

Epidemiology & Incidence of Common Cancers in Nigeria

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Introduction

- Cancer is a public health problem world-wide affecting all categories of persons.
- It is the second common cause of death in developed countries and among the three leading causes of death in developing countries.

Cancer trends

- WHO reported that about 24.6 million people live with cancer worldwide¹
- 12.5% of all deaths are attributable to cancer and if the trend continues, it is estimated that by 2020, 16 million new cases will be diagnosed per annum out of which 70% will be in developing countries¹
- Parkin et al reported that in indigenous Africans, 650,000 people of estimated 965million are diagnosed of cancer annually and lifetime risk of dying from cancer in African women is 2 times higher than in developed countries.²

Cancer Burden is under-reported

- The burden of cancer in Nigeria is unknown; mainly because of lack of statistics or under-reporting.
- This is not peculiar to Nigeria but most parts of Africa.
- In a study of cancer registry literature update from all over the world, only 1% of the literature emanated from Africa compared to 34% and 42% from Europe and Asia respectively³.
- This is partly due to inaccurate population statistics which makes age specific incidence rates impossible or if available inaccurate.
- Large proportion of the population still never seek orthodox medical care and so are not recorded

Reasons for under-reporting

- Other reasons are
 - inadequate diagnostic facilities,
 - limited access to care,
 - Inadequate technical manpower and infrastructure as well as quality of cancer data systems all contribute to inaccurate data on cancer burden.
- There are 11 cancer registries in Nigeria; located in various tertiary hospitals in various parts of the country
- Most of the Registries are poorly funded and except probably The Ibadan Cancer Registry, they all produce hospital-based data.

Table 1: The Cancer Registries in Nigeria

The Ibadan Cancer Registry, University College Hospital, Ibadan

Cancer Registry, Lagos University Teaching Hospital, Lagos

Cancer Registry, Jos University Teaching Hospital, Jos

Cancer Registry, Ahmadu Bello University Teaching Hospital, Zaria

Ife/Ijesha Cancer Registry, Obafemi Awolowo Teaching Hospital Complex, Ile-Ife

Cancer Registry, University of Nigeria Teaching Hospital, Enugu

The Cancer Registry, University of Ilorin Teaching Hospital, Ilorin

Cancer Registry, University of Maiduguri Teaching Hospital, Maiduguri

Cancer Registry, University of Benin Teaching Hospital, Benin City

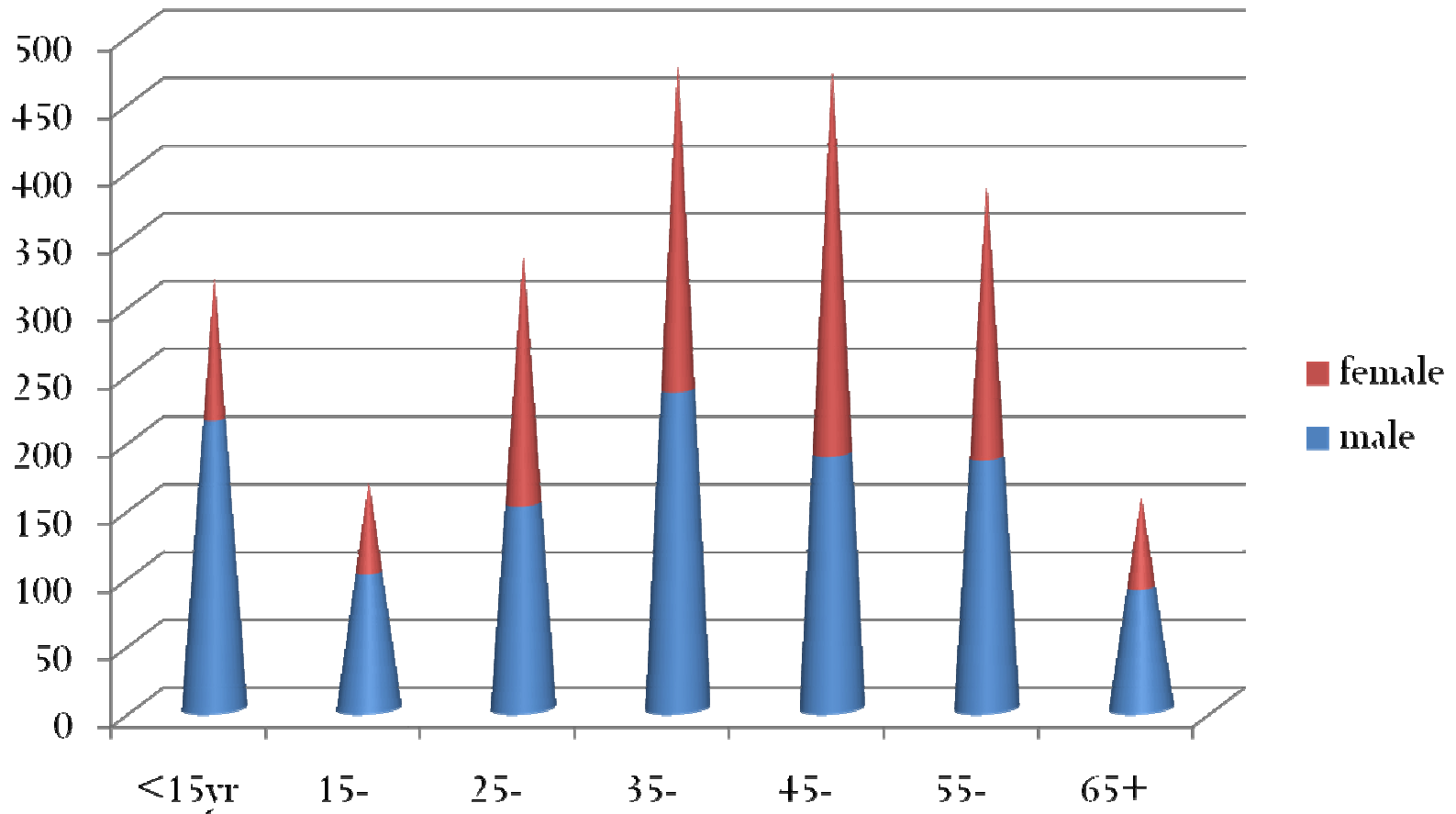
Cancer Registry, Aminu Kano University Teaching Hospital, Kano

Cancer Registry, Nnamdi Azikwe University Teaching Hospital, Nnewi

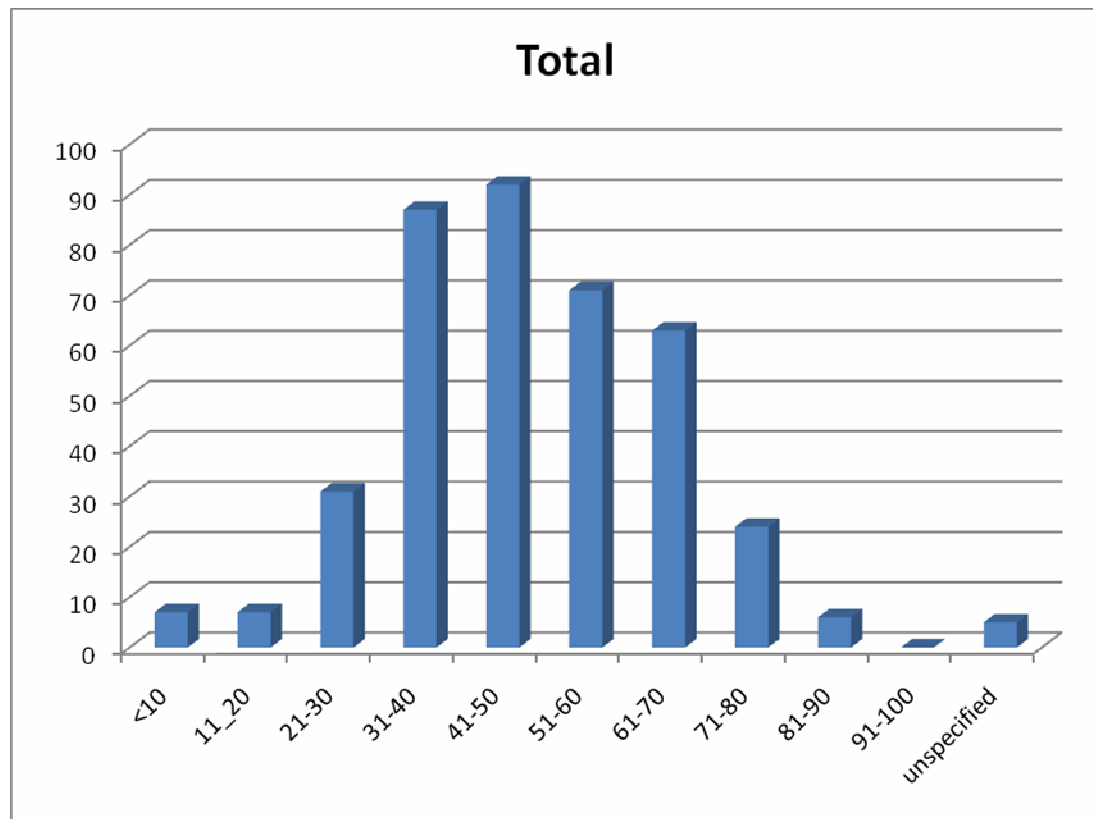
Cancer incidence-earlier data

- The earliest study from Nigeria was from the Ibadan Cancer Registry-1960-69(ICR); Edington & MacLean reported higher rates of cancer in females with age standardized rates (ASR) of 105.1 and 78 per 100,000 females and males respectively^{4,5}.
- In 1998, 74.5 per 100,000 females and 63.9 for males was recorded from the same center^{4,6}.
- In Zaria, 1976-78 data reported 1575 cases with 52% of cases in males and 48% in males; a latter study however showed more cancers in females than males^{8,9}.

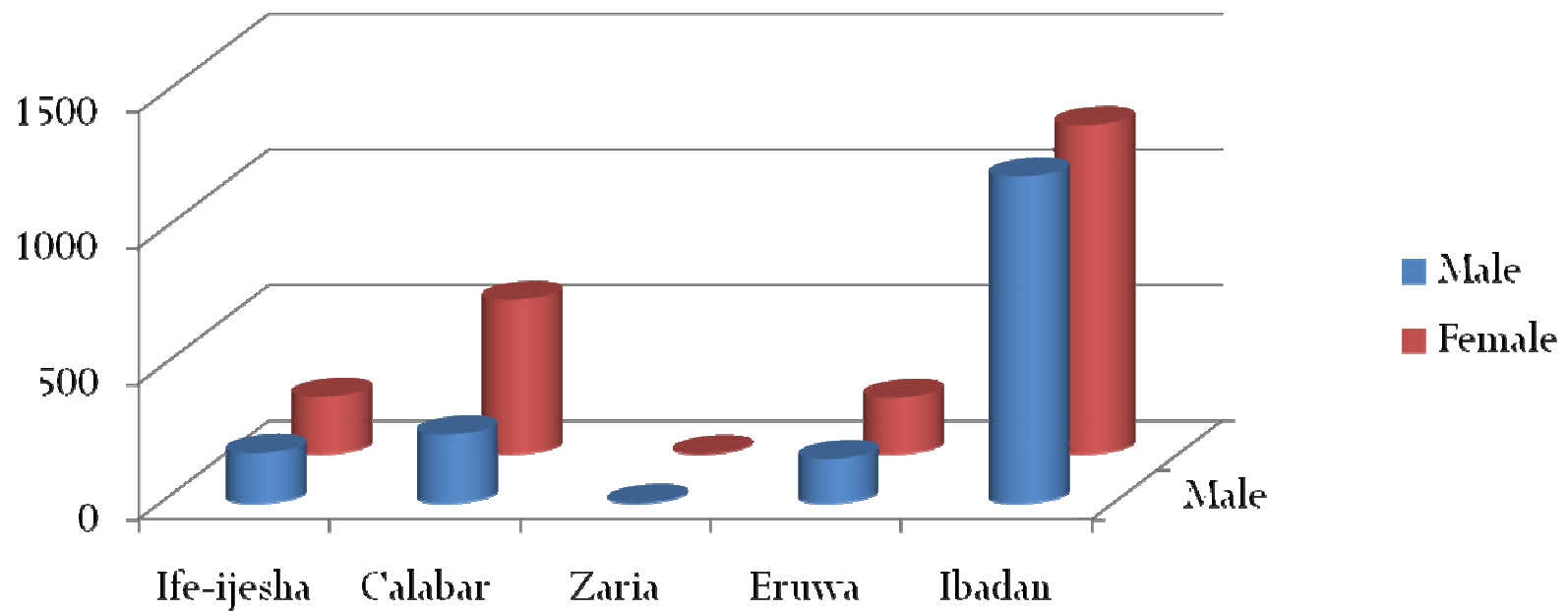
Number of Cancer Cases by Age group & Gender(ICR, 1960-69) ⁷



AGE DISTRIBUTION OF CANCERS IN LUTH; 2007(Morbid Anatomy, LUTH)



Regional data from 1980s-1990s⁴



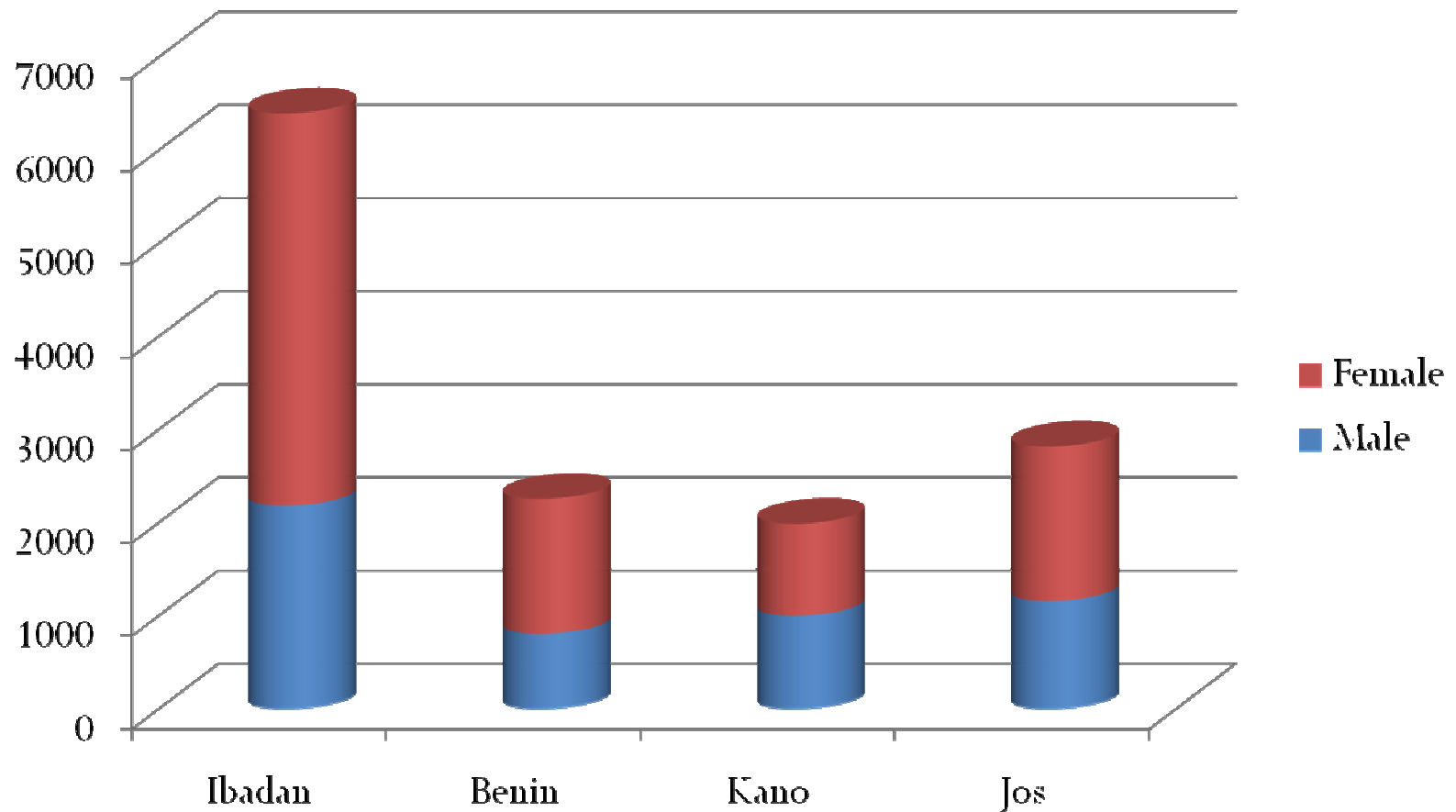
Current Cancer incidence

- Current data (2001-2005) from Ibadan showed increasing incidence and the ASR for all cancers as 81.6 per 100,000 for males and 115.1 per 100,000 for females with 65.9% and 34.1% in females and males respectively⁷.
- From Kano, of 1001 cancers recorded for period 1995-2004, male cancers accounted for 50.3% and 49.7% in females¹⁰.
- Mandong et al recorded 1162 and 1657 cancer cases respectively for males and females for the period between 1995 and 2002 from the Cancer Registry in Jos University Teaching Hospital^{11,12}.
- Report from University of Benin Teaching Hospital showed 2258 cases over a 20year period with female cancers predominating(64%) while that from Calabar showed a total of 588 cancers between 2004-2006 with 50.9% and 49.1% respectively for males and females^{13,14}.

Current incidence data cont.

- The WHO estimated incidence of cancer from all sites in 2002 for Nigeria was 90.7 and 100.9 per 10,000 for males and females respectively while mortality rates were 72.2 and 76 respectively-Globocan¹⁵.
- This is comparable to 89.1 and 104.1 / 100,000 incidence for males and females and 72.2 and 79.6 crude mortality rates recorded for Ghana but much less than figures recorded for United Kingdom and USA
- Generally cancer incidence in Nigeria appears low compared to developed countries which may not truly reflect the burden
- Similar to reports from other parts of the world, it is slightly higher in female.

Current Regional data-Late 90s-2000s^{7,10-15}

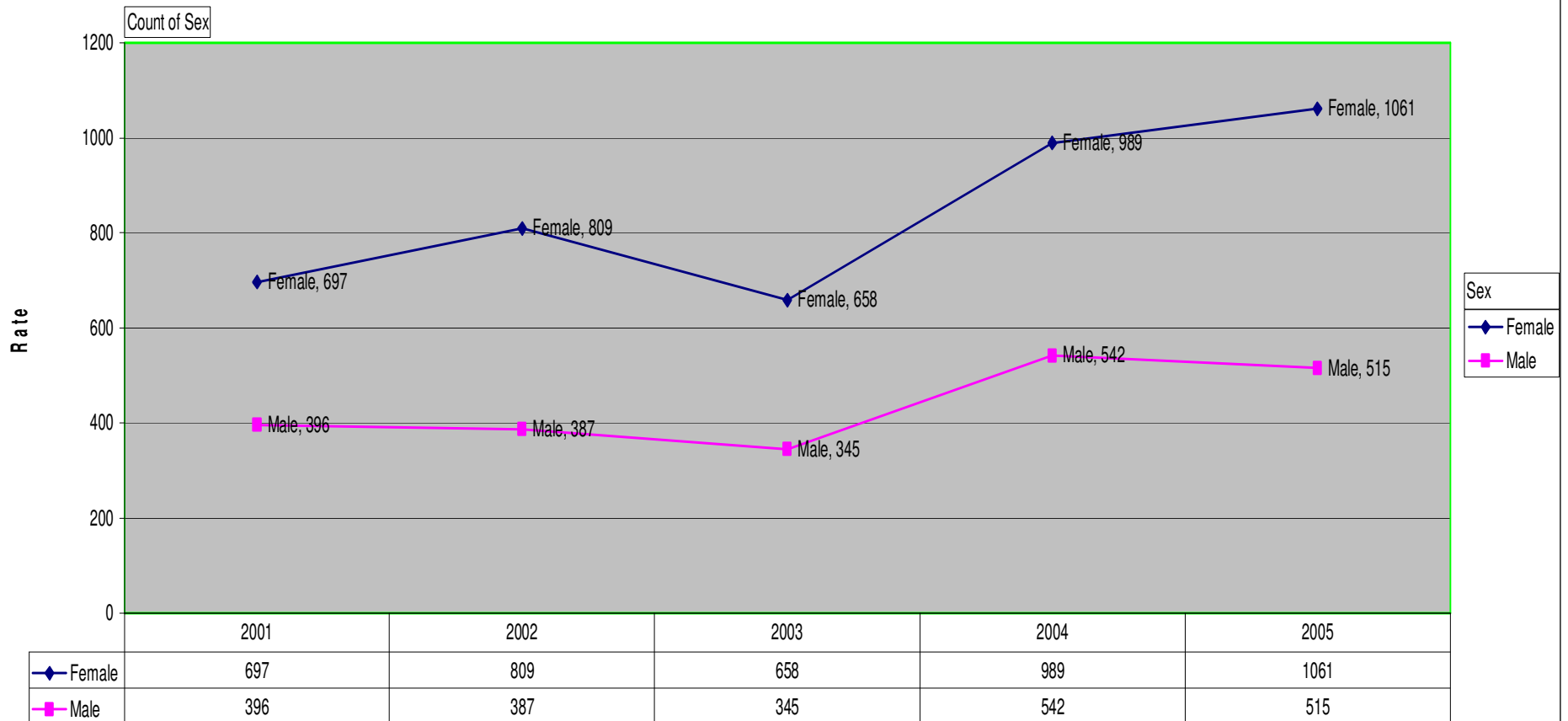


ICR-Incidence 2001-2005(steady increase) ⁷

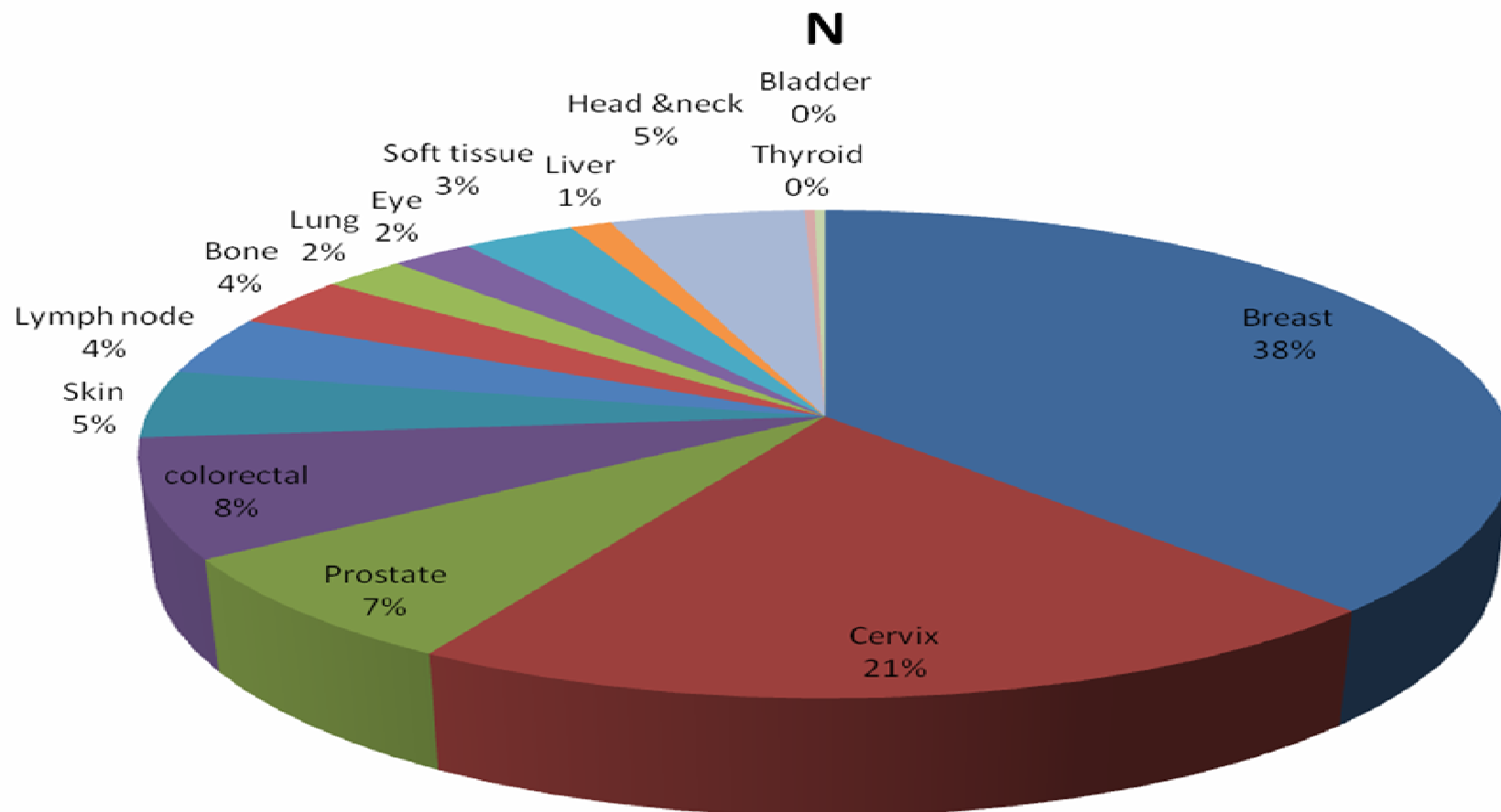
Year	Female	Male	Grand Total
2001	697	396	1093
2002	809	387	1196
2003	658	345	1003
2004	989	542	1531
2005	1061	515	1576
Total	4214	2185	6399

Increasing cancer trend (data from The Ibadan Cancer registry) ⁷

Cancer Trends 2001-2005
All Malignant Tumours



DISTRIBUTION OF CANCERS SEEN AT THE MORBID ANATOMY DEPARTMENT IN LUTH (2007)

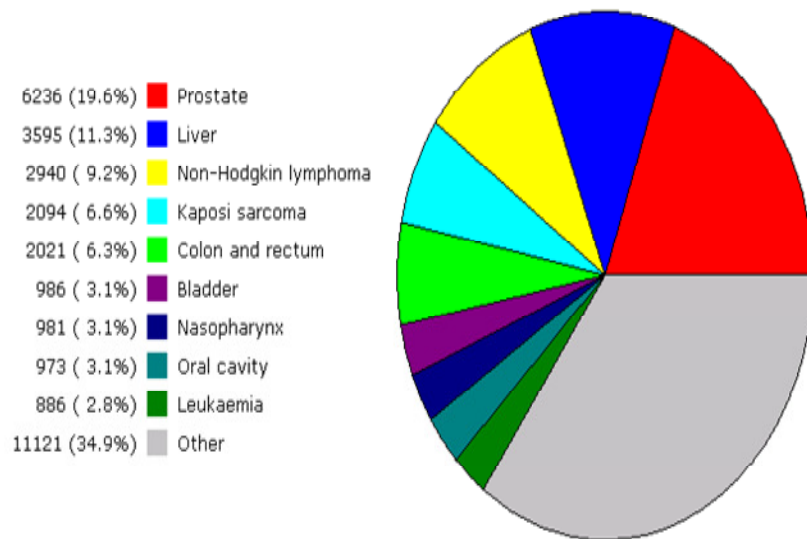


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Regional data^{4,7,10-12}

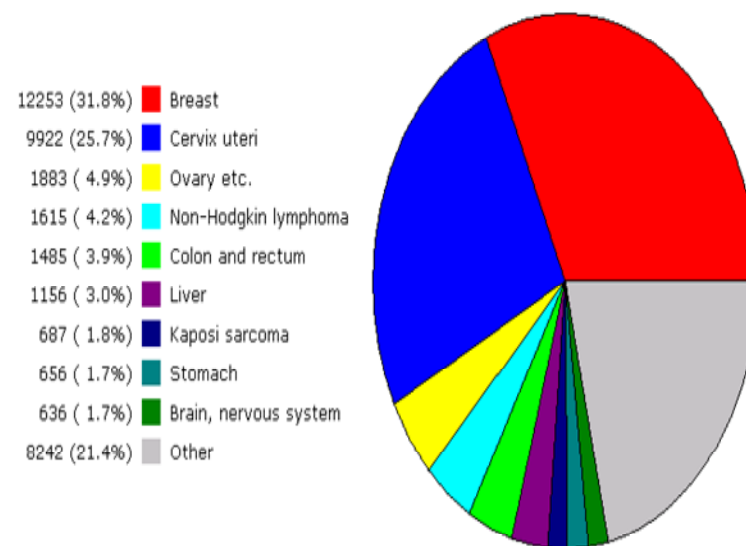
Registry	Period	Male	Female	Total
Ibadan	2001-2005	2185	4214	6399
Ife-Ijesha	1993-95	187	213	400
Benin	1980-1999	810	1448	2258
Kano	1995-2004	1001	989	1990
Jos	1995-2002	1162	1657	2813

Nigeria
New cancer cases (all ages), Males
Total: 31833



GLOBOCAN 2002, IARC

Nigeria
New cancer cases (all ages), Females
Total: 38535



GLOBOCAN 2002, IARC

2009-07-12

Relative Frequencies of 6 most common cancers in Ibadan⁴

1960-80		1981-95	
Site	Frequency (%)	Site	Frequency (%)
NHL(+Burkitt)	15.1	BREAST	414.8
CERVIX	10.3	CERVIX	12.7
LIVER	6.5	NHL(+ Burkitt)	7.4
BREAST	6.0	LIVER	6.4
CONN. TISSUE	4.5	PROSTATE	4.7
CHORIOCA	4.4	COLORECTAL	3.8

Cancer incidence in both sexes^{7,10-14}

Site	Ibadan (2001-2005)	Kano (1995-2004)	Calabar (2004-2006)	Jos (1995-2002)	Benin (1980-1999)	SUM	Position
Breast	1612	193	174	528	412	2919	1
Cervix	1246	226	48	524	465	2509	2
Prostate	544	165	204	225	161	1299	3
NHL	89	75	8	208	63	443	6
Liver	182	32	13	203	75	505	5
Colo-rectal	226	127	12	158	129	652	4
Male	2185	1001	255	1162	810	5413	
Female	4214	989	570	1657	1448	8878	
Total	6399	1990	825	2819	2258	14291	

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Cancer Reg & Epid wkshop April '09

5yrs

10yrs

3yrs

8yrs

20yrs

2009-07-12

- Thus data from various parts of the country show that cancer incidence is increasing with female cancers leading
- changing pattern has also been noticed from all the regions of the country
- Increasing incidence has been attributed to poor awareness about the risk factors, changes in lifestyle

The six most common cancers in Nigeria in descending order of frequency are

- Breast,
- cervix,
- prostate,
- colorectal
- liver cancer and
- NHL

Breast cancer

- is the commonest female cancer and most common cancer in both sexes^{2,4}.
- Studies have indicated increase in the relative frequency ratio; moving from number 2 or 3 to the number one cancer in both sexes^{4,11,12,18}.
- This increase has been attributed to increase awareness and presentation for screening.
- Majority of breast cancers occur in pre-menopausal women with the peak age in the 5th decade^{11-13, 18-21}.

- Parity is 5.3-6 and age at first child is <20yrs.
- The most common histological type is invasive ductal carcinoma (not otherwise specified-NOS) in 73-80% of cases^{11-13,18-21}.
- About 80-85% still present in advance stage III with attendant poor outcome^{11-13,18-22}.
- In Nigerian studies, only 25-50% of the tumours are reported to be oestrogen/progesterone receptor positive, which is the basis for hormonal treatment²³⁻²⁴.
- It is common practice to give anti-oestrogen blindly in Nigeria without recourse to ER/PR status, this is reported to be at the risk of complication such as endometrial carcinoma, which has been reported in Nigeria(Banjo et al)

The risk factors for breast cancer

- female gender
- increasing age
- maternal relative with breast cancer
- abnormal genes (BRCA 1, BRCA2 genes)
- nulliparity
- late age at first pregnancy and longer reproductive span(early menarche < 12yrs, late menopause > 50yrs).
- Others are obesity,
- increased dietary fat & alcohol intake,
- cigarette smoking,
- previous breast lesion with atypical changes,
- previous breast cancer.

Male breast cancer

- in Nigeria, it represents 3.7 -8.6%²⁵⁻²⁶ of all breast cancers
- This is higher than the 1% recorded from other parts of the world. The higher figures in Nigeria may be due to small sample size, since the data are mainly hospital based.
- The peak age incidence is 40-49years; similar to that of female cancer¹⁸⁻²².
- Majority are invasive ductal carcinoma.
- It is characterized by late presentation at advanced stage with attendant poor prognosis¹⁸⁻²².

Cervical Cancer

- It is the 2nd most common cancer in Nigerian women and the most common female genital cancer constituting a major cause of mortality among Nigerian females in their most productive years.
- It was the commonest cancer reported from Ibadan, Eruwa, Zaria, Jos, Benin and Calabar and in the early years, 2nd to breast in Enugu and Ife-Ijesha⁴
- A steady increase was reported by Babarinsa et al in Ibadan in between 1975-1995 which was attributed to poor screening facilities, and lack of organized national screening programme²⁷

- Recent data shows that it has however been overtaken by breast cancer; except in Kano where it was reported as the most common cancer in both sexes¹⁰ ; In Jos, it is the most common female cancer¹²
- On the other hand, incidence of other gynae cancers such as choriocarcinoma and endometrial has reduced drastically

Cervical cancer

- The age range is between 17-80yrs with peak in the 5th decade^{4-10, 27-29}.
- Patients are multiparous with average parity of 5.6-6.5.
- Multiple marriages, late presentation are common and majority of the patients have not had Pap smear done before²⁷⁻²⁸.
- Squamous cell carcinoma is the most common (90-91%) histological type while adenocarcinoma represents 2.4% to 5.1%^{4,7,27-29}.

- HPV is a necessary cause of cervical cancer being present in 99.9% of cases³⁰.
- In a study of 233 cases of cervix cancer from Lagos, HPV 16 and 18 were present in 65.2%³¹.
- This supports data that effective vaccination against these 2 types will reduce the cervical burden in Nigeria.
- It gladdens the heart to know that the Federal Ministry of Health has already given license to bring

in vaccines

- Institution of organized screening programmes to detect the pre-cancerous stage has reduced the mortality and morbidity of this cancer in developed countries. This can also be done in Nigeria with strong commitment
- A cheaper method by using VIA has been reported to be acceptable and effective³².

Prostate Cancer

- Is the most common cancer in Nigerian males; having overtaken liver cancer.
- It accounts for 6.1-19.5% of all cancers and incidence is increasing^{10-12,18}.
- Current data from most parts of the country show it to be the 3rd most common cancer except in Calabar where a very high figure was recorded for prostate cancer as the most common in both sexes accounting for 34.7% of all cancers¹⁴. Earlier report from that center between 1979-88 had recorded 28.6% of all male cancers⁴.
- The increase incidence has been attributed to introduction of PSA screening test which enable earlier diagnosis of cases¹⁸.

- Compared to African-American men, Nigerian men are 10 times more likely to have prostate cancer and 3.5 times more likely to die from it³³.
- Environmental and most importantly, genetic factors have been incriminated as the reason for the geographic differences in incidence.
- The mean age in Nigeria varies between 60.5-71.4yrs^{10,12,18,33-36}. Most of the data showed no tendency towards younger age at presentation^{10,18}.
- Patients present late with advanced disease³³⁻³⁶.

Risk factors for prostate cancer

- race,
- age above 40years,
- positive family history,
- high fat diet and
- high serum androgens levels; the latter being most consistent.

Diagnosis & Treatment-Prostate CA

- digital rectal examination and biopsy,
- transurethral ultrasound and
- serum PSA assay.
- Treatment is by orchidectomy(with the use of anti-androgens);
- Response is poor as initial response is short lived

Colo-rectal Cancer

- Colorectal carcinoma is the commonest malignancy of the gastrointestinal tract worldwide
- Previous studies had shown it to be a rare disease in Nigeria representing 3-6% of all malignant tumours in most studies^{13,17,39}.
- It accounts for 10-50% of all GIT malignancies in Nigeria^{37,-39}.
- Peak incidence-60-70yrs; mean age in Lagos is 50.7yrs³⁸
- When it occurs in the young, associated with polyposis syndrome or ulcerative colitis should be suspected

- Contrary to previous report which showed it to be rare, recent report shows the incidence to be increasing; an 81% increase over a period of two decades was reported from Ibadan⁴⁰.
- A recent study from Lagos & Sagamu showed similar trend with an increase in annual frequency of this cancer from 14 cases/annum to 32.3cases /annum³⁹.
- The low incidence in Nigerians was attributed to fibre rich diet which is common practice and rarity of the familial polyposis syndrome and IBD.
- Recent urbanization/civilization has resulted in upsurge of confectionary food outlets in major cities resulting in many Nigerians changing their dietary habit from a fibre rich diet, which was common practice to a highly refined carbohydrate and fat diet.

- The age incidence of CRC in Nigeria is lower compared to developed countries; about 10 years difference has been reported in many studies.
- Peak age reported from Nigeria ranged between 42.9yrs to 53yrs with a mean of 46yrs.
- There has also been an increase in the proportion of young patients with CRC. Reports from various parts of Nigeria showed that 35-42% of CRC are below age 40yrs. CRC in younger age has been shown to present a diagnostic and therapeutic problem and prognosis tend to be less favourable. ¹⁵
- Generally CRC is more common in males than females with average male:female ratio of 1.5:1 in Nigeria³⁸⁻⁴³ and 2:1 in America

- Similar to reports from other parts of Nigeria, recent report from Lagos showed a mean age of 50.7yrs, M: F ratio of 1.3:1 with 23% occurring below 40yrs³⁹.
- The majority (76.4%) was well to moderately differentiated adenocarcinoma. Mucinous carcinoma (10.7%) and signet ring carcinoma (1.2%) were more common in patients under 40yrs compared to well differentiated tumours.
- Majority of CRC are located in the rectosigmoid³⁷⁻⁴³.
- Majority of patients present with late stage disease
- Management has not improved beyond surgery with or without adjuvant chemotherapy.

Major predisposing factors of CRC

- Pre-malignant conditions such as
 - Polyps
 - inflammatory bowel disease (IBD) and
- Dietary factors:
 - Low content of un-absorbable vegetable fiber
 - High content of refined CHO in diet
 - High content of animal protein
 - High fat content in diet
 - low intake protective micro nutrients
- Familial adenomatous polyposis coli syndrome- multiple adenomatous polyps throughout the GIT due to mutation in APC gene on chromosome 5q21.
- HNPCC (hereditary non-polyposis coli cancer syndrome) or Lynch syndrome- Autosomal dominant disorder described by Henry Lynch. Characterised by increase risk of colon cancer and endometrial & ovarian cancer. Caused by mutations in DNA mismatch repair genes → microsatellite instability

Liver cancer

- Liver cancer is the most common cause of cancer death in Nigeria⁴¹ and most common liver malignancy in Nigeria is hepatocellular carcinoma (HCC).
- Data from various parts of Nigeria show that it accounts for between 1.6%- 7.2% of all cancers in both sexes and represent the 2nd or 3rd most common cancer in males
- HCC was earlier reported to be the most common male cancer until recently when was overtaken by prostate cancer.
- It is the most common malignancy on medical wards^{44, 43}.
- It is the most common cause of liver disease in Nigeria accounting for between 29.3% - 64% of all liver biopsies in

Liver cancer

- The peak age incidence is between the 4th and 5th decade with M: F ratio of 2 to 1⁴⁴⁻⁴⁹.
- The peak age incidence has been found to be a decade earlier than for liver cirrhosis and hepatitis⁴⁷.
- A significant number of cases occur in association with liver cirrhosis⁴⁴⁻⁴⁹.

Major aetiological factors of HCC

- chronic hepatitis B & C virus infections,
- male gender,
- exposure to aflatoxin and
- chronic alcohol abuse;
- the most prevalent in Nigeria being hepatitis B virus and aflatoxin.
- Prevalence of HBsAg in serum of Nigerian HCC patients varies between 50-61%^{44,50}.
- HCV infection is less with anti-HCV prevalence in serum of HCC patients being 12% -18.7%^{45,50}.

Liver cancer

- HCC has a dismal prognosis in this part of Africa because patients present late with advanced disease and often with poor liver function due to liver cirrhosis^{45, 49}.
- Resection and transplantation, the only hope of long term survival for HCC patients, is usually impossible and most of the patients die within 3 months of presentation ^{45, 49}.
- Early detection is the key to improving the outcome.
- Prevented by HBV vaccination; this has now been included as part of childhood immunization
- Treatment of chronic viral hepatitis, follow up of patients with ultrasound has been advocated for early detection.

Childhood Cancer

- About 50% of patients seeking medical attention in many general hospitals in Nigeria are children and majority of them suffer from preventable diseases.
- Previous autopsy study from Lagos revealed that 39.7% of childhood deaths are due to infective causes, only about 3.3% of deaths were attributed to neoplasm¹⁵.
- However with improved child survival due to improved immunization against childhood infections and improved management modalities, the role of malignancies in childhood mortality is becoming more apparent.

Childhood cancer

- Data from various parts of the country show that the five most common childhood cancer are
 - Non Hodgkin's lymphoma majority of which are Burkitt's lymphoma,
 - Retinoblastoma
 - Nephroblastoma,
 - Sarcomas and
 - Leukaemia.
- Earlier studies from Ibadan had also reported remarkable percentage of brain tumours and leukaemias^{4,5}

- Burkitt's lymphoma (BL) which is strongly associated with malaria, Epstein Barr virus and malnutrition has higher frequency in the southern forest areas compared to the northern savannah areas. ^{6,8}
- The recent decrease noted in the incidence of BL has been attributed to improved living condition and better malaria control.
- While retinoblastoma and nephroblastoma are common under 5 years, lymphomas and sarcomas occur in older children. ⁵³⁻⁵⁵

The challenges of childhood cancers

- Probability of second malignancy after irradiation e.g. leukaemias and thyroid cancers;
- Unavailability of immunocytochemistry and other modern diagnostic modalities pose diagnostic challenges as many of these tumour histologically appear as small round blue undifferentiated cells on light microscopy;
- Poor management outcome due to late presentation, poverty and unavailability of radiotherapy.
- Although >70% of childhood cancer is now curable with best modern therapy, the treatment is expensive and majority of children (80% of world's children) currently have little or no access to it in economically disadvantaged countries like ours.

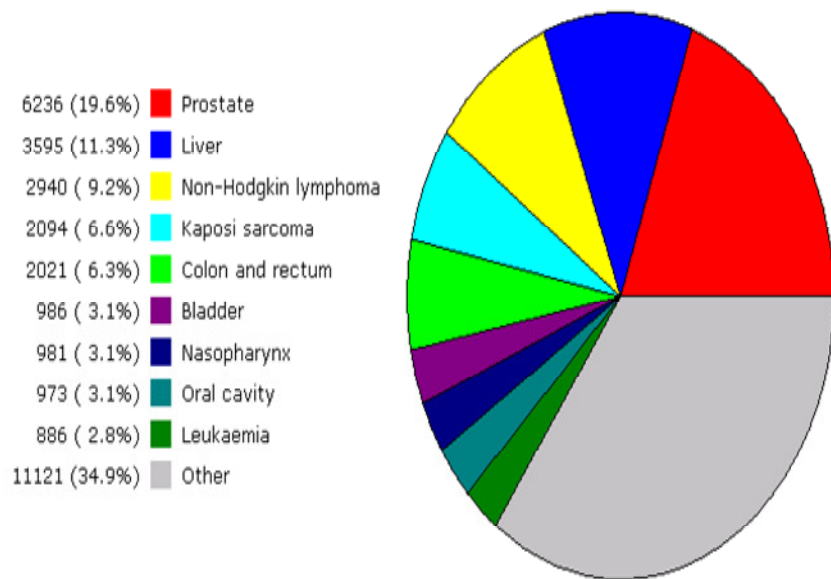
Cancer in women

- Deaths in Nigerian women were from obstetric complications and communicable diseases; cancer was less common thus the emphasis was on communicable diseases.
- Data from Ibadan showed common female cancers in 1960-69 as cervix, breast, NHL; In 1998, breast became the commonest followed by cervix and ovary⁴⁻⁶.
- Current data shows that female cancers account for about half of the total
- The common female cancers reported from the North are cervix, breast, ovary while from Enugu and Lagos breast is commonest followed by cervix both accounting for over 40%.

five most common female cancers are:

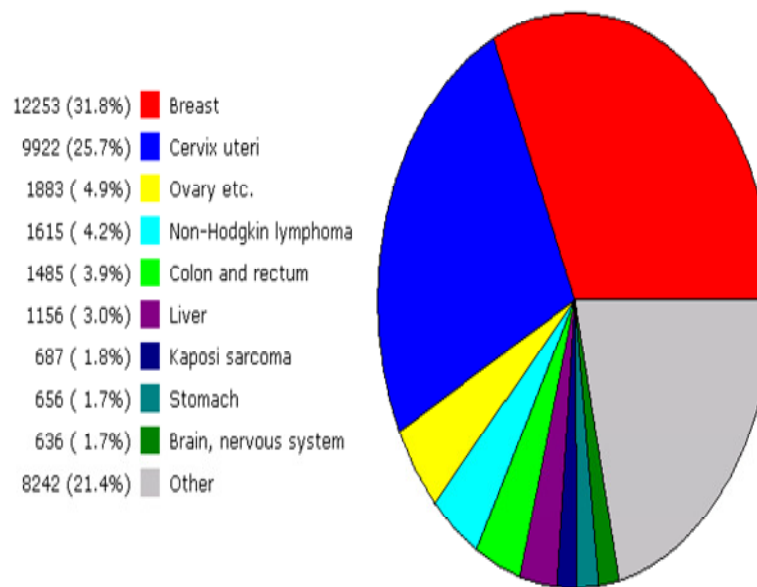
- Review of data from various parts of the country shows that the five most common female cancers are
- breast,
- cervix,
- ovary,
- colorectal and
- uterus
- This data appears similar to Globocan data for 2002.

Nigeria
New cancer cases (all ages), Males
Total: 31833



GLOBOCAN 2002, IARC

Nigeria
New cancer cases (all ages), Females
Total: 38535



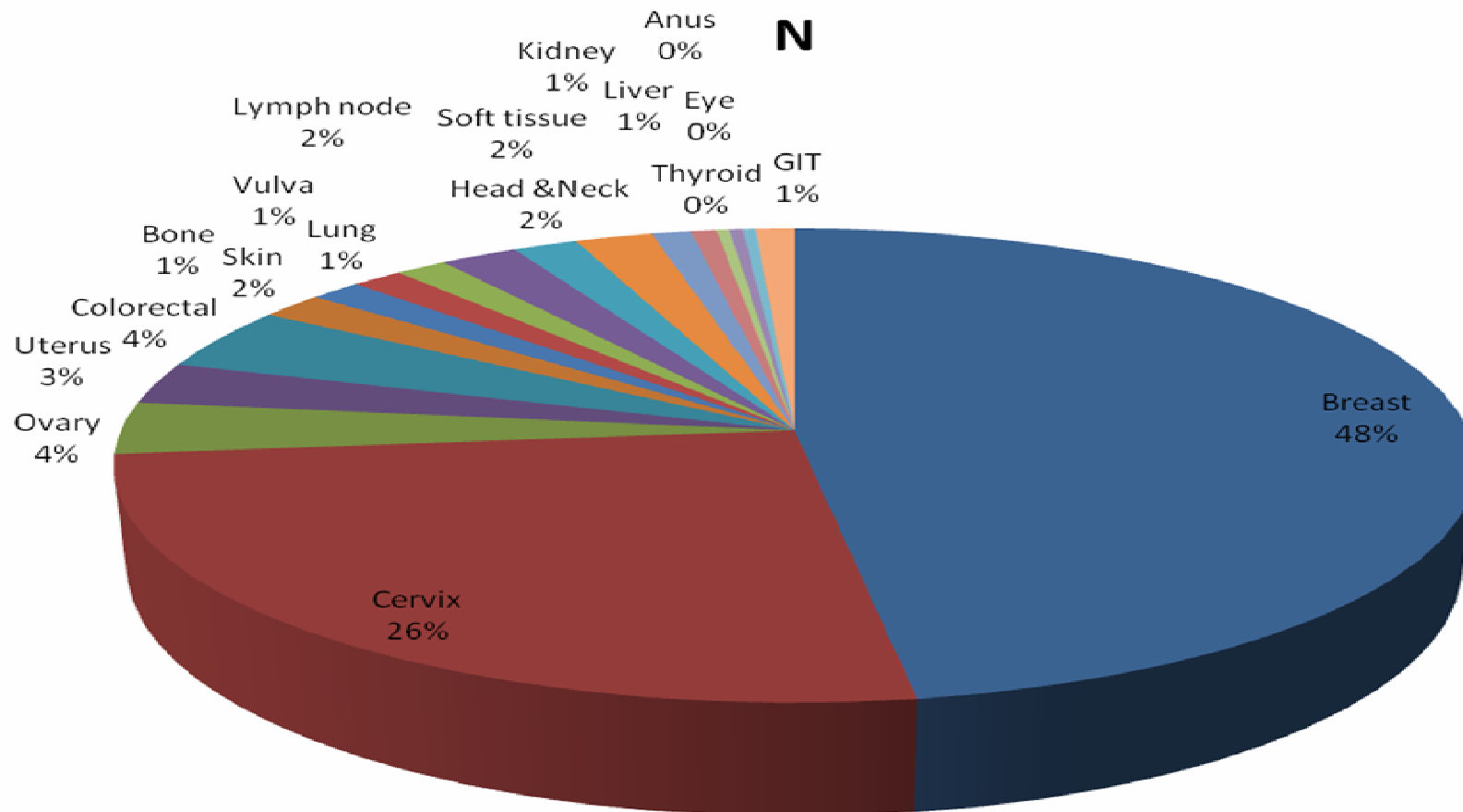
GLOBOCAN 2002, IARC

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Female cancers-regional comparison(descending order) ^{7,10-15}

Ibadan (2001-2005)	Jos (1995-02)	Kano (1995-04)	Calabar (2004-2006)	Lagos (2002-2007)	Globocan 2002
Breast	Cervix	Cervix	Breast	Breast	Breast
Cervix	Breast	Breast	Cervix	Cervix	Cervix
CRC	NHL	Ovary	others	CRC	Ovary
Ovary	Uterus/tubes	Nm Skin	blood	Uterus	NHL
Uterus	CRC	Uterus	liver	Ovary	CRC

DISTRIBUTION OF FEMALE CANCERS IN LUTH(2007)



Female cancers cont.

- Cervical and breast cancers are consistently leading though they have changed position; breast having overtaken cervical cancer but both have been increasing,
- Breast cancer is also the commonest cancer in both sexes.
- Colorectal and liver cancers are major emerging threats in Nigerian women
- Changing dietary habit from high to refined fibre diet could be responsible for the colorectal cancer while endemicity of the hepatitis B virus with emerging HCV may explain that of liver cancer

Female cancers cont.

- Among the female genital cancers, cervical cancer leads, endometrial is also becoming more while choriocarcinoma is declining
- NHL also featured prominently in the earlier studies from Ibadan (4th), Ife-ijesha (3rd) and Zaria (2nd)
- Changing the life pattern and instituting screening program can control all the major female cancers

Conclusion

- Although available data are hospital based, it is obvious that cancer incidence is rising in Nigeria
- However, majority of the Common Cancers are preventable or curable if detected early.
- It is noted that the NCCP has set laudable goals; my recommendation is that its activities should be stratified and prioritized; starting from
 - increase public awareness and
 - Training of personnel and provision of up-to-date facilities for cancer registration which will
 - improved data collection by Cancer Registries.
- When the actual burden of cancer is known, the government will be able to plan more accurately.

Conclusion

- It should be noted also that increase awareness will result in increase number of new cases, thus training and re-training of health personnel concerned with Cancer diagnosis and management cannot be over-emphasized.
- A National Cancer Institute is mandatory which will promote Research and Training in Cancer
- Basic treatment of cancer should be part of NHIS
- The various challenges that contribute to cancer morbidity and mortality in Nigeria cannot be tackled by govt alone, it should be regarded as everybody's problem as 'it represents a tremendous burden on patients, families and the society' ..