ORIGINAL ARTICLE

Pattern of cancer deaths in the medical wards of a teaching hospital in South East Nigeria

EB Arodiwe, SO Ike, SC Nwokediuko, CK Ijoma, II Ulasi

Department of Medicine, University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu, Nigeria

Abstract

Background: Cancers are emerging public health problems in developing countries like Nigeria. The epidemiological shift and aging population make cancers a challenge.
Objective: We set out to describe the pattern of death due to cancer in our medical ward. The hospital is one of the premier hospitals covering the South East zone of Nigeria.
Materials and Methods: We retrospectively reviewed the case notes and death certificates of all who died of cancer in our adult medical wards for 16 years (January 1995 to December 2010).
Statistical Analysis Used: Statistical Package for Social Sciences (SPSS Inc. Chicago, IL) version 17.0 was used.
Results: Twenty seven thousand, five hundred and fourteen patients were admitted into the medical wards. Six thousand, two hundred and fifty died. Out of the 6250 deaths, cancers accounted for 7.6%. Male to Female ratio was 2.4:1. The mean age at death was 43.7 ± 17.4 years. The mean age at death in both sexes was similar (42.9 ± 17.5 for men and 45.7 ± 17.0 years for women), $P = 0.109$. Primary liver cell carcinoma was the most common cause of death among men (40.8%), while cancer of hematopoietic organ was the most common in women (48.7%). The overall fatality rate was 1.7% (477/27 514) of medical admissions. Younger and middle age groups were most commonly affected in both sexes.
Conclusion: Since the most productive age groups were affected, governments in developing countries should as a matter of urgency put in place adequate cancer preventive and curative services.

Key words: Cancer, mortality, medical wards, South East Nigeria

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Introduction

In the past, cancer, diabetes, and a few other non-communicable diseases used to be regarded as diseases of the affluent and the West. However, recent research has revealed a new trend. The diseases have crossed the "borders."

Africa carries an increasing cancer burden, 75% of the 650 000 annual cases present late, at young ages and about 510 000 die.[1] Infectious agents like Hepatitis B, C, Human Papilloma Virus (HPV), and *Helicobacter pylori* contribute significantly to cancers in developing countries.[2] The HIV pandemic is changing the pattern and prevalence of cancer especially in East Africa where AIDS-related cancers like Kaposi sarcoma, lymphomas, anal cancers, and cervical cancers are increasing.[3] There are very few human and material resources for cancer control in developing countries where cancers occur at younger ages, 70% of cancer deaths occur and only 5% of global funds for cancer control are present.[4]

The problems of collecting cancer mortality statistics in developing countries have been described.[5] Knowledge of cancer patterns in Africa have largely been based on hospital series collected by clinicians and pathologists.[6]

Address for correspondence:
Dr. Ejikeme B. Arodiwe,
Department of Medicine, University of Nigeria,
Teaching Hospital, Ituku/Ozalla, Nigeria.
E-mail: arodiwenephrol@yahoo.com

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Despite the problems associated with interpreting data from hospital-based series, they are an invaluable source of information on cancer patterns where incidence and mortality data are unavailable.

This paper is hospital-based data and the study conducted in the adult medical wards only. It was therefore carried out to establish the relative contributions of the various cancers to the cancer deaths certified at the University of Nigeria Teaching Hospital, Enugu. The hospital is a tertiary health institution strategically located in the South East zone of Nigeria. This is in the Ibo speaking tribe of Nigeria. It serves approximately a quarter to a third of the Nigerian population currently estimated to be 158.2 million.[7] The hospital receives patients from Enugu state (where it is located), and from neighboring states of Kogi, Anambra, Ebonyi, Abia, and Imo. Enugu state covers an estimated area of 7161 km.[8]

Materials and Methods

All cancer deaths diagnosed from patients case notes, admission and death registers, and medical certificates of cause of death in the 16-year period from the beginning of January 1995 to the end of December 2010 were retrieved from the hospital records department and medical wards, and reviewed retrospectively to find all the deaths due to cancer. Four hundred and seventy seven cases were retrieved and reviewed. Information collected on each case included the name, age, sex, date of death, type of tumor causing the death, and site of the primary tumor.

The primary site and morphology data were coded using the International Classification of Diseases (10th Edition, ICD-10, World Health Organization).[9] The ages were grouped according to the format used by International Agency for Research on Cancer (IARC, Lyon, France) for cancer reporting;[5,6] namely 0-14, 15-24, 25-34, 35-44, 45-54, 55-64, and ≥65 years. Cases were analyzed according to sex and age distribution for all cases, and sex and age distribution for selected sites. Ethical clearance was obtained from the hospital's ethics committee.

All data were coded, edited appropriately, and entered into personal computer. Analysis of the data was done using the Statistical Package for Social Sciences (SPSS Inc. Chicago, IL) version 17.0. Simple descriptive statistics were used. Mean ± Standard deviation was generated for continuous variables. Student's *t*-test was used to compare means of continuous variables, while Chi-square test was used to test significance of differences between two proportions. $P < 0.05$ was taken to be statistically significant.

Results

Six thousand two hundred and fifty patients died in the medical wards during the period of study. Out of this, 477 (7.6%) died of cancer. Of those that died from cancer, 70.2% were males. The male to female ratio was 2.4:1. Mortality rate was significantly higher in males than in females, $P < 0.001$. The age range for all was 15-92 years, with a mean of 48.3 ± 17.8 and median of 42 years. There was no significant difference in the mean age for males (42.9 ± 17.5 years) and females (45.7 ± 17.0), F 0.092, df 475, $P = 0.109$ [Table 1].

Figure 1 depicts the distribution of cancer deaths by year and sex. After a peak in 1996, there was a sharp decline, which was more precipitous in men than women up to 2002 (7 years later) when another slight rise occurred in females with a fall in males. Thereafter, there were little fluctuations in number of cancer deaths in females while it kept fluctuating widely in men with peaks in 2003 and 5 years later (2008).

Figure 2 shows the distribution of the cases according to age group and sex. The number of deaths for each age group was clearly higher in men. There was a steady rise in the number of deaths from adolescence till adulthood followed by a plateau in the females up to the middle age of 54 years when it fell slightly till in the elderly when it appears to start rising again. However, in males, there was a steady rise in cancer mortality from the age group 15-24 until it peaked at age group 25 to 44 years. There was then, a steady fall until elderly age of 64 years when it started rising again.

The number of cases from each primary cancer site by age group, the summary relative frequency (RF) rates of these sites in males and females are shown in Tables 2 and 3, respectively. In males, the highest mortality was from the liver (RF 40.8%), followed by the hematopoietic organs (39.9%) and prostate (3.9%). In females, malignancies of the hematopoietic organs (48.7%) were the commonest, followed by the liver (24.6%), and unspecified intra-abdominal tumors (6.3%). Death from tumors of the anus and eyes were uncommon in both sexes. There was no death from stomach cancer in females, but it accounted for 1.2% in males.

The number of males in the adolescent and young adult age group (15-24 years) was 56, while females were 14,

Table 1: Age and Sex distribution of cancer deaths

Age group (Years)	Males		Females		Total	
	N	(%)	*N*	(%)	*N*	(%)
15-24	56	11.7	14	2.9	70	14.7
25-34	71	14.9	27	5.7	98	20.5
35-44	64	13.4	28	5.9	92	19.3
45-54	56	11.7	28	5.9	84	17.6
55-64	43	9.0	22	4.6	65	13.6
≥65	45	9.4	23	4.8	68	14.3
Total	335	70.2	142	29.8	477	100

N=Number of cases

giving a male to female ratio of 4:1. In this age group, malignancies of the hematopoietic system dominated the picture, causing 9.9% of deaths in males and 5.6% in females. These were followed in both sexes by hepatic tumors.

The gender distribution of the RF of mortality from the various primary cancer sites in older adults, including the elderly, showed that the commonest fatal malignancies in males are those arising in the liver, while in females hematopoietic cancers were the commonest.

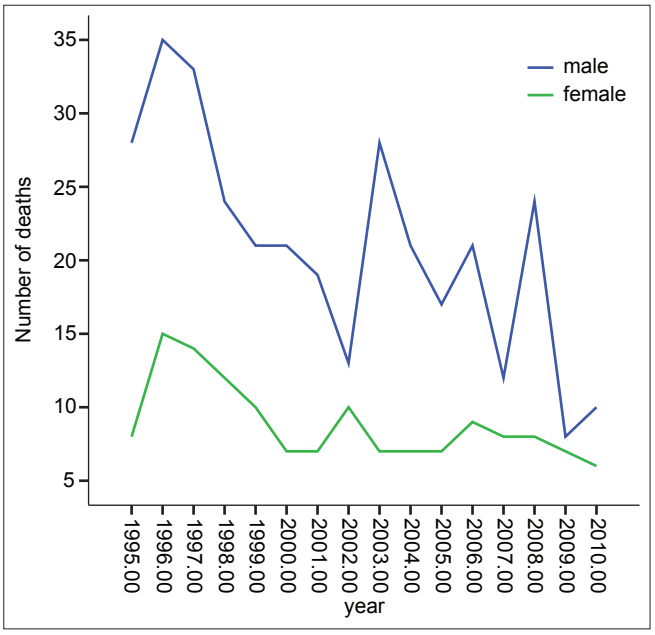

Figure 1: Distribution of number of deaths according to the vear involved and sex

Discussion

Information on disease prevalence, patterns of morbidity, and mortality in communities is of vital importance to health planners. Unfortunately, such information is often lacking in developing countries. As such, hospital-based disease frequency and pattern of death often offer second best alternative. Such hospital-based data, when monitored over a period may assist in assessing changes in disease and death pattern, thus helping health planners to re-order their priority.

Cancer is the most dreaded non-communicable disease

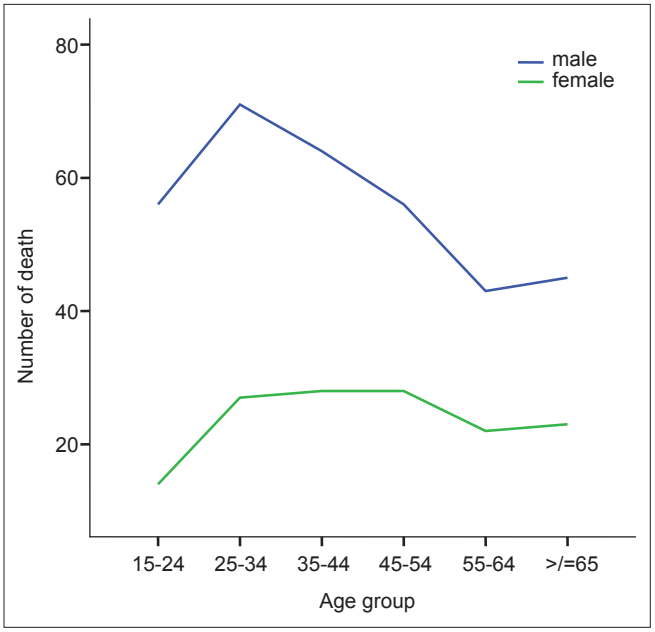

Figure 2: Distribution of deaths according to age group and sex

Table 2: Distribution of cancer deaths by site and age group in males, *N* (%)

Site	15-24	25-34	35-44	45-54	55-64	≥65	Total RF (%)
Liver	21 (6.3)	36 (10.8)	29 (8.7)	23 (6.9)	16 (4.8)	11 (3.3)	136 (40.8)
Hematopoietic	33 (9.9)	29 (8.7)	26 (7.8)	20 (6.0)	16 (4.8)	9 (2.7)	133 (39.9)
Organs							
Prostate	0	0	0	1 (0.3)	1 (0.3)	11 (3.3)	13 (3.9)
Others	0	1 (0.3)	2 (0.6)	3 (0.9)	3 (0.9)	2 (0.6)	11 (3.3)
IAM (unspecified)	1 (0.3)	3 (0.9)	1 (0.3)	1 (0.3)	2 (0.6)	3 (0.9)	11 (3.3)
Lung	0	1 (0.3)	2 (0.6)	6 (1.8)	1 (0.3)	0	10 (3.0)
Pancreas	0	0	2 (0.6)	0	2 (0.6)	2 (0.6)	6 (1.8)
Stomach	0	0	1 (0.3)	1 (0.3)	1 (0.3)	1 (0.3)	4 (1.2)
Brain	0	0	1 (0.3)	0	1 (0.3)	1 (0.3)	3 (0.9)
Bone	0	0	0	0	0	2 (0.6)	2 (0.6)
Gall bladder	0	0	0	0	0	1 (0.3)	1 (0.3)
Oesophagus	0	0	0	0	0	1 (0.3)	1 (0.3)
Colon and rectum	0	0	0	0	0	1 (0.3)	1 (0.3)
Bladder	0	0	0	1 (0.3)	0	0	1 (0.3)
Kidney	0	1 (0.3)	0	0	0	0	1 (0.3)
Soft tissue	1 (0.3)	0	0	0	0	0	1 (0.3)
Total	56 (16.7)	71 (21.2)	64 (19.1)	56 (16.7)	43 (12.8)	45 (13.4)	335 (100)

N=Number, IAM=Intra abdominal malignancy

Table 3: Distribution of cancer deaths by site and age group in females, *N* (%)

Site	15-24	25-34	35-44	45-54	55-64	≥65	Total RF (%)
Haematopoietic organs	8 (5.6)	14 (9.9)	13 (9.2)	13 (9.2)	12 (8.5)	9 (6.3)	69 (48.7)
Liver	4 (2.8)	6 (4.2)	8 (5.6)	5 (3.5)	5 (3.5)	7 (4.9)	35 (24.6)
Others	2 (1.4)	1 (0.7)	3 (2.1)	1 (0.7)	1 (0.7)	1 (0.7)	9 (6.3)
IAM (unspecified)	0	0	2 (1.4)	4 (2.8)	1 (0.7)	2 (1.4)	9 (6.3)
Lung	0	3 (2.1)	0	1 (0.7)	1 (0.7)	0	5 (3.5)
Cervix	0	0	1 (0.7)	0	2 (1.4)	0	3 (2.1)
Soft tissue	0	1 (0.7)	1 (0.7)	1 (0.7)	0	0	3 (2.1)
Pancreas	0	0	0	0	0	2 (1.4)	2 (1.4)
Brain	0	1 (0.7)	0	1 (0.7)	0	0	2 (1.4)
Breast	0	1 (0.7)	0	0	0	0	1 (0.7)
Gall bladder	0	0	0	0	0	1 (0.7)	1 (0.7)
Ovary	0	0	0	1 (0.7)	0	0	1 (0.7)
Colon and rectum	0	0	0	1 (0.7)	0	0	1 (0.7)
Kidney	0	0	0	0	0	1 (0.7)	1 (0.7)
Total	14 (9.9)	27 (19.0)	28 (19.7)	28 (19.7)	22 (15.5)	23 (16.2)	142 (100)

in developing countries where it is invariably fatal, due to lack of adequate preventive and curative services. Unlike in developed countries, which have policy, strategies, and programs for cancer prevention and management, these are scarcely available in developing countries. Consequently, although the incidence of cancer is rising globally, the developing countries account for 52% of this increase and for 70% of cancer deaths while only possessing 5% of global funds for cancer control and very few human and material resources.[1]

Cancer is the second most common cause of death, constituting 12% of all deaths after cardiovascular disease.

It kills more people than tuberculosis, HIV/AIDS, and Malaria combined.[10,11] Cancer accounted for 8.6% of all death in a tertiary hospital in western Nigeria and was the 4th commonest cause of death.[12] In another study in middle belt of Nigeria, it accounted for 7.1% of deaths in the medical wards.[13]

Our study showed that more than half of the deaths (57.4%) occurred between the age group 25-54 years. This is the most productive age group and is of grave economic consequence. The age and sex distribution of the cancer patients is a reflection of the Nigerian population structure. The age and sex structure of the population according to the 1991 census shows a very broad based pyramid, reflecting the large proportion of children and young persons.[14] Those less than 15 years constituted approximately 45% of the total population. The proportion of aged persons (60 years and above) constituted only 3.3%. The high proportion of young people is because of high fertility level and declining mortality.[14] This explains the reason why most admissions and deaths are relatively younger than in developed countries. Also most elderly people are found in the villages and are more likely to patronize traditional medical doctors than seek help in the hospital. This finding is consistent with data emanating from Africa, especially south of the Sahara.[1] More men died from cancer than women did. This is in agreement with studies in our environment showing a higher admission and death rates in men than women.[12,13] Women are less likely to be hospitalized because of cultural beliefs. Men are traditionally regarded as the breadwinners, so everything must be done to safeguard their health. Women must cook and look after the home. Until they become very ill, they are not likely to come to hospital for admission. A larger number of women also patronize faith healers than men. Out of ignorance, cancer is regarded as incurable; hence, such cases are not likely to come to hospital until terminal stage. It is estimated that cancer deaths in Nigeria is slightly higher in females than males.[3] Our study, however concentrated on adult medical wards. This may explain the higher frequency in men.

Previous reviews of cancer in our environment have been mainly restricted to single cancers, rather than relative contributions of the various cancers to the disease burden because of the absence of functional population-based cancer registry.[15-17] This makes it difficult to estimate the proportion of cancers in our area admitted to the hospital. Cancer patients are admitted if they have complications, are critically ill, have metastasis, need surgery like tumor debulking; chemotherapy or pain therapy. Radiation therapy is not available.

In the current study, malignancies of the liver were the leading cause of death in males, closely followed by the hematopoietic organs and the prostate. In females, malignancies involving the hematopoietic organ were the leading cause of death, followed by the liver and unspecified intra-abdominal tumors. In addition, death

from tumor of the stomach appears to be commoner in males than females. The commonest cancers of Nigerian men are cancers of prostate (18.2%), liver (15.7%), and lymphomas (7.4%).[3,18,19] This is in agreement with our findings showing how common these cancers are as causes of death, despite the fact that this study was conducted in the medical wards only. The pattern of death due to cancer in our adult medical wards was similar to findings in another study in the middle belt region of Nigeria.[13] The importance of these cancers as common causes of death in women in adult medical wards was also shown by our study. In women traditionally, cancer of cervix and breasts are commonest with minimal regional variation.[18] Most of these cancers are found in gynaecological and surgical wards, hence their little contribution to causes of death in the medical wards. However, in the West African sub-region liver and hematopoietic (especially non-Hodgkin's lymphoma) cancers are among the first five commonest cancers among women.[3,19,20]

Liver cancer is common in men 40 years and above. The risk factors, which are common in our environment, include infection with Hepatitis B or C viruses (transmitted through infected blood, unsterile needles, and unsafe sex), excessive alcohol use, and food contamination by Aflatoxin, a fungus.

Prostate cancer is commoner in men from 50 years old. This is clearly shown in our work, as most of the deaths from prostate cancer occurred in those aged 65 years and above, Table 2. Ageing, family history, high consumption of fat, and red meat as well as use of sex hormones are associated risk factors.

Cancer of hematopoietic organs is a very important cause of death in our environment. Environmental pollution from the increasing rate of industrialization and high burden of infection may account for the high morbidity and mortality from cancer of the hematopoietic organs.

Cancer deaths from stomach and pancreas are generally low in most parts of Africa. H. pylori infection is a known risk factor for cancer of the stomach, and its incidence is high in sub-Saharan Africa and indeed in most regions of Africa. Increasing westernization, with increasing intake of refined and highly processed food will likely result in the increase in the prevalence of these cancers.

Conclusion

Majority of the causes of cancer death in this study were based on clinical and ancillary investigations. Post mortem examinations would have helped in confirming the causes of death in some cases that may not be obvious. Post mortem, examinations are still very unpopular in our environment because of cultural and religious beliefs.

Cancer incidence and mortality are emerging public health problems in developing countries. This is due to mostly increasing ageing population, high prevalence of cancers associated, or caused by infections and entrenchment of the modifiable risk factors in the populace. In view of the paucity of human and material resources, governments in Africa will need to work urgently on cancer control policy, strategies, and programs especially for common cancers of liver, hematopoietic organs, prostate, breast, and cervix. Cancer prevention should commence at community level with cost-effective measures directed initially at two or three of the common preventable cancers chosen for pilot programs. Subsequently, as resources improve, this can be scaled up. There should be concerted effort at improving coverage for Hepatitis vaccinations. In addition, a central (national) body should co-ordinate the activities of various hospitals, NGOs, government, and researchers. There should be improvement in on-going surveillance for cancers and their risk factors through community surveys and regional cancer registries. Finally, there is need to build capacity of personnel and facilities involved in cancer care, these will contribute to reducing the burden of cancer in Africa.

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