BRIEF HISTORY OF UBTH CANCER REGISTRY

The University of Benin Teaching Hospital Cancer Registry commenced effective data collection in January 2008. The Hospital Cancer Registry Committee was inaugurated by the then Chief Medical Director of the Hospital, Professor E. E. Okpere in 2007. The Committee was headed by the then Chairman, Medical Advisory Committee, Professor M.O. Ibadin with Professor M.N. Okobia as the Co-ordinator and Dr. D.E. Obaseki as Deputy Coordinator. The Committee held a series of meetings and carried out feasibility studies between October and December 2007. A cancer registry sensitization workshop was organized on September 6, 2007 at the premises of the hospital.

UBTH CANCER REGISTRY Is Also A Member Of The MDT. (Multi-Disciplinary Team) For Cancer Management In The Hospital.

UBTH CANCER REGISTRY STAFF STRENGTH AS AT 2018:

COORDINATORS

1.	DR. D.E. OBASEKI	-	Coordinator, Cancer Registry
2.	DR. G.D. FORAE	-	Deputy Coordinator, Cancer Registry
3.	DR. A.G. OKO-OBOH	-	Asst. Coordinator, Cancer Registry

SUBSTANTIVE STAFF

1.	MRS. AIGBEDION OSAS. R.	-	Snr. Data Processing Officer
2.	MR. EMUAKEMEH ALEXANDER O.	-	Senior. Data Processing Assistant I
3.	MRS. OGBE OGHENEOVO GRACE	-	Senior Data Processing Assistant II
4.	MRS. OSAIGBOVO F.U.	-	Senior Data Processing Assistant II

CANCER TRENDS IN BENIN-CITY NIGERIA:

A SIX-YEAR REPORT OF THE BENIN CANCER REGISTRY-

A POPULATION BASED ANALYSIS

(2009-2014)

AUTHORS

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Citation

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registry- A Population Based Analysis (2009-2014): The Benin Cancer Registry (BCR) Report 2015.

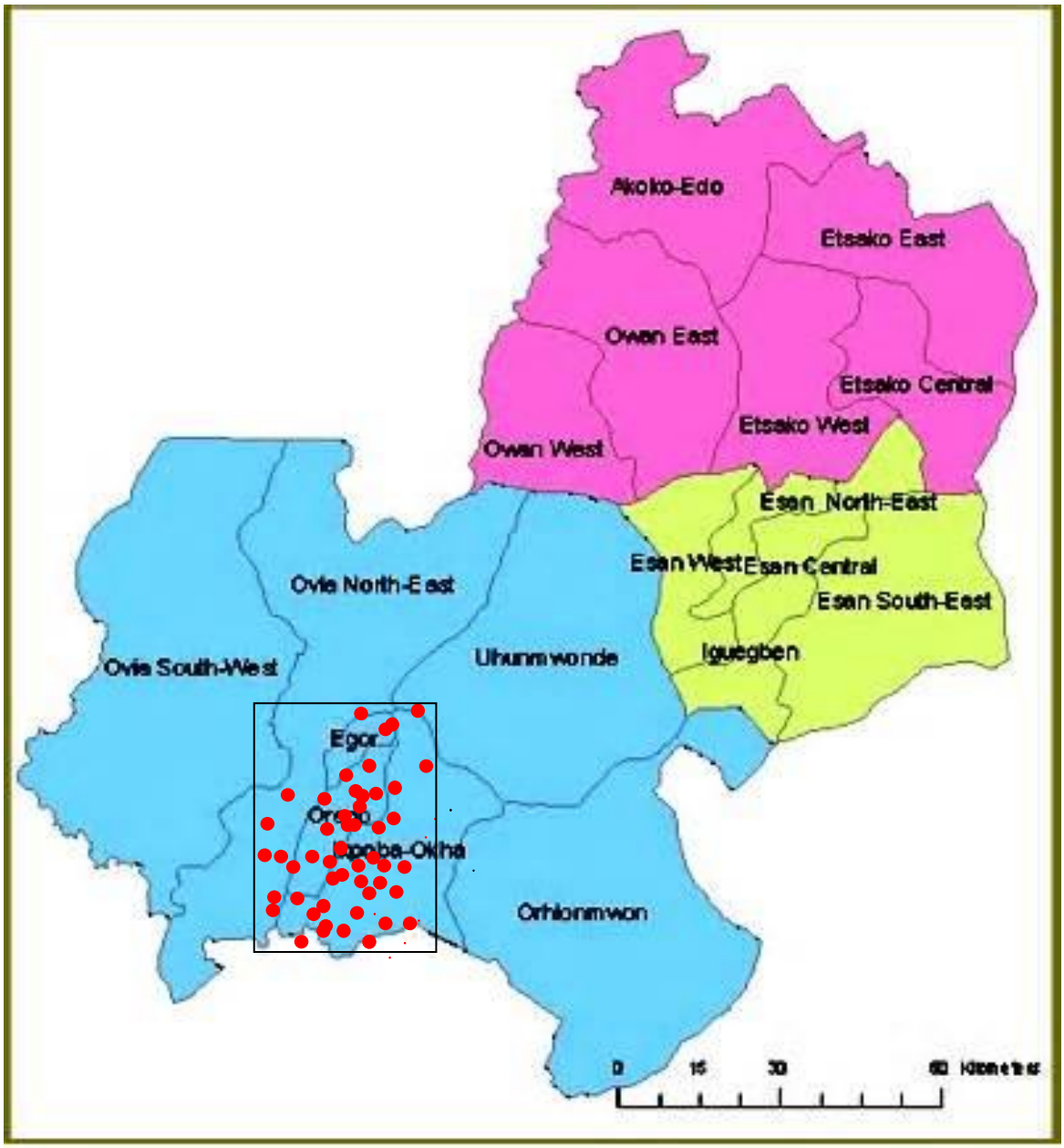
ISBN:…….

Map of the Federal Republic of Nigeria


NIGER
CHAD
Niamey
Zinder
Tschad-see
Sokoto
Niger
Komadugu Yobe
Katsina
Jigawa
Zamfara
Kano
Yobe
Borno
BURKINA FASO
Kebbi
Maiduguri
Kano
BENIN
Kaduna
Bauchi
Kaduna
Gombe
Niger
Adamawa
Garoua
CHAD
Abuja
1
Plateau
Kwara
Benue
Oyo
Nassarawa
Ibadan
Osun
Ekiti
Kogi
Taraba
Benue
Ogun
Ondo
Lagos
Edo
3
Ebonyi
Porto Novo
Lagos
Benin-Stadt (Benin City)
2
Niger
Abia
Cross River
Delta
Imo
CAMEROON
Atlantic
Ocean
Rivers
4
Bayelsa
Port Harcourt
1. Federal Capital
2. Anambra
3. Enugu
4. Akwa Ibom
Capital City
National Border
State Border
0
100
200
km

Map of Edo State of Nigeria

Showing the population area covered by the registry in red dots



FOREWORD

The Benin Cancer Registry **(BCR)** was first inaugurated in July 2007 as an initiative of the management team of the University of Benin Teaching Hospital (UBTH) under the headship of the then Chief Medical Director, Prof E. E. Okpere, who appointed Prof M.O. Okobia as the pioneer coordinator. It was initially designed as a hospital based registry to collect, collate and analyze data on all cancers seen within the hospital with a mission statement of providing efficient and reliable cancer data/records for monitoring, evaluation, planning, policy and screening of the population at risk for cancers. The registry was listed and awarded individual membership in January 2008 by the International Association of Cancer Registries (IACR).

The mission statement is in line with the aims and objectives of this publication. **'Cancer trends in Benin-City, Nigeria: A six years population based study (2009-2014).**' This includes a comprehensive analysis of data generated by the Benin cancer registry.

This publication presents the different **frequencies in relation to age, sex, occupation, marital status, types of diagnoses, treatment modalities, topographic patterns and histological diagnostic patterns including variants** of all cancer cases. Furthermore the study affords us the opportunity to know the **average annual crude incidence rate (CR)**, the **age standardized incidence rate (ASR) and** the **mortality patterns** documented within the population study group.

This comprehensive report would be useful to all stakeholders actively involved in cancer care and management in this clearly defined population. This will also help in health policy formulation and for further research and advocacy.

Prof. M.I. Momoh

Dean, School of Medicine

THE AIMS AND OBJECTIVES OF THE BENIN CANCER REGISTRY

1. Compilation and Documentation of all cases of cancer within the study population
2. Screening of the study population to ascertain those at risk of developing cancer

3. To analyze all frequencies and pattern distribution of cancer cases seen and the average annual crude incidence rate (CR), the age standardized incidence rate (ASR) and the mortality patterns documented within the population study group reported by the Benin cancer registry using the CANREG-4 software and the International Classification of Diseases for Oncology (ICD-10) coding system.
4. To institute a follow-up mechanism for all cases of cancer.
5. To use the cancer registry information to create an enabling framework for the formulation and sustenance of public enlightenment campaign for early detection, treatment and prevention of cancer.
6. To provide data for research and further studies.

ACKNOWLEDGMENT

The cancer registry wishes to sincerely thank the management of this hospital under the dynamic leadership of the immediate past Chief Medical Director, Professor M.O. Ibadin who chaired the standing committee then as the Chairman Medical Advisory Committee (CMAC) with a clear mandate of starting the UBTH cancer registry. He spared no efforts or resources in facilitating the work of the registry and upgrading this registry to a population based facility.

Furthermore we also wish to thank all past coordinators (Prof M. Okobia and Prof C. Osime) and the present coordinator- Dr D.E. Obaseki who is currently the Chief Medical Director of UBTH. The authors are grateful to past and present members of the Benin cancer registry and all cancer Oncologists for their contribution to the growth of this unit.

The authors are grateful to Medical Directors, Consultants and other members of staff of Central Hospital, Stella Obasanjo's Hospital, St. Philomena Catholic Hospital, Prof J.U. Aligbe of Department of Pathology UBTH and Ashamas Clinic, Biogenics Pathology Services located in Benin-City. We also acknowledged other public and private hospitals and laboratories too numerous to mention within the Benin metropolis.

We wish to also thank the present and past Heads and staff of the Departments of Surgery, Pathology (Morbid Anatomy), Internal Medicine, Obstetrics and Gynaecology, Haematology, Child Health, Radiology, Radiotherapy and Dentistry of the University of Benin Teaching Hospital for their numerous support. We are also grateful for the cooperation of the Head and staff of the Medical Records Department of UBTH.

We also want to specially appreciate the invaluable contribution of the Nigerian National System of Cancer Registries (NSCR) under the headship of Prof Clement Adebamowo and all his staff for playing pivotal roles in the training of the Benin Cancer Registry (BCR) data abstractors and analysts.

We wish to thank all the Staff of the Benin cancer registry unit for their indefatigable efforts and supports in compiling these data.

We wish to appreciate the Authors who have consulted widely and have worked tirelessly in carrying out this meticulous research work.

We wish to recommend this publication to all stakeholders involved in cancer management and for further research purposes.

TABLE OF CONTENT

BACKGROUND

The immediate area covered by the Benin cancer registry is the Benin-City metropolis and its surrounding environment. Benin-City is located in Edo state of Nigeria. There are 3 senatorial districts in Edo state which include: (I) Edo south senatorial district (II) Edo central senatorial district and (III) Edo north senatorial district.

The Edo south senatorial district includes Egor, Oredo, Ikhoba-Okha, Ovia North-East, Ovia South-West, Uhunwonde and Orhionmwon local government areas. The Edo central senatorial district includes Esan Central, Esan North-East, Esan South-East, Esan West and Igueben local government areas while Edo North senatorial district is made up of Etsako Central, Etsako West, Etsako East, Owan East, Owan West and Akoko Edo local government areas. (Figure 2)

According to the 2006 population census, Edo state has a geographic land mass area of 17450 km^2 with a population of 3,218,332 which comprises of 1,640,461 males and 1,577,871 females. The demography of Benin-City is cosmopolitan, with majority as the Binis and a substantial population of Ibos, Yorubas, Hausas, Esans, Urhobos and people of other neighbouring ethnicity. The major religions include Christianity, Islam and African traditional religion. However Christianity is the dominant religion.

CHAPTER ONE

EXECUTIVE SUMMARY

BACKGROUND

The Benin cancer registry (BCR) report is one of the first population based cancer incidence report from south-south geopolitical region of Nigeria. This cancer incidence report covers a six year period of January 2009 to December 2014. The BCR collates data of all new cases of cancer diagnosed in the cosmopolitan population of Benin-City and the adjoining environment.

INTRODUCTION

The importance of cancer registry in the growing Nigerian population cannot be overemphasized. This is one of the first reports of cancer incidence from this region. Information on cancer registry is relevant to evaluation of frequency distribution pattern, occurrence, trends, histological types and grading of different cancers. It also estimate the age standardized incidence rates and cancer mortality in our environment. The World Health Organization specialized cancer research agency known as (IARC), has documented in GLOBOCAN 2012 report that there was an estimated 14.1 million new cases of cancer globally. Again GLOBOCAN has also predicted a substantive increase to 19.3 million new cases per year in the year 2025 globally.

MATERIALS AND METHODS

This cancer incidence report covers a six year period from January 2009- December 2014. In Nigeria, cancer is not a notifiable disease hence all cancer cases are actively sourced for on a regular basis by the Benin Cancer Registry staff with regular visit to more than 20 data sources. These sources include cancer related departments of government teriary hospitals, government and private secondary and primary healthcare centres and other diagnostic histopathology laboratories. Yellow coded cards were

completed with cancer data of each new case on every scheduled visit after a thorough scrutiny of the records. The extracted information is transferred into appropriate cancer registry data using the international Classification of Diseases-oncology (ICD-O) coding system. The data were analysed using the computerized statistical software package CANREG-4.

RESULTS

General: A total of three thousand and ninety (3090) new cases of cancer were reported over a 6 year period of 2009-2014. Out of these 3090 cases, 1258 and 1832 cancer cases were seen in males and females respectively. The male to female ratio thus stand at 1.0:1.5.

Incidence Rates: The overall standardized age adjusted cancer incidence rate for male and female is 60 per 100,000 and 79 per 100,000 respectively. In females, the most frequently reported cancers include breast cancer (35.4%), cervical cancer (16.5%), ovarian cancer (2.9%), colo-rectal cancer (2.9%), non-melanoma skin cancer (1.9%). The **average annual crude incidence rate (CR)** and the **age standardized incidence rate (ASR)** for breast cancer was 16.7 per 100,000 population and 25.4 per 100,000 population respectively.

In males, the most common cancers include prostate cancer (36.3%), colorectal 5.3%, non-melanoma skin cancer (3.4%), bladder (2.3%), oesophagus (1.8%), liver (1.8%) and stomach (1.7%) of all male cancers. The incidence rate of prostate cancer in males is 24 per 100,000.

Cancer Mortality Patterns: A total of 3,858 deaths (mortality) from all cancer and non-cancer cases were recorded between 2009 and 2014. Of these, only 379 were cancer mortality (primary disease) which accounted for 9.8% of all recorded mortality. Again out of the 3090 total cancer cases seen during this period, cancer mortality accounted for 379 (12.3%) of all cancer cases. Among the 379 cancer mortality recorded, 221 (58.3%) deaths were recorded in females and 158 (41.7%) deaths in males. The

female to male mortality ratio is 1.4:1.0. The five most common causes of cancer mortality in females and males are shown in graphic pattern in figure 5. Among the female cancer mortality include breast, liver, colorectal, cervical and ovarian cancers accounting for 28.1%, 11.7%, 9.0%, 8.1% and 5.9% respectively. The five most common causes of cancer mortality in males include prostatic, colorectal, pancreatic, liver and gastric cancers. This constituted 25.9%, 18.4%, 9.5%, 8.9% and 7.0% respectively. The other causes of cancer mortality for females and males is seen in table 10

CONCLUSION

This population based report from the Benin cancer registry is the first of its kind in this region. The importance of this cancer registry report is to provide more insight into the exact standardized age adjusted incidence rate of the various cancers with emphasis on the common cancers incidence in males and females and mortality patterns. This hopefully will allow us to compare our findings with other population based studies locally and globally.

CHAPTER TWO

INTRODUCTION

Benin-City is the capital of Edo state. It is located at longitude 5^{o} 37' and latitude 6^{o} 20' north of the equator. It is a major commercial centre in Southern Nigeria and ranked among the top ten most densely populated cities in Nigeria. It is estimated that the total estimated population of Benin-City is about 1,400,000 million people by 2015.

Benin Cancer Registry (BCR) is situated at the University of Benin Teaching Hospital, (UBTH) Benin-City. UBTH is the sixth of the first generation teaching hospitals in Nigeria and a renowned centre of excellence for oncology practice in Southern Nigeria. It is located in the geographically strategic city of Benin to provide secondary and tertiary health care to the people of Edo, Delta, Ondo, Anambra, Kogi, Bayelsa and other neighbouring states.

The BCR was initially a hospital based registry that has since been upgraded to a population based one covering the Benin City metropolitan area. The 2008 UBTH annual cancer report of the registry which constitutes the first cancer data in the registry was retrospectively compiled and published by the first co-ordinator of the cancer registry, Prof M.O. Okobia.

In Nigeria, cancer is not amongs the notifiable diseases, therefore cancer data collection within this geographic location is actively carried out on a regular basis by the Benin Cancer Registry Staff. The importance of cancer registry in the growing Nigerian population cannot be over-emphasized. This is one of the first reports of cancer incidence from this geo-political region. Information on cancer is relevant for evaluation of frequency distribution pattern, occurrence, trends, histological types, grades of different cancers, age standardized incidence rates and cancer mortality in this environment.

Over the last 2 decades there has been an increase in awareness of registration of cancer cases in most health facilities in the African sub-region that normally screen the population at risk for cancer cases. Hence some of the data from such African cancer registries have immensely contributed valuable figures for the estimation of cancer burden in Africa population. The World Health Organization specialized cancer research agency known as IARC has documented in GLOBOCAN 2012 an estimated 14.1 million new cases of cancer.[1,2] This is an upsurge from 12.7 new cases reported in the 2008 GLOBOCAN document.[1,2] Again GLOBOCAN has also predicted a substantive increase to 19.3 million new cases per year in the year 2025.[2] This may be attributable to growth and aging of the global population.[2,3]

The objective of this report is to provide information on the prevailing cancer patterns in the clearly delineated population of Benin-City metropolitan area. The BCR primary concern is to assess the incidence of cancer burden and mortality patterns in the population residents in the defined geographic region within the Benin-City metropolis and the environs as well as describing data on cancer incidence, planning and evaluation.

CHAPTER THREE

MATERIALS AND METHODS

GEOGRAPHIC LOCATION AND POPULATION DISTRIBUTION

The BCR is a population based registry covering the entire population of Egor LGA (population=340,287) (Area 93km^2), Oredo LGA (population=374,515) (Area=249km^2) and Ikpoba-Okha LGA (population=372,080) (Area=494km^2) according to the 2006 national census figures.[4] The total area covered is 714km^2 with a total population of 1,086,882 persons comprising the entire Benin-City metropolitan area and its environs. The estimated population of Benin-City in 2015 is about 1,400,000 people. It is one of the major commercial cities in Nigeria. Edo state has a geographic land mass area of 17450 km^2 with a population of 3,218,332 which comprises of 1,640,461 males and 1,577,871 females.[4]

CANCER DATA SOURCING

Cancer cases are actively sourced for by the BCR staff, by regularly paying scheduled visits to more than 20 data sources. These sources include cancer related departments of government tertiary hospitals, government and private secondary and primary hospitals and diagnostic laboratories. Cancer registry staff including cancer data abstractors and clerks were locally recruited and trained on the Principles and Practice of Cancer Registration in addition to practical hands-on training on techniques of data abstraction from patients' records. The need to ensure confidentiality in the handling of cancer registry data was emphasized during the training. We sought registration with the International Association of Cancer Registries (IACR) and we were awarded individual membership in January 2008.[5,6] The yellow coded cards were completed with cancer data for each new cases on every schedule visits after thorough scrutiny of the records.

DATA ANALYSIS

The abstracted information is transferred into appropriate cancer registry data using the ICD-O coding system. Training of cancer registry staff was done in different training workshops organized by the National system of cancer Registries (NSCR), Abuja on the use of the computerized statistical software package CANREG-4. This software has provisions for detecting duplicate registrations and performing automatic checks on the validity of the entered data. The primary site and morphology data were coded by the software by using the International Classification of Diseases for Oncology (ICD-O, 2nd ed.)[7] Information on other variables were like-wise coded as advised by IARC.[1,2,7] Data entry and analysis were carried out using a customized version of the CANREG-4 software provided by IARC.

Cancer cases diagnosed are identified and recorded. The cases registered include all invasive cancers in the ICD-10 categories ranging from C00 to C95.[2,7] *In situ* carcinoma and other precancerous lesions are not registered. The information collected included age, sex, religion, tribe, occupation, date of incidence, basis of diagnosis, primary site, histology, clinical extent of disease, treatment details. The population of the registry area at risk by sex and 5-year age group was estimated based on the census reports of 2006.[4] This study report the results for the period 2009-2014 only. The results are presented as the number of cases by site (ICD-10) and sex, with crude incidence rates (CR), age-specific incidence rates and age-standardized incidence rates (ASR) per 100,000 person-years, performed by direct method using the world standard population.[4,7]

CHAPTER FOUR

RESULTS

FREQUENCY AND ANNUAL DISTRIBUTION PATTERN OF CANCER CASES

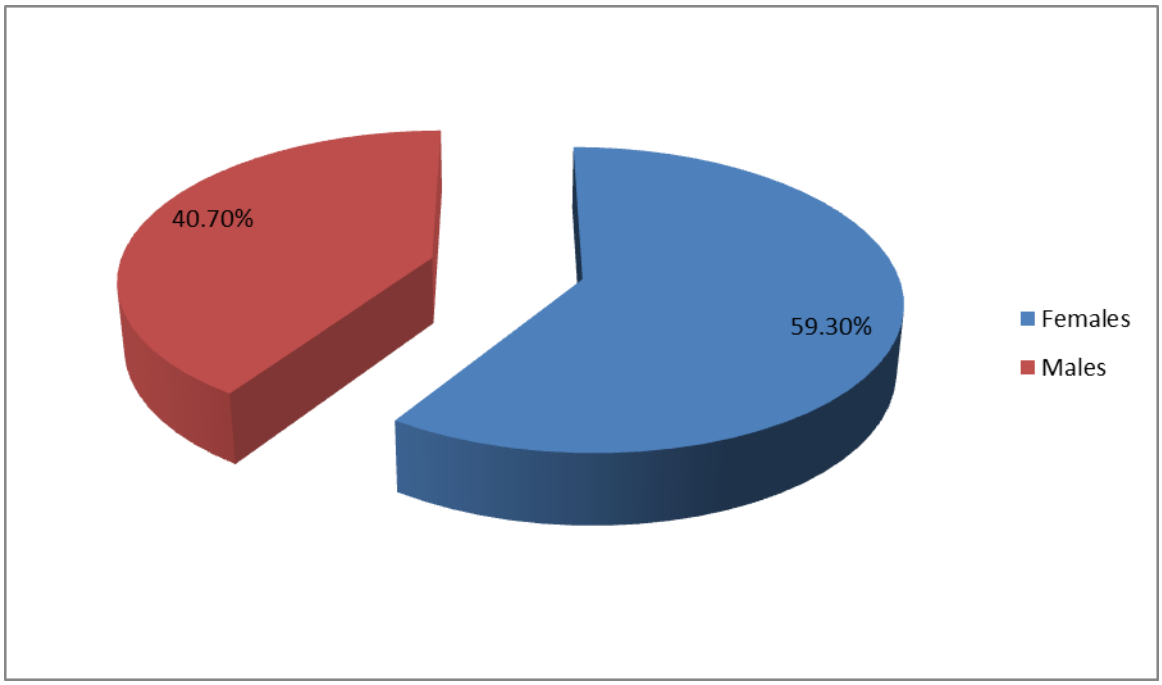
A total of three thousand and ninety (3090) new cases of cancer were reported over a 6 year period of 2009-2014 in the Benin cancer registry of the University of Benin Teaching Hospital. Table1 and figure 1 show the sex distribution of all reported cases. Out of the 3090 cases, 1258 (40.7%) and 1832 (59.3%) cancer cases were seen in males and females respectively. The male to female ratio is 1.0:1.5

The yearly distribution trend shows the highest number of cases with 903 cases accounting for 29.2% while the lowest number of cases was reported in 2012 with 236 cases representing 7.6%.

Table 1: Annual cancer Distribution by Sex over 6 years

	Confirmed		
	Unknown	Male	Female	Total
2009	0	270	401	671
2010	0	362	541	903
2011	0	208	276	484
2012	0	97	139	236
2013	0	212	282	494
2014	0	109	193	302
	0	1258	1832	3090

Figure 1: Frequency Distribution of Cancer by sex



FREQUENCY DISTRIBUTION PER YEAR PER MONTH

The monthly frequency distribution shows that the month of March has the highest number of cancer cases accounting for 400 (13%) of all cases while the month of September and December recorded the lowest turn-out of cancer cases. This constituted the respective sum of 192 and 191 cases and a total of 12.4% of all cancer cases. (Table 2)

Table 2: Frequency distribution of cancer cases per year per Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOT
2009	39	98	86	54	61	54	56	61	39	33	45	45	671
2010	74	96	116	52	59	71	94	88	59	81	46	67	903
2011	59	46	82	28	38	43	29	45	31	33	21	29	484
2012	20	22	20	21	18	16	26	16	19	15	24	19	236
2013	29	46	50	64	71	34	44	23	25	43	36	29	494
2014	51	31	46	46	30	20	7	2	19	13	35	2	302
	272	339	400	265	277	238	256	235	192	218	207	191	3090

DIAGNOSIS BASED ON MARITAL AND OCCUPATIONAL STATUS

Cancer cases were more commonly diagnosed among the married group. A total of 2626 accounting for 85.0% of cancer cases were reported among those who are married as seen in table 3. The rest cancer cases accounting for 15.0% were seen in the unmarried group. Among the listed occupation in table 4, businessmen and women have the highest cancer population accounting for 955 (30.9%) cases. This was followed by self-employed which constituted 452(14.6%). Retired workers and civil servants accounted for 291(9.4%) and 288(9.3%) cancer cases respectively. The reason for this high rate among businessmen/women and self employed individuals may be attributed to probably high rates of occupational and environmental exposure to carcinogenenic agents.

Table 3: Number of cases per year per Marital Status

		2009	2010	2011	2012	2013	2014	TOT
1:	Married: 1:	568	764	439	181	411	263 :	2626
2:	Single: 2:	55	81	35	30	61	28 :	290
3:	Divorced: 3:	2	6	2	3	2	1 :	16
4:	Seperated: 4:	45	16	5	22	19	10 :	117
	Missing:	1	36	3	0	1	0 :	41
								3090

Table 4: Number of cancer cases per year per Occupation

		2009	2010	2011	2012	2013	2014	TOT
1:	Farmer: 11:	88	71	19	21	13	16 :	228
2:	Policeman: 12:	0	4	16	2	3	2 :	27
3:	Doctor: 13:	4	3	14	0	0	4 :	25
4:	Lawyer: 14:	4	6	17	0	0	1 :	28
5:	Engineer: 15:	9	3	12	5	3	1 :	33
6:	Architect: 16:	0	3	3	0	2	2 :	10
7:	Accountant: 17:	2	6	1	2	2	3 :	16
8:	Buisnessman: 18:	321	199	141	79	152	63 :	955
9:	Teacher: 19:	17	13	7	1	12	8 :	58
10:	Tailor: 20:	4	4	4	3	4	1 :	20
11:	Driver: 21:	11	28	5	3	2	1 :	50
12:	Hairdresser: 22:	14	8	1	2	3	0 :	28
13:	Banker: 23:	4	7	1	2	4	2 :	20
14:	Nurse: 24:	5	13	1	1	3	5 :	28
15:	Civil Servant: 25:	60	58	46	52	37	35 :	288
16:	Self Employed: 26:	28	63	113	26	148	74 :	452
17:	Retired: 27:	65	62	49	21	47	47 :	291
18:	Unknown: 99:	32	254	31	15	36	33 :	401
	Missing:	3	98	3	1	23	4 :	132
								3090

BASIS OF DIAGNOSIS

Cancer cases were determined on the basis of diagnosis. The most common basis of diagnosis was through histological diagnosis accounting for 92.8% of all cancer cases documented. Histological diagnosis of primary cancer constituted 90.4% while histological diagnosis of metastatic cancer accounted for 2.4%. Autopsy diagnosis accounted for 0.9% of all cases. Other less common methods of basis of diagnosis are documented in table 5.

Table 5: Number of cases per year per Basis of diagnosis

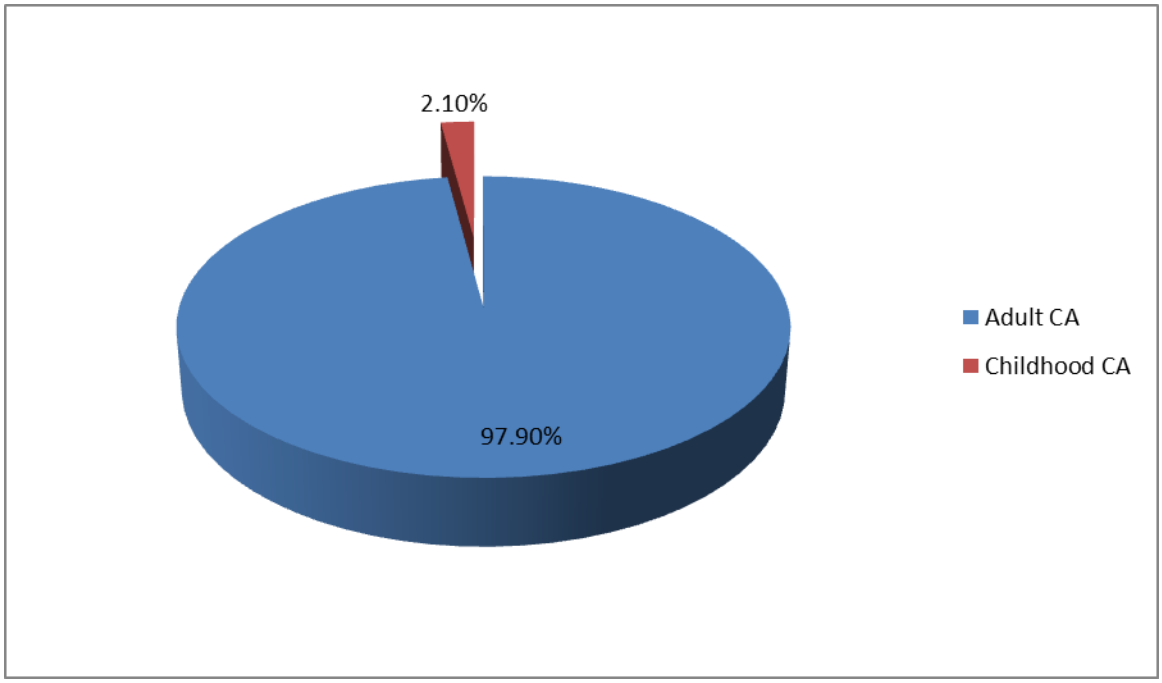
			2009	2010	2011	2012	2013	2014	TOTAL
1:	Death Certificate Only:	0:	0	0	0	0	0	0 :	0
2:	Clinical only:	1:	1	1	0	16	71	1 :	90
3:	Clin. Invest./Ult Sound:	2:	0	0	0	2	1	0 :	3
4:	Surgery/Autopsy:	3:	0	0	0	3	0	0 :	3
5:	Laboratory test:	4:	0	1	12	16	12	36 :	77
6:	Cytology:	5:	0	3	1	2	0	1 :	7
7:	Histology of metastases:	6:	15	6	3	9	9	32 :	74
8:	Histology of primary:	7:	651	878	467	188	378	231 :	2793
9:	Autopsy/Histology:	8:	1	3	1	0	23	1 :	29
10:	Unknown:	9:	3	11	0	0	0	0 :	14

									3090

TOP CANCER IN CHILDREN/ADOLESCENTS AND ADULTHOOD

A total of 65 cancer cases were seen in Children and Adolescents below the age of 19 years within this period of study which represents 2.1% of all cancer reported. Majority of the cancer cases were seen in adulthood above the age of 19 years accounting for 97.9% as seen in figure 2.

Figure 2: Cancer frequency distribution in children and adult



STANDARDIZED INCIDENCE RATES

Standardized incidence rate is calculated from the proportion of new cases per 100,000 of the population at risk in a specific given time. This can best be derived from a population based cancer registry. The overall age adjusted incidence rate for male and female is 60 per 100,000 and 79 per 100,000 respectively. The **average annual crude incidence rate (CR)** and the **age standardized incidence rate (ASR)** for breast cancer was 16.7 per 100,000 population and 25.4 per 100,000 population respectively. The incidence rate of prostate cancer in males is 24 per 100,000 as seen in tables 6 and 7 (Appendix)

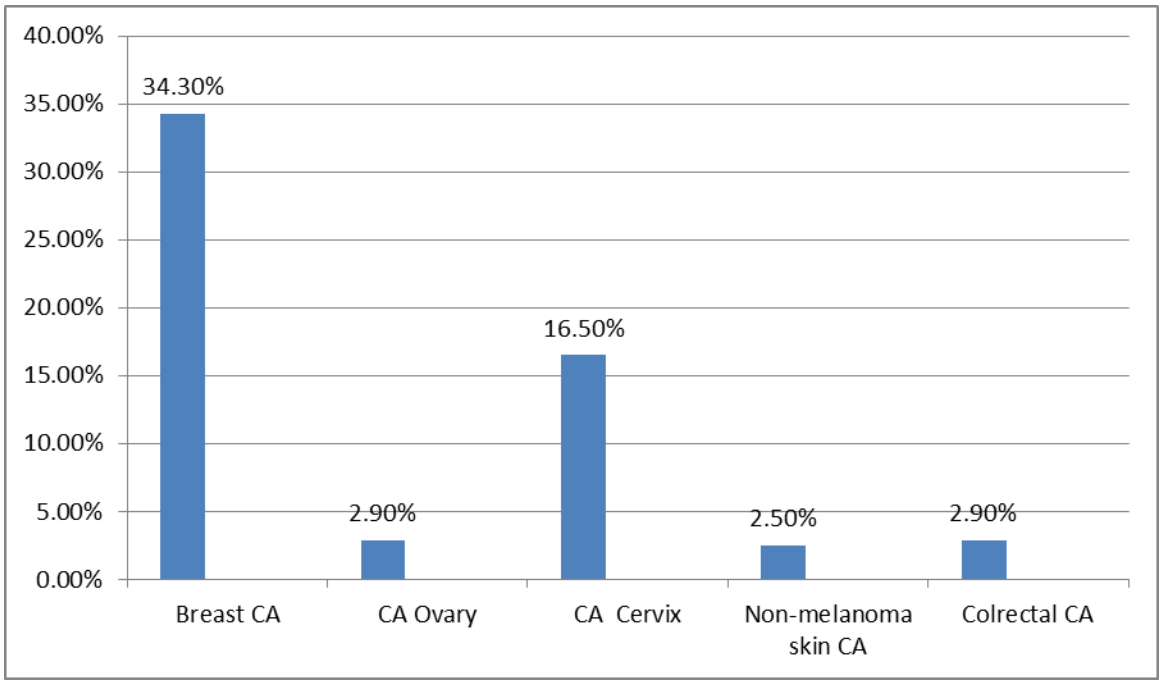
DIAGNOSIS BASED ON TOPOGRAPHY

Table 8 (see appendix) shows the general overall annual topography distribution of all cancer cases using the ICD-10 coding system. The breast has the highest topographic site distribution for both cancer cases accounting for 649(21.0%). This is closely followed by the prostate gland with 457(14.8%) cases while abdomen had 326 cases which represent 10.6% of the topographic distribution.

TOP CANCERS IN FEMALES

This study has shown that breast cancer is the most common cancer with 649 cases accounting for 21% of all cancer cases and 35.4% of all female cancers. Cancer of the cervix is the second most common female cancer with 302 thus constituting 9.8% of all cancer cases and 16.5% of all female cancer cases as seen in tables 7, 8, 9 in appendix and figure 3. Among the morphologic types of breast cancers, carcinoma of the breast (NOS) constituted 443 cases accounting for 68.3% of all cases. Comparing the two top cancers in females, it becomes apparent that, on the average, there are 2 breast cancers cases for every 1 cervical cancer cases in this locality. Other common female cancers include cancer of the ovary (2.9%), colorectal (2.9%) nonmelanoma skin cancer (1.9%).

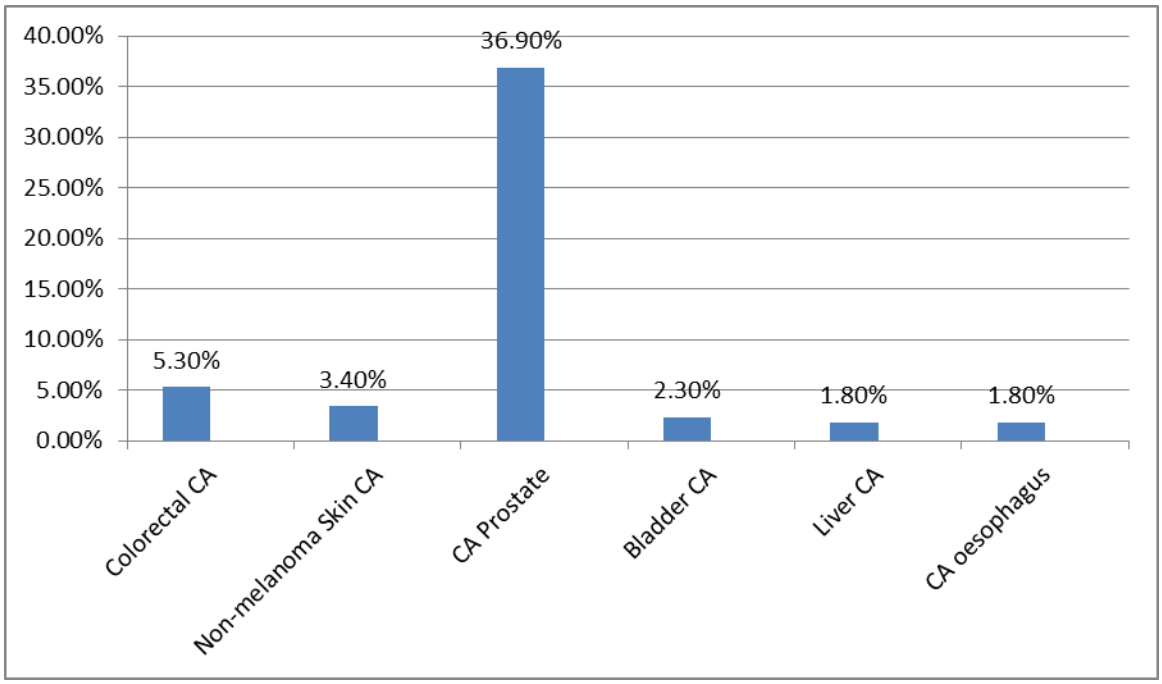
Figure 3: Frequency of the six most common cancers in females



TOP CANCERS IN MALE

Our study showed that prostate cancer is the second most common cancer overall. There are 457 cases constituting 14.8% of all cancers. Again prostate cancer is the most common male cancer accounting for 36.3% of male cancers. See tables 6, 8, 9 in appendix and figure 4. Other top cancers in males include colorectal cancer 5.3%, non-malignant melanoma skin cancers (3.4%), bladder (2.3%), oesophagus (1.8%), liver (1.8%) and stomach (1.7%) of all male cancers.

Figure 4: The frequency of the six most common cancers in Male



CANCER MORPHOLOGY

Morphologically, carcinomas are the most common cancers seen in this study accounting for a total of 808 out of 3090 cases which represent 26.1% of all cancers.Of these 808 cases of carcinoma, 737 were carcinoma not otherwise specified (NOS) while the other variants accounted for the rest. A total of 300 adenocarcinoma cases were seen during this period which accounted for 9.7% of all cancer cases. In all 300 adenocarcinoma cases, 275 (91.7%) were adenocarcinoma (NOS). Squamous cell carcinoma accounted for 114 cases (3.7%) of all 3090 cancers cancers.

Lymphomas and sarcomas including Kaposi sarcoma are less commonly encountered accounting for 1.1% and 0.8% of all cancer cases respectively. The other frequency of other morphological types of cancers morphology is documented in table 9 in appendix.

CANCER MORTALITY PATTERNS

A total of 3858 deaths (mortality) were recorded in UBTH during the study period of 2009-2014. Of these, 379 deaths were as a result of cancer (primary disease). Cancer deaths therefore account for 9.8% of all recorded deaths. Out of the 3080 total cancer cases seen during this period, 12.3% of this is associated with mortality. Among 379 cancer deaths recorded, 221 (58.3%) cases are recorded in females and 158 (41.7%) cases in males giving a male to female of 1:1.4. The most common cancers causing death among females are those of breast, liver, colorectal, cervix and ovaries accounting for 28.1%, 11.7%, 9.0%, 8.1% and 5.9% respectively. The five most common cancer mortalities in males include prostate, colorectal, pancreatic, liver and stomach cancers. This constituted 25.9%, 18.4%, 9.5%, 8.9% and 7.0% respectively. The other causes of cancer mortality for females and males is seen in table 10

Figure 5: Five most common cause of Cancer Mortality in Females and Males

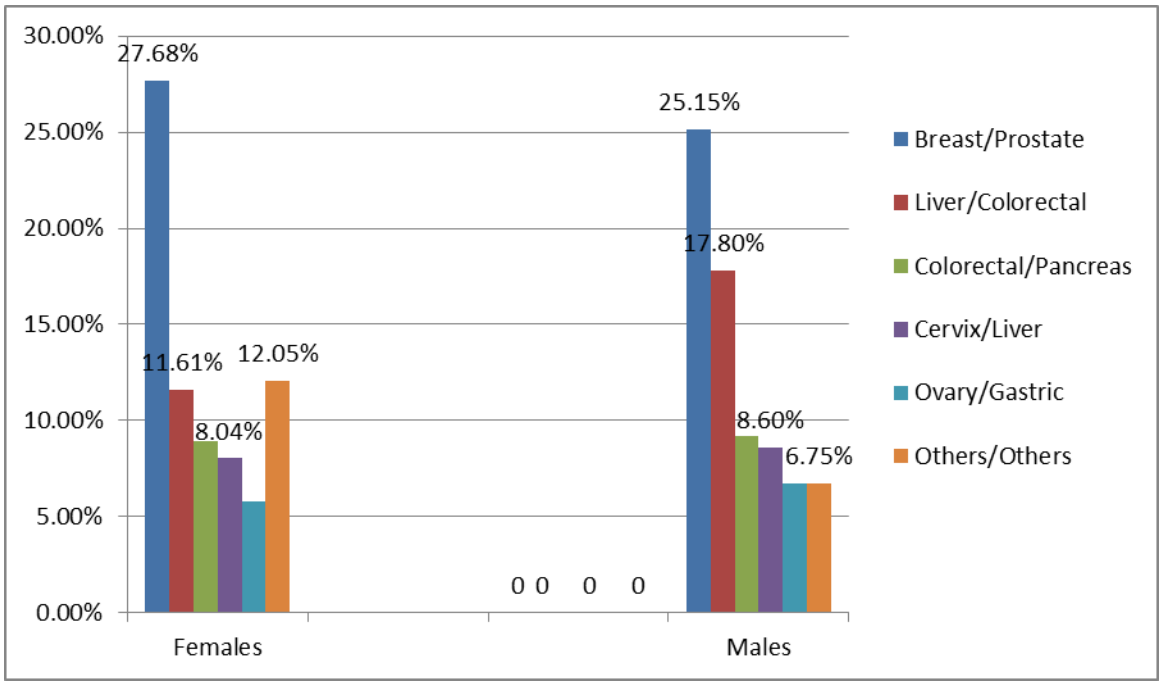


Table 10: Major causes of cancer mortality in males and females 2009-2014

Cause of death	Females		Cause of death	Males	
	No	%		No	%
Breast	62	27.68%	Prostate	41	25.15%
Cervix	18	8.04%			
Ovary	13	5.80%	Liver PLCC/GB CA	14	8.60%
Choriocarcinoma/GTDs	4	1.79%	Oesophagus	10	6.13%
Non-Hodgkin's lymphoma/Leukemia	8	3.57%			
Liver/PLCC	26	11.61%			
Pancreas	11	4.91%	NHL/Leukemia	7	4.30%
Colon, rectum and anus	20	8.93%	Pancreatic	15	9.20%
Endometrium	3	1.34%	Brain	1	0.61%
Soft tissue sarcoma	5	2.23%	Larynx	2	1.23%
Stomach	12	5.36%	Colon, rectum and anus	29	17.80%
Lung/Bronchogenic	3	1.34%	Bronchogenic/Lung	7	4.29%
Larynx	1	0.45%	Non-Hodgkin's lymphoma/Leukemia	7	4.29%
KS(HIV Associated)	4	1.78%	KS(HIV Associated)	1	0.61%
Nasopharynx/Sinonasal	2	0.89%	Connective and soft tissues sarcoma	2	1.23%
Brain	2	0.89%	Multiple myeloma	1	0.61%
Esophagus	3	1.34%	Stomach/Gastric	11	6.75%
Multiple myeloma	-	-	Bladder	4	2.45%
Others	27	12.05%	Others	11	6.75%
Total	**224**	**100.00%**	**Total**	**163**	**100.00%**

CHAPTER FIVE

COMPARATIVE ANALYSIS OF FINDINGS AND DISCUSSION

The importance of cancer registry in the growing African population cannot be overemphasized. Information on cancer registry is key to evaluation of frequency distribution pattern, occurrence, trends, histological types and grading of different cancers. It is also important in the assessment of age standardized incidence rates and mortality patterns in our environment. Over the last 2 decades there has been an increase in awareness of registration of cancer cases in most health facilities in the African sub-region that normally screen the population at risk for cancer cases. Some of the data from such African cancer registries have immensely contributed to the estimation of cancer burden in the African population.[6,8,9] The Benin Cancer Registry is one of few such registries that have provided vital cancer records for the teaming cosmopolitan population of the this region.

The World Health Organization specialized cancer research agency, the International Agency for research on Cancers (IARC) have documented in GLOBOCAN 2012 report an estimated 14.1 million new cases of cancer. This is an upsurge from 12.7 new cases reported in the 2008 GLOBOCAN document. GLOBOCAN has predicted a substantial increase to 19.3 million new cases per year by 2025. This may be attributable to growth and aging of the global population.[6,9]

Over the six-year period of this report, a total of 3090 new cases of cancer were diagnosed. This is exclusive of all cases of carcinoma-in-situ and other premalignant conditions. Females were reported to have more cancer cases in the population than males as seen in table 1 and figure 1. Hence the ratio of male to female cancer cases is 1:1.5. The reflection of more female cancer cases in this report is similar to reports from other parts of Africa and the World where more cases of cancers were documented in the female population than in the males.[9,10,11]

The frequency of diagnosis of cancer by histology in our report is 92.8%. This is relatively high when compared to studies from other African studies like Uganda and Zimbabwe where diagnosis by histology accounted for 59% and 64% respectively. In this study cancer cases were noted to be fewer in the last quarter of the year. The low September and December figures may be attributed to low hospital patronage due to vacation and back-to-school expenses, busy schedules during the festive periods with attendant reduced hospital visitations.

In our study breast cancer accounted for the most common cancer overall, it constitutes 21% of all new cancer cases and 35.4% of all female cancers in this population. There is a steady increase in the age distribution from late thirties to late seventies with a peak age bracket of 55-59 years. This is similar to what is reported globally where breast cancer is the most commonly diagnosed female cancer with an estimated 1.7 million new cases (11.9%) diagnosed annually (GLOBOCAN 2012),[1,12] and second to lungs cancer which account for 1.8 million new cases yearly (13%) globally.[1,11,12]

In this report, the **average annual crude incidence rate (CR)** and the **age standardized incidence rate (ASR)** for breast cancer was 16.7 per 100,000 population and 25.4 per 100,000 population respectively (Figure 7 appendix). This is very similar to previous report from Ibadan, South Western Nigeria where breast cancer was the most common female cancer with for age standardized incidence rate of 25.3 per 100,000.[6,8,9,13] Furthermore, similar findings have also been documented in Brazaville Congo in Central Africa where the age standardized incidence rate of 22.5 per 100,000 was reported. However, in other African countries the age standardized incidence rates varies widely.[11,14]

Previous reports from Oran, Algeria in North Africa documented a much higher age standardized incidence rate of 34.5 per 1000,000 population.[14] Again the highest age standardized incidence rate in Africa population was documented in White females in Harare, Zimbabwe where the age standardized

incidence rate is 121.2 per 100,000 population.[15,16] Furthermore, previous reports from the white population of South Africa have also shown a relatively high age standardized incidence rate of 62.8 per 100,000 population.This is contrary to reports of similar studies done in black females in Harare Zimbabwe where the age standardized incidence rate is 19.8 per 1000,000 population sample.[15,16] Howerver lower reports were also documented previously in Blantyre Malawi where the age standardized incidence rate is 12.0 per 100,000 Population.[14,17]

South African black female populace do have lower age standardized incidence rate of 13.6 per 100,000 population. Also similar reports from Gambia in West-Africa documented a much lower age standardized incidence rate of 7.0 per 100,000 population when compared to our findings and other previous African population studies.[18] However still comparing our findings to other Western and Caucasian population, we noticed a marked variation in incidence rates. Studies from Caucasian series reported that breast cancer have a high age standardized incidence rate per population.[14,18,19] Previous GLOBOCAN 2008 reported a high variation in incidence rates in Africa and European women.[1,19]

The age standardized incidence rate varies from as low as 19.3 per 100,000 in East Africa to an average of about 90.0 per 100,000 in Western Europe.[19] The reason for this variation may be due to adequate and complete documentation of breast cancer cases in Caucasians as compared to Africa settings where most cases will go unreported. Studies also have it that breast cancer incidence is more common in urban consmopolitan setting than in rural settings. The reason for this discrepancy could be due to differences in the life style as more urban women are exposed to western lifestyle as compared to rural women.

In our study prostate cancer is the most common cancer in males accounting for 14.8% of all cancer cases and 36.3% of all male cancers. This report shows that prostate cancer incidence in men increases with age with majority of cases seen in adults above 65 years. This is similar to global reports where

prostate cancer is the most common urogenital cancer in males accouting for 13.8% of all male cancer and the 5th most common cancer with 914,000 new cases yearly.[20,21,22]

Incidence rates of prostate cancer vary by more than 25-fold worldwide, prostate cancer incidence rate is very high in blacks. In our study the crude incidence rate and age standardized incidence rate of prostate cancer were similar to those documented in African Americans. Also, high age adjusted rates was documented in New Zealand and Australia accounting for 104.2 per 100,000 men.[20,22,23] The Scandinavian countries and North America also have relatively high standardized age incidence rate due largely to special facilities including the wide availability of screening test for prostate specific antigen (PSA) and subsequent biopsy for histological assessment.

Furthermore, serial African studies have varying differences in the age standardized incidence rate of prostate cancer. Previous report from Ibadan, Western Nigeria documented age standardized incidence rate of 19.8 per 100,000.[9,13,22] This is similar to the 24 per 100,000 documented in Benin study.[20] Similar age standardized incidence rate of 28.5 per 100,000 and 21.5 per 100,000 have been reported in black men in Harare, Zimbabwe and Swaziland repectively,[15,16,17,22] while 21,8 per 100,000 men was documented in Namibia. Nevertheless relatively lower age standardized incidence rate of 5.8 per 1000,000 and 7.9 per 100,000 men have also been documented in men population in Algiers, Algeria and Tunis, Tunisia respectively when compared to our findings. Relatively higher figures of 38.6 per 100,000 and 70.1 per 100,000 men have also been reported in Uganda men and white men in Harare, Zimbabwe.[17,18] Furthermore relatively higher values have also been seen among blacks in regions of sub-Saharan Africa countries, South America countries and the Carribean sub-regions.[20,21,22] The lowest age-standardized incidence rate is estimated in Asian series especially the South-Central Asia accounting for 4.1 per 100,000 men.[20,22,23]

Cancer of the cervix still ranked among the leading female cancer in this environment. It is the second most common female cancer after breast cancer. It thus accounted for 16.5% of all female cancer cases. However this is relatively low when compared to figures from other parts of West Africa population including Niamey, Niger and Conakry, Guinea. Relatively higher incidence rate have also been documented in Central Africa, East Africa and South Africa population.[6,9,14,24] Nevertheless relatively lower incidence rate have been reported in Tunisia and Algeria. Previous reports have it that cervical cancer is more common than breast cancer in some West African cosmopolitan population except Ibadan, Abidjan and Quagadougou.

The incidence of colorectal carcinoma is relatively low accounting for 128 (4.1%) of all new cancer cases in this report. This is similar to previous reports from Africa where colorectal carcinoma is low. In our study the average annual crude incidence rate is 1.4 per 100,000 for females and 1.8 per 100,000 for males. The age standardized incidence rates is 2.3 per 100,000 for female and 2.9 per 1000,000 for males. However these rates are relatively higher in North Africa population and other Caucasian population.[14,24,25] The reason for this discrepancy may be related to diets and lifestyle. Studies have it that African diets contain high fibre content and low protein content as compared to western diet that contain high protein diet and low fibre diet.

Cancer mortality statistics record was not as comprehensive as expected due to several limiting factors including inadequate follow-up of patients, low socio-economic background, ignorance and level of education of the patients. Most of the cancer cases may have died through different circumstances. Some may have died in other healing or spiritual homes in a bid to seek other modalities of treatment. Some may have also died at home due to poor financial constraits. Most of the deaths are not reported in the local death registry in the local council while only few available records documented in hospitals death records. However this is similar to what obtains in other parts of Africa where death records are not

adequately reported except in some few Africa countries like Egypt, South-Africa and Mauritus which have relatively more robost death registry records and therefore contributes more actively to the global mortality records.[14,26,]

However in this study there is a higher percentage of cancer mortality in females when compared to males. This is evidently supported by the very high frequency of breast, cervical and colorectal carcinoma in this study. Globally, this study is been supported by the fact that the frequency of cancer mortality in females is greater than that of the males.[26] Studies done by Bray et al[27] documented that breast and cervical cancer morbidity and mortality pattern is high in developing countries. In our study males also, have relatively significant mortality pattern. This can be attributable to the high frequency of prostate cancer documented in this study. Previous reports have demonstrated that male prostate cancer is ranked very high among the most common cause of mortality in Nigeria and globally.[28]

However this study is at variance with global statistics where lung/bronchogenic carcinoma was the most common cause of mortalty globally accounting for 31% and 26% for male and females respectively.[26,27,29] In this study lung/bronchogenic cancer only occupied a relatively small proportion of cancer mortality accounting for 1.3% and 4.3% in females and males respectively. Furthermore, although global statistics also revealed that breast and prostate cancer mortality were the second most common cause of mortality in females and males respectively accounting for 15% and 10% respectively.[26] Our study documented that breast and prostate cancers were the most common causes of mortality in females and males accounting for 27.7% and 25.2% respectively.

Studies done in the United states have shown that lung, breast and colorectal cancers accounted for more than 50% of female cancer mortality while lungs, prostate and colorectal cancer constitute more than 50% of all male cancer mortality.[26,27,29] Nevertheless in this study cancers of the breast, liver, cervix and colorectal accounted for more than 50% of cancer mortality in females while cancers of the prostate,

colorectal and pancreatic accounted for more than 50% of cancer mortality in males. The reason for this variation may be attributable to multifactorial influences including age, genetic, environmental, low socio-economic influence and education background of the patients.[29]

In conclusion from this report, breast cancer is most common overall cancer in this environment. Prostate cancer is the second overall and the most common male cancer while cervical cancer is the third overall and the second most common female cancer in this setting. The most common cause of cancer mortality in female include breast, liver, colorectal and cervical cancer. In males the most common cause of cancer mortality are prostate closely followed by colorectal, pancreatic and liver cancer.

However our reports of the cancer cases are relatively low when compared to studies from Caucasian populations. The reason for this may be due to challenges of adequate record keeping and follow-up of cancer cases in our environment as most cases are under-reported.The reason for this variation in the yearly trend may be attributable to the interruption of health care services in teriary hospitals due to industrial disharmony and incessant stikes actions embarked upon by different union groups in the hospitals both locally and nationally.

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