

Cancer distribution pattern in south-western Nigeria

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Abstract: The burden of cancer in Nigeria is appreciable with about 100,000 new cancer cases being reported in the country each year. This study aimed to determine the level of occurrence and pattern of distribution of different cancer types in two major functional cancer registries in south-western Nigeria. A desk review of the level of occurrence and pattern of distribution of different cancer types in Lagos and Ibadan cancer registries over a 5 year period (2005-2009) was carried out. The results obtained showed a total number of 5094 cancer patients registered between 2005 and 2009 in both Lagos (60%) and Ibadan (40%) cancer registries. Breast cancer accounted for the majority of cases (20.2%), followed by cervical cancer (7.9%), fibroid (4.4%), liver (4.4%), stomach (4.3%), brain (3.9%), pancreas (3.8%), prostate (3.3%), lung (3.0%) and cancer of the kidney (0.7%). There were significant differences ($P \leq 0.05$) in the level of occurrence between cancers of the breast, cervix, prostate, liver, ovary and all other cancers. Liver cancer (147; 77) and bone cancer (91; 37) were predominant in females than males while lung cancer (89; 65), stomach cancer (112; 109), and kidney cancer (24; 14) were predominant in males than females. In conclusion, the findings of this study provide insights to cancer epidemiology in the western region of Nigeria. This study confirms earlier findings that breast, prostate, liver and cervical cancers account for the majority of cases of cancers in Nigeria. Thus, there is need to organize on a wider scale suitable methods for early detection of these diseases.

Key words: cancer, types, distribution, Nigeria

Introduction

Cancer which is one of the most dreaded non-communicable diseases has become an important contributor to the global burden of diseases. The burden of cancer is growing, and it is one of the leading causes of death worldwide (Binu *et al.*, 2007). There are more than 100 types of cancer and their symptoms vary widely (Adebamowo & Ajayi, 2000). Globally, approximately 10 million people are diagnosed with cancer annually (Stewart & Kleihues, 2003). The increase of cancer incidence is occurring at a faster rate of 48% in developed countries and 52% in developing countries (Parkin *et al.*, 1993). With increasing industrialization and westernization of dietary and other socio-behavioural attitudes in most developing countries, it is estimated that the burden of cancer will increase to epidemic proportions in twenty-first century (Okobia, 2003). Deaths from cancer in the world are projected to continue to rise, with an estimated nine million people expected to die from cancer in 2015 and 11.4 million in 2030 (WHO, 2007a,b). The cancer epidemiological report in Africa showed 667,000 incident cases and 518,000 deaths in 2008 (Boyle & Levin, 2008).

The burden of cancer in Nigeria is appreciable. According to the World Health

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Organization, 100,000 new cancer cases are being reported in the country each year, although different observers believe the figure could become as high as 500,000 new cases annually by 2010 (Ogundipe & Obinna, 2008). It may be projected that by 2020, cancer incidence for Nigerian males and females may rise to 90.7/100,000 and 100.9 /100,000, respectively. In Nigeria, with a population of nearly 140 million people, complex diseases such as cancer are currently emerging as important health care priority for the future. The subsequent attendant increase in life expectancy is likely to lead to an increase in the incidence of all types of cancers, as a higher proportion of the population reaches the complex diseases-bearing age (Adebamowo & Ajayi, 2000; Anyawu, 2000).

There are two major functional cancer registries in south-western Nigeria; Ibadan Cancer Registry at University College Hospital, Ibadan and Lagos Cancer Registry at Lagos University Teaching Hospital, Lagos. Although, some hospitals in south-western Nigeria have screening programmes for cervical cancer, but these programmes are poorly funded, unsystematic and not comprehensive. Most of these cancer registries data are not routinely collected and published. Information on incidence, prevalence, pattern and high risk factors are essential to plan, implement and to evaluate control of cancer. But this information is not readily available for most of the developing countries (Binu *et al.*, 2007; Boyle & Levin, 2008) may be due to limited number of cancer registries, attitude of people to health facilities utilization, level of education of people, poverty and poor record keeping. It may thus be necessary to determine the level of occurrence and pattern of distribution of different cancer types in two major functional cancer registries in south-western Nigeria.

Materials and Methods

Study area

The sources of data were Ibadan Cancer Registry at University College Hospital, Ibadan and Lagos Cancer Registry at Lagos University Teaching Hospital, Lagos in Nigeria. Lagos University Teaching Hospital is one of the largest teaching hospitals in Nigeria. It is located in Lagos State which is a state in south-western Nigeria. Lagos is one of Nigeria's most populated states. It is the chief port, principal economic and cultural centre. The teaching hospital has 761 bed spaces and records over 9,000 patient attendances in a month. University College Hospital Ibadan is one of the oldest and largest teaching hospitals in West Africa region with approximately 600 bed spaces. It is located in Oyo state in south-western Nigeria. Ibadan is the largest city in Nigeria.

Data collection and analysis

This was a retrospective desk review of registers of the level of occurrence and pattern of distribution of different cancer types in Lagos and Ibadan cancer registries over a 5 year period (2005-2009). A standard data collection tool was used to obtain socio-demographic information (sex, marital status and location), type of cancer and year of diagnosis. The data obtained from this study were analyzed using the Epi-Info 2002 software programme. The data was presented in frequency distribution tables with percentages and Chi square analysis was used to test the significance at $p \leq 0.05$.

Ethical considerations

An ethical permission was obtained from the record units of the institutions of the studied areas to obtain data on level of cancer occurrence and cancer distribution pattern in their cancer registries.

Results

A total number of 5094 cancer patients were registered between 2005 and 2009 in both Lagos (60%) and Ibadan (40%) cancer registries. Males and females accounted for 64.5% and 35.5% of the patients, respectively. Some 63% (3211) of the patients were married. There were 857 (16.8%) patients in 2005, 871 (17.1%) in 2006, 788 (15.5%) in 2007, 1046 (20.5%) in 2008 and 1532 (30.1%) in 2009. Breast cancer had the highest percentage (20.2%), followed by cervical cancer (7.9%), fibroid (4.4%), liver (4.4%), stomach (4.3%), brain (3.9%), pancreas (3.8%), prostate (3.3%), lung (3.0%) and the cancer of the kidney was the lowest type (0.7%)

Table 1: The frequency (%) of cancer by type and sex

Cancer types	Male	Female	Total	χ^2	P-value
Abdominal	74 (4.1)	70 (2.1)	144 (2.8)	16.44	0.0001
Bone	91 (5.0)	37 (1.1)	128 (2.5)	72.88	0.00
Brain	109 (6.0)	90 (2.7)	199 (3.9)	33.78	0.00
Breast	64 (3.5)	965 (29.3)	1029 (20.2)	481.56	0.00
Cervical	NA	403 (12.3)	403 (7.9)	240.37	0.00
Colon	66 (3.7)	128 (3.9)	194 (3.8)	0.18	0.67
Connective and soft tissue	90 (5.0)	83 (2.5)	173 (3.4)	21.49	0.00
Ductal	65 (3.6)	161 (4.9)	226 (4.4)	4.63	0.03
Eye	103 (5.7)	69 (2.1)	172 (3.4)	46.43	0.00
Fibroid	NA	226 (6.9)	226 (4.4)	129.90	0.00
Kidney	14 (0.8)	24 (0.7)	38 (0.7)	0.03	0.86
Leukaemia	73 (4.0)	85 (2.6)	158 (3.1)	8.23	0.004
Liver	147 (8.1)	77 (2.3)	224 (4.4)	93.21	0.00
Lung	65 (3.6)	89 (2.7)	154 (3.0)	3.17	0.08
Non-hodkins lymphoma	48 (2.7)	49 (1.5)	97 (1.9)	8.51	0.004
Ovary	NA	155 (4.7)	155 (3.0)	87.81	0.00
Pancreas	94 (5.2)	101 (3.1)	195 (3.8)	14.41	0.0002
Prostate	169 (9.4)	NA	169 (3.3)	318.24	0.00
Stomach	109 (6.0)	112 (3.4)	221 (4.3)	19.42	0.00
Others	425 (23.5)	364 (11.1)	789 (15.5)	138.31	0.00
Total	1806 (100)	3288 (100)	5094 (100)		

NA- Not applicable

Breast cancer was registered in 3.5% (64) and 29.3% (965) of male and female patients, respectively, out of the 1029 total patients. Liver cancer (147; 77) and bone cancer (91; 37) were predominant in female than male while lung cancer (89; 65), stomach cancer (112; 109), kidney cancer (24; 14) were predominant in male than female (Table 1). There were significant differences ($P \leq 0.05$) in the level of occurrence between cancers of the breast, cervix, prostate, liver, ovary and all other cancers (Table 1). Most of the studied cancers; cervical (235; 168), breast (718; 311), abdominal (84; 60), liver (126; 98), lung (114; 40), ovary (79; 76), prostate (121; 48), stomach (141; 80) predominantly occurred in married patients than single patients. Only the bone cancer (77; 51) was observed to occur in single patients

than married patients. There were significant differences ($P \leq 0.05$) between cancers of the breast, cervix, prostate, fibroid, ovary and all other cancers (Table 2).

Table 2: Frequency (%) of cancer type by marital status

Cancer type	Frequency (%)			χ^2	P-value
	Single	Married	Total		
Abdominal	60 (3.2)	84 (2.6)	144 (2.8)	1.41	0.24
Bone	77 (4.1)	51 (1.6)	128 (2.5)	30.31	0.00
Brain	86 (4.6)	113 (3.5)	199 (3.9)	3.47	0.06
Breast	311 (16.5)	718 (22.4)	1029 (20.2)	25.15	0.00
Cervical	168 (8.9)	235 (7.3)	403 (7.9)	4.19	0.04
Colon	71 (3.8)	123 (3.8)	194 (3.8)	0.01	0.91
Connective and soft tissue	86 (4.6)	87 (2.7)	173 (3.4)	12.49	0.0004
Ductal	72 (3.8)	154 (4.8)	226 (4.4)	2.65	0.10
Eye	62 (3.3)	110 (3.4)	172 (3.4)	0.07	0.80
Fibroid	46 (0.8)	180 (5.6)	226 (4.4)	28.01	0.00
Kidney	15 (3.7)	23 (0.7)	38 (0.7)	0.10	0.75
Leukaemia	69 (3.7)	89 (2.8)	158 (3.1)	3.15	0.08
Liver	98 (5.2)	126 (3.9)	224 (4.4)	4.63	0.03
Lung	40 (2.1)	114 (3.6)	154 (3.0)	8.23	0.004
Non-hodkins lymphoma	40 (2.1)	57 (1.8)	97 (1.9)	0.78	0.38
Others	292 (15.5)	497 (15.5)	789 (15.5)	0.001	0.98
Ovary	76 (4.0)	79 (2.5)	155 (3.0)	9.99	0.002
Pancreas	86 (4.6)	109 (3.4)	195 (3.8)	4.43	0.04
Prostate	48 (2.5)	121 (3.8)	169 (3.3)	5.50	0.02
Stomach	80 (4.2)	141 (4.4)	221 (4.3)	0.06	0.81
Total	1883 (100)	3211 (100)	5094 (100)		

Table 3: Distribution frequency (%) of cancer type by cancer registry location

Cancer type	Frequency (%)			χ^2	P-value
	Lagos	Ibadan	Total		
Abdominal	90 (2.9)	54 (2.6)	144 (2.8)	0.40	0.53
Bone	49 (1.6)	79 (3.9)	128 (2.5)	25.68	0.00
Brain	117 (3.8)	82 (4.0)	199 (3.9)	0.12	0.73
Breast	814 (26.7)	215 (10.4)	1029 (20.2)	197.02	0.00
Cervical	273 (8.9)	130 (6.4)	403 (7.9)	11.06	0.001
Colon	93 (3.0)	101 (5.0)	194 (3.8)	12.13	0.001
Connective and soft tissue	115 (3.8)	58 (2.8)	173 (3.4)	3.17	0.08
Ductal	123 (4.0)	103 (5.0)	226 (4.4)	3.01	0.08
Eye	121 (4.0)	51 (2.5)	172 (3.4)	8.01	0.01
Fibroid	49 (1.6)	177 (8.7)	226 (4.4)	144.27	0.00
Kidney	9 (0.3)	29 (1.4)	38 (0.7)	20.98	0.00
Leukaemia	111 (3.6)	47 (2.3)	158 (3.1)	7.21	0.01
Liver	102 (3.3)	122 (6.0)	224 (4.4)	20.28	0.00
Lung	71 (2.3)	83 (4.1)	154 (3.0)	12.69	0.0004
Non-hodkins lymphoma	51 (1.7)	46 (2.3)	97 (1.9)	2.24	0.14
Others	472 (15.5)	317 (15.5)	789 (15.5)	0.01	0.94
Ovary	81 (2.7)	74 (3.6)	155 (3.0)	3.94	0.05
Pancreas	102 (3.3)	93 (4.6)	195 (3.8)	4.94	0.03
Prostate	100 (3.3)	69 (3.4)	169 (3.3)	0.04	0.83
Stomach	111 (3.6)	110 (5.4)	221 (4.3)	9.10	0.003
Total	3054 (100)	2040 (100)	5094 (100)		

Most of the cancer types were recorded in the Lagos registry than Ibadan registry. Abdominal cancer (90), brain cancer (117), breast cancer (814), cervical cancer (273), ovary

cancer (81) and prostate cancer (100) were recorded more frequently in Lagos than Ibadan (Table 3). However, some of the cancer types like bone cancer (49; 79), Colon (93; 101), Fibroid cancer (49; 177), Liver cancer 102; 122), Kidney cancer (9; 29) and Lung cancer (71; 83) occurred more in Ibadan cancer registry than Lagos registry.

There were significant differences ($P \leq 0.05$) between cancers of the breast, cervix, fibroid, ovary and all other cancers. Most of the cancers were diagnosed in 2009. However, ductal cancer had highest diagnosis of 57 patients in 2008 as against the 53 diagnosed patients in 2009 out of the 226 total patients. The cancer of the kidney recorded highest diagnosis of 10 patients in 2005 as against 9 patients in 2009 out of the 38 patients. Sixty-three patients had liver cancer in 2008 while 59 patients were diagnosed in 2009 (Table 4).

Table 4: Frequency (%) of cancer type by year of diagnosis

Cancer type	2005	2006	2007	2008	2009	Total	χ^2	P-value
Abdominal	19 (2.2)	30 (3.4)	25 (3.2)	30 (2.9)	40 (2.6)	144 (2.8)	2.98	0.56
Bone	13 (1.5)	20 (2.3)	24 (3.0)	30 (2.9)	41 (2.7)	128 (2.5)	5.26	0.26
Brain	42 (4.9)	34 (3.9)	27 (3.4)	41 (3.9)	55 (3.6)	199 (3.9)	3.15	0.53
Breast	192 (22.4)	175 (20.1)	125 (15.9)	150 (14.3)	387 (25.3)	1029 (20.2)	58.41	0.00
Cervical	87 (10.2)	82 (9.4)	62 (7.9)	62 (5.9)	110 (7.2)	403 (7.9)	15.38	0.004
Colon	30 (3.5)	42 (4.8)	26 (3.3)	37 (3.5)	59 (3.9)	194 (3.8)	3.44	0.49
Connective tissue	30 (3.5)	37 (4.2)	28 (3.6)	34 (3.3)	44 (2.9)	173 (3.4)	3.37	0.50
Ductal	32 (3.7)	45 (5.2)	39 (4.9)	57 (5.4)	53 (3.5)	226 (4.4)	8.56	0.07
Eye	21 (2.5)	22 (2.5)	32 (4.1)	43 (4.1)	54 (3.5)	172 (3.4)	7.15	0.13
Fibroid	41 (4.8)	42 (4.8)	30 (3.8)	50 (4.8)	63 (4.1)	226 (4.4)	1.96	0.74
Kidney	10 (1.2)	8 (0.9)	3 (0.4)	8 (0.8)	9 (0.6)	38 (0.7)	4.35	0.36
Leukaemia	20 (2.3)	30 (3.4)	27 (3.4)	40 (3.8)	41 (2.7)	158 (3.1)	5.04	0.28
Liver	34 (4.0)	33 (3.8)	35 (4.4)	63 (6.0)	59 (3.9)	224 (4.4)	8.81	0.07
Lung	18 (2.1)	23 (2.6)	30 (3.8)	38 (3.6)	45 (2.9)	154 (3.0)	5.94	0.20
N-lymphoma	13 (1.5)	15 (1.7)	17 (2.2)	26 (2.5)	26 (1.7)	97 (1.9)	3.36	0.50
Others	142 (16.6)	125 (14.4)	118 (15.0)	168 (16.1)	236 (15.4)	789 (15.5)	2.06	0.73
Ovary	28 (3.3)	30 (3.4)	28 (3.6)	35 (3.3)	34 (2.2)	155 (3.0)	5.17	0.27
Pancreas	25 (2.9)	25 (2.9)	45 (5.7)	45 (4.3)	55 (3.6)	195 (3.8)	12.56	0.01
Prostate	31 (3.6)	24 (2.8)	27 (3.4)	35 (3.3)	52 (3.4)	169 (3.3)	1.16	0.89
Stomach	29 (3.4)	29 (3.3)	40 (5.1)	54 (5.2)	69 (4.5)	221 (4.3)	6.86	0.14
Total	857	871	788	1046	1532	5094		

Discussion

WHO reports that cancer is the second commonest cause of mortality after cardiovascular diseases. However, data about the prevalence of cancer in Nigeria like elsewhere in Africa is scarce as only 7.2% of the population is covered by cancer registries (Akinwande *et al.*, 2009). The present study may be the first of its kind to be conducted on the pattern of cancers in south-western Nigeria. Epidemiological information on cancer including the pattern is an important basis for determining the priorities for cancer control in any population group. There are marked differences in distribution of cancers in different regions of the world (Pisani, 1994). Environmental and socio-cultural factors such as active and passive tobacco smoking, use of non-smoking tobacco, alcohol intake, exposure to ultraviolet rays, dietary factors, pollutants of air, water and soil contribute to the development of different types of cancers (Page & Asire, 1985; Satariano & Swanson, 1988; Stewart & Kleihues, 2003; Binu *et al.*, 2007). However, this present study could not access some of the environmental and

socio-cultural factors of the patients as only the cancer registries registers were used for this study.

The data obtained revealed that female patients had a higher percentage of cancers in the study areas, which is not consistent with the earlier study of Binu *et al.*, (2007) who showed higher male patients with cancer than female in Nepal. This may be due to curiosity of the females about their health than male counterpart which will eventually lead to more attendance in the clinic. It may also be due to increasing cases of breast, cervical and fibroid cancers as shown in this study. This finding is consistent with the findings by other authors (Adebamowo & Ajayi, 2000; Madong *et al.*, 2003; Adefuye, 2006) who showed that cancer of the cervix is the commonest genital tract malignancy in the female and ranked second to breast cancer. Although, cancers of cervix and breast are common among women in most of the developing countries as earlier stated, the later is the specific leading cancer in women in the developed countries (Stewart & Kleihues, 2003).

It has been established in this study that cancer cases are commoner in married patients. This observation may be due to remarkable association of some studied cancers (breast, cervical and prostate) with age (Battikhi, 2003), child bearing (Tretli & Haldorsen, 1990) and sexual intercourse (Akinwande *et al.*, 2009). The highest cases of cancers in year 2009 (30.1%) as against the earlier years may be due to increase level of health education among people in south-western Nigeria to undergo cancer screening as early detection is important for good management of cancers. Presently there are quite a number of institutional based breast and cervical cancer screening activity in Nigeria.

It has been shown in this study that more proportion of cancers is found in Lagos cancer registries than Ibadan cancer registries. This finding may be due to the dense population in Lagos and some environmental factors such as vehicular emission, tobacco smoke, carcinogenic chemicals and industrial pollution which are commoner in Lagos. However, it cannot be concluded that all registered patients in Lagos cancer registry were from Lagos. There were significant differences between the level of occurrence of breast, cervical, prostate cancers and other forms of cancers. Similar findings have been reported by others (Adebamowo & Ajayi 2000; Madong *et al.*, 2003; Adefuye, 2006; Awodele *et al.*, 2009) that showed the high rate of breast and cervical cancers compared with other cancers.

In conclusion, the cancer pattern revealed in this study provides valuable insights to cancer epidemiology in the western region of Nigeria. Breast, prostate, liver and cervical cancers are the most frequent cancer in the area. Thus, there is need to organize on a wider scale suitable methods for early detection of these diseases. Studies like this present one may also provide useful information for health planning and future research.

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