Cancer presentation patterns in Lagos, Nigeria: Experience from a private cancer center

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Abstract

Background: Cancer incidence and mortality is increasing worldwide. In 2018, there were an estimated 18.1 million new cancer cases and 9.6 million cancer deaths. In Nigeria, it is estimated that 100,000 new cases occur annually, with a high case fatality ratio. The burden of cancer in Nigeria is significant, as the country still grapples with infectious diseases and has limited data on cancer epidemiology. Our study is descriptive using data from a hospital-based registry.

Objectives: This retrospective study assesses the characteristics of patients that presented to a private cancer center in Lagos, Nigeria. We aimed to update knowledge on the current trends of cancer in Nigeria as exemplified by the experience of this cancer center and set a foundation for guiding future research and policy efforts in cancer screening, prevention, and control.

Methods: The records of all the 548 oncology patients registered at the Lakeshore Cancer Center (LCC) cancer registry from January 2015 to June 2018 were reviewed for this study.

Results: Most common cancer types were breast cancer for females (46%) and prostate cancer for males (32%). 92% of the tumors were malignant and 97% of the patients were symptomatic. Among patients diagnosed with cancer, 49% were ≤ 50 years old, 90% paid for their healthcare out of pocket, and 67% did not complete treatment.

Conclusions: This study highlights the state of cancer care in Nigeria and should guide future research, with a focus on public awareness, screening programs and implementation of novel cancer control policies and infrastructure that supports early detection.

Introduction

An estimated 18.1 million new cancer cases occurred in 2018 worldwide, according to the International Agency for Research on Cancer (IARC), using the GLOBOCAN 2018 estimates of cancer incidence and mortality.[1,2] In the same year, an estimated 9.6 million people died from cancer-related causes, and approximately 70% of these deaths occurred in low- and middle-income countries (LMICs).[1,2] In 2018, across both sexes, the commonest new cancers worldwide in descending order were lung with approximately 2.1 million (11.6% of the total cases and 18.4% of the total cancer deaths), breast with approximately 2.1 million (11.6% of the total cases and 6.6% of the total cancer deaths), prostate with approximately 1.27 million cases (7.1% of total cases and 3.8% of cancer deaths), colorectal with approximately 1.09 million (6.1% of cases and 5.8% of deaths), and non-melanoma skin cancer with approximately 1.04 million (5.8% of cases and 0.7% of deaths).[1] In 2018, males saw a higher incidence of cancers with 9.5 million new cases compared to 8.6 million new cases in females.[1] In males, the top 5 cancers accounted for over 50% of new cancers and include cancers of the lung (14.5%), prostate (13.5%), colorectal (10.9%), stomach (7.2%), and liver (6.3%).[1] In females, the corresponding top 5 cancers were breast (24.2%), colorectal (9.5%), lung (8.4%), cervical (6.6%), and thyroid (5.1%).[1] The rising incidence of cancer has been attributed to population growth and aging population and adoption of behavioral and lifestyle factors such as tobacco use, alcohol intake, unhealthy diet, and physical inactivity.[3-6]

In Nigeria, some 100,000 new cancer cases occur every year, with a high case fatality ratio.[7,8] Studies of cancer epidemiological patterns from cancer registries show that the most frequent cancers among Nigerian men are prostate and colorectal, while breast and cervical cancers are the commonest in women,[9] in contrast to worldwide figures listed earlier. With approximately 20% of the population of Africa, Nigeria contributed 15% to the estimated 681,000 new cases of cancer that occurred in the continent in 2008.[10] The burden of cancer in Nigeria is significant, as the country still grapples with infectious diseases with limited data on cancer epidemiology. Also, programs directed at cancer screening, early detection, primary prevention policies and standardized cancer treatment are almost non-existent.[11] This is a result of the general inadequacies of the healthcare system in Nigeria. In 2017, Nigeria spent only 3.7% of her Gross Domestic Product (GDP) on healthcare,[12,13] and increased public healthcare spending has been associated with better health outcomes.[14-16] In 2010, the World Health Organization ranked Nigeria's healthcare system 187 out of 191 countries.[17] There is a lack of universal health coverage, and it is estimated that <5% of the population is covered by some form of health insurance, and the majority of patients have high out of pocket payments.[18] Out of pocket payments account for over 70% of total healthcare expenditures in Nigeria; in 2017, the per-

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centage estimated by the World Bank is 77%.[18,19] This cuts across every form of healthcare including oncological care. Beyond this, Nigeria has limited health infrastructure to deal with the rising burden of cancers.[20] In Nigeria, like many other low- and middle-income countries (LMIC), allocation of public funds to cancer care is low, making the case for public-private partnerships including a dedicated oncology center, one that is well funded and focused on the holistic need of cancer patients.[21]

Lakeshore Cancer Center (LCC) is the first operational facility in Nigeria solely dedicated to cancer prevention and treatment. LCC was launched on January 24, 2015, it is located in Lagos, the most populous city in Africa where 22 million people live according to 2016 demographic data, and is closely affiliated with the oldest cancer center in the world, the Roswell Park Cancer Institute (RPCI), Buffalo, New York, USA. The team at LCC consists of certified cancer specialists and a cross-section of passionate and highly dedicated professionals. Through collaboration between local experts who offer an in-depth knowledge of the peculiarities of the Nigerian healthcare culture, and international oncology consultants, LCC provides a comprehensive range of services covering a broad spectrum of cancers. The LCC also has a hospital-based cancer registry, established in July, 2017, and is affiliated with the Nigerian National System of Cancer Registries (NSCR), the supervisory body of cancer registries in Nigeria. There are currently 13 Population Based Cancer Registries (PBCRs) and 20 Hospital Based Cancer Registries (HBCRs) in Nigeria, which includes LCC's registry.[22]

This study was conducted to determine the pattern and distribution of cancers and characteristics of oncology patients that were presented to the only designated private comprehensive cancer care center in Lagos, Nigeria. It aims to provide updated knowledge on the current trends of cancer presentation in Nigeria and to set a foundation for guiding future research and policy efforts in comprehensive cancer control.

Materials and Methods

Study design

This is a retrospective and descriptive cross-sectional study of oncology patients at Lakeshore Cancer Center (LCC) from January 2015 to June 2018. This study was approved by the University of Pittsburgh Institutional Review Board (IRB) - (#PRO18050101). Patient information was de-identified prior to giving the Principal Investigator (PI) access to the data for review and analysis. The data extracted from the LCC registry for analyses was on patient's socio-demographic characteristics (age, gender, marital status, occupation, education, religion, and ethnicity) and lifestyle behaviors (smoking & alcohol consumption). Ethnicity data is reported as part of demographic data collected. Family history of cancer was examined and type of health care coverage was gathered to determine patients that paid out of pocket or are covered by Health Maintenance Organizations (HMOs). The basis of diagnosis, presence of symptoms, tumor behavior, types of treatment and patients that completed treatment were collected to determine the overall patient's clinical profiles and outcomes. Chronic disease risk factors were assessed by collecting data on HIV, asthma, hypertension, diabetes and peptic ulcer disease to determine comorbidities. Other factors examined in the study were the use of traditional medicine prior to visiting the clinic, patient awareness of LCC, and any previous healthcare contact to determine if patients were newly diagnosed or for follow-up care.

Study participants and sample size

Of the 663 patients that visited LCC from January 2015 to June 2018, 17% (115) of them sought other healthcare services such as cancer screening, chronic disease management, and cancer education, while the remaining 548 are oncology patients. All the 548 oncology patients registered in the LCC cancer registry from January 2015 to June 2018 were recruited for the study. LCC's cancer registry was established in July 2017 and patients managed in the center prior to the establishment of the cancer registry were retrospectively registered.

Data analysis

Data was analyzed using the IBM Statistical Package for Social Sciences (SPSS) version 25.0, produced by IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. Variables were analyzed using descriptive statistics.

Results

Socio-demographic and clinical data of 548 patients who were registered at LCC cancer registry from January 2015 to June 2018 were analyzed. The demographic characteristics of oncology patients treated at the center were 73% female, 74% married, 87% had a tertiary level of education and 81% were professionals and business owners. The average age of the patients was 52 years old and 49% (269) of the patients diagnosed with cancer were 50 years old or less. Patients were mostly Christians (91%) and predominantly from the Yoruba and Igbo (76%) ethnic groups (Table 1).

Breast cancer was the most common cancer in women with 181 cases (46%), while the commonest cancer in men was prostate cancer with 50 cases (32%) (Figure 1). Overall, the majority of cancer diagnoses were: breast (33%), gynecological cancers (14%), prostate (9%) and colorectal (7%) (Table 2).

A review of health behaviors shows that 26% of the patients consumed alcohol and 6% smoked. Only 21% of the patients had a family history of cancer. The most common chronic disease patients reported was hypertension (31%), while 16% had other comorbid diseases. An overwhelming majority (90%) of the patients were private (non-Health Maintenance Organization-HMO) and paid for their healthcare out of pocket.

Table 1. Socio-demographic characteristics of oncology patients.

Variables	N (%)
Age, (Mean 52 years)	548
≤ 20 years	3 (<1)
21-30 years	33 (6)
31-40 years	110 (20)
41-50 years	123 (22)
51-60 years	125 (23)
≥ 60 years	154 (28)
Gender	548
Female	401 (73)
Male	147 (27)
Marital Status	548
Married	402 (74)
Single	51 (9)
Widowed	56 (10)
Divorced/Separated	36 (7)
Occupation	413*
Professionals/Administrators	255 (62)
Business Owners	78 (19)
Retirees	67 (16)
Unemployed	4 (1)
Student	9 (2)
Religion	521*
Christian	475 (91)
Muslim	45 (8)
Hindu	1(1)
Ethnicity/Tribe	548
Yoruba	227 (41)
Igbo	192 (35)
Edo	12 (2)
Other	117 (22)
Education	328*
Primary	10 (3)
Secondary	33 (10)
Tertiary	284 (87)

*Some missing data.

Only 9% of the patients revealed using traditional medicine prior to their visits to the clinic. Thirty-nine percent of the patients were referred by their doctors or other hospitals while 20% found the center online. Forty percent of the patients had previous contact with other healthcare systems abroad and 45% had previous contact with domestic private or teaching hospitals before referral to LCC. Definitive diagnosis was made with histology of the primary site in 95% of cases, while cytology techniques were diagnostic in 5% of the cases (Table 4). Table 4 shows that of the 547 cases for which we had data on symptoms at diagnosis, 97% of the patients were already symptomatic with symptoms ranging from local to systemic, depending on the tumor site. 546 patients had a diagnosis that was either clinical, histology or cytology based. Of the 545 patients whose tumor behavior was reported, 92% of the tumor was malignant, 5% in situ, 1% benign and 2% uncertain. Of the 436 patients that had TNM staging available, nearly half (49%) of them were Stage IV disease, 26% were Stage III, 17% were stage II and 8% Stage I cancer. Over a third of the patients (39%) received single treatment modalities which included: chemotherapy (18%), surgery (16%), radiotherapy (1%), hormonal therapy (1%), immunotherapy (2%), and targeted therapy (1%). Most patients (61%) received a combination of the above modalities and 61% of treated patients received a combination of at least two treatment modalities in various forms while a few benefited from up to four modalities.

Table 5 shows available follow-up and outcome information from January 2015 to June 2018. The follow-up data consists of all patients (n=663) including those who sought care for non-cancer treatment reasons were included, highlighting one of the challenges of cancer registration in Nigeria-data storage is inconsistent. Nine percent were active patients, 13% were receiving follow-up care, 40% were lost to follow-up and 38% are deceased. Table 5 also shows that only 21% of the oncology patients completed treatments, 12% are currently undergoing treatments (active and follow-up care) and 67% did not complete treatment.

Discussion

In this study, we reviewed cancer presentations patterns at a private cancer care facility in Lagos, Nigeria. We aimed to provide some knowledge on presentation patterns in Lagos, Nigeria. Our results show a high preponderance of late stage cancer pre-

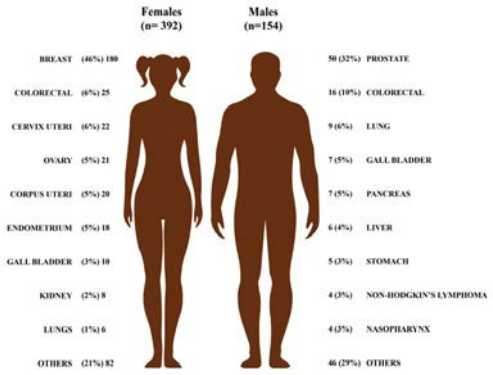

Figure 1. Cancer site by frequency based on gender.

Table 2. Cancer site by gender and overall frequency.

Site	Gender		Total, n (%)
	Female	Male	
Central nervous system			
Brain	2	1	3 (<1)
Meninges	0	1	1 (<1)
Breast	180	1	181(33)
Respiratory system			
Nose	1	2	3 (<1)
Accessory Sinuses	1	2	3 (<1)
Nasopharynx	1	4	5 (1)
Lung	6	9	15 (3)
Gastrointestinal system			
Tongue	1	1	2 (<1)
Parotid	0	1	1 (<1)
Oropharynx	1	0	1 (<1)
Hypopharynx	0	2	2 (<1)
Esophagus	3	2	5 (1)
Tonsil	0	1	1 (<1)
Stomach	4	5	9 (2)
Small intestine	3	3	6 (1)
Colorectal	25	16	41 (7)
Anus	5	0	5 (1)
Liver	5	6	11 (2)
Gallbladder and bile tract	10	7	17 (3)
Pancreas	5	7	12 (2)
Peritoneum	0	1	1 (<1)
Gynecological			
Cervix uteri	22	-	22 (4)
Corpus uteri	20	-	20 (3)
Ovary	21	-	21 (4)
Vagina	1	-	1 (<1)
Endometrium	18	-	18 (3)
Male reproductive tract			
Prostate	-	50	50 (9)
Testis	-	1	1 (<1)
Scrotum	-	1	1 (<1)
Urinary System			
Kidney	8	1	9 (2)
Hematological			
Hodgkin's Lymphoma	1	2	3 (<1)
Non-Hodgkin's Lymphoma	1	4	5 (1)
Leukemia	2	1	3 (<1)
Multiple myeloma	3	0	3 (<1)
Plasmacytoma	1	1	2 (<1)
Bone	3	2	5 (1)
Endocrine			
Thyroid	2	0	2 (<1)
Others/unspecified	28	20	48 (9)
Total	392 (72%)	154 (28%)	546 (100)

*Some missing data.

sentation, and the most prevalent cancers across both sexes is breast cancer. In females, the most common cancer is breast while in males, we found the most common cancer to be prostate cancer. Epidemiology of cancer is known to vary across different regions of the world.[1] Trends in cancer incidence across populations, gender and age are important in defining policy, scientific research, and cancer interventions. Such data assist us to better guide allocation of resources in the fight against cancer. In a country like Nigeria, where there is paucity of studies with accurate documentation of cancer trends, our study offers a snapshot of an important problem in Nigeria. In this retrospective, descriptive cross-sectional study of a Nigerian hospital-based cancer registry, we reviewed the patterns and presentations of cancers at the Lakeshore Cancer Center (LCC).

Oncology care in Nigeria is constrained, and has limited capacity.[21] In total, Nigeria has 9 designated comprehensive cancer care centers, 8 public and 1 private, which is the LCC.[23] In 2018, it was estimated that there were 26 oncologists in Nigeria, compared to 11,700 in the United States.[24] With the limited access to quality cancer care, LCC, as a designated comprehensive cancer care center plays an important role in cancer prevention and treatment. LCC also contributes to knowledge on the current cancer trends in Nigeria and sets a foundation on which to build future research and policy efforts in cancer control. In Nigeria, the resource-constrained health care system, lack of cancer awareness, poverty, shortage of well-trained health care personnel and inadequate research infrastructure all contribute to adverse cancer outcomes.[25-28] Furthermore, for many patients, healthcare practitioners are a last resort in addressing health concerns,[29-31] contributing to late-stage diagnosis and poor cancer outcomes.

It is well known that advancing age is the most important risk factor for the development of cancer.[32,33] We had similar findings in our study, the median age for all cancers was 52 years. When compared to data from high income countries, cancers are diagnosed at older ages. In the United States, the median age of cancer diagnosis in men and women is 66 years, and 25% of new cancer cases are diagnosed in people aged 65-74 years.[32] In our study, cancer prevalence was highest in the 41-60-year-old age bracket, with 45% of all diagnosed cancers. Overall, 49% of cancer cases in our study were diagnosed in patients aged 50 years old or younger, showing a skew towards a younger demographic, and makes a case for early cancer prevention programs.

Table 3. Lifestyle, family history, referrals, and chronic disease characteristics of oncology patients.

Variables	N (%)
Lifestyle	Alcohol 539*; Smoking 540*
Alcohol consumption	138 (26)
Smoking	31 (6)
Family history	548
Yes	116 (21)
No	432 (79)
Type of patient	548
Private	493 (90)
HMO/Company	55 (10)
Chronic diseases	548
Comorbidities**	90 (16)
HIV	6 (1)
Asthma	17 (3)
Hypertension	172 (31)
Diabetes	54 (10)
Peptic ulcer	50 (9)
No chronic diseases	159 (29)
Traditional medicine	547*
Yes	47 (9)
How patient found lakeshore	548
Online	110 (20)
Doctor/Hospital	212 (39)
Relatives	108 (18)
Other	118 (22)
Previous healthcare contact	257*
Abroad	104 (40)
Domestic	116 (45)
Unspecified	37 (15)

*some missing data; **>1 chronic illness.

Table 4. Clinical outcomes of oncology patients at Lakeshore cancer center.

Variables	N (%)
Basis of diagnosis	546*
Histology of primary	516 (94)
Cytology	26 (5)
Clinical only	4 (1)
Presence of symptoms	547*
Symptomatic	531 (97)
Asymptomatic	16 (3)
Behavior of tumor	545*
Benign	4 (1)
In Situ	27 (5)
Malignant	504 (92)
Uncertain	10 (2)
Staging	436*
I	35 (8)
II	75 (17)
III	112 (26)
IV	214 (49)
Type of treatment	406*
Single therapy	
Chemotherapy	76 (19)
Surgery	65 (16)
Radiotherapy	5 (1)
Hormonal	9 (2)
Combination therapy	
Chemotherapy	144 (35)
Surgery	91 (22)
Radiotherapy	9 (2)
Hormonal	7 (2)

*Some missing data.

Table 5. Patient outcomes from January 2015 to June 2018.

Variable	N (%)
Patients	663**
Active	59 (9)
Follow-up	87 (13)
Lost to Follow-up	265 (40)
Deceased	252 (38)
Complete treatment	539*
Yes	113 (21)
No	361 (67)
Ongoing	65 (12)

*some missing data, **combined outcome data for oncology patients and those that sought other healthcare services such as cancer screening, chronic disease management, and cancer education.

Nigeria has a young population with a median age of 17.9 years and a current life expectancy of 55.2 years.[34] As life expectancy improves and the population lives to older ages, the skew may disappear.

Across both genders, the prevalence of cancer was 2.3 times higher in females compared to males, 73% vs 27% respectively. This finding is in opposition to findings reported by a paper examining cancer registry trends in southwest Nigeria that showed a male preponderance of 64.5% of total cancers.[35] However, data from other cancer registries in Lagos State show numbers and trends similar to ours, with the registries in Lagos University Teaching Hospital (LUTH) and Lagos State University Teaching Hospital (LASUTH) showing percent female prevalence of 73.5% and 74.9% respectively.[36] In our study, breast cancer was the commonest cancer overall (33%), and other gynecological cancers (cervix uteri, corpus uteri, vaginal, endometrial and ovarian cancers accounting for an additional 14% approximately. The higher female prevalence may also be explained by the differences in health seeking behaviors in both genders. Available data suggests that females are more likely to seek health care compared to males.[37]

In our study, the commonest type of cancer overall was breast cancer (33.0%), followed by prostate cancer 9%, colorectal cancer 7%, cervical cancer 4 % and ovarian cancer 4%. We also noted a high percentage of unspecified cancers (9%). Lung cancer which is the commonest worldwide ranks 9th overall in our study. Our data shows colorectal cancer ranking second and cervical cancer ranking third. Cervical cancer is a highly preventable disease, and through aggressive HPV vaccination and cervical cancer prevention programs, is set to be eliminated in Australia in the coming years.[38] As cervical cancer awareness, prevention and screening modalities become ubiquitous, other gynecological cancers and colorectal are poised to take center stage. Since the introduction of the HPV vaccine into the country and the vaccine becomes more accessible, we anticipate that in the future cervical cancer incidence will continue to decrease.

In males, the patterns we found were similar in some aspects to data reported from other registries. In our study, prostate cancer was the commonest cancer, accounting for 32% of all cancer cases, followed by colorectal cancer at 10.0%. A unique finding in our data is that lung cancer ranked third amongst all male cancers at 7.6%. In previous studies in Nigeria registries, lung cancer was not among the top 5 commonly occurring cancers in men.[36]

The stage of cancer at presentation is an important contributor to the mortality and outcome of cancer treatment. Cancer care in Nigeria is characterized by late stage presentation after first symptom and delayed diagnosis.[39,40] This was also true in our study as we found that 75% of patients presented late (Stage 3 and 4). As a descriptive study, we were unable to explore the reasons for delayed presentation and where patients typically visit prior to presenting to LCC. We recommend further studies to explore these important questions.

In our study, 97% presented with symptoms, which can be an indication of advanced disease.[41] In Nigeria, routine cancer screening programs are largely unavailable,[42] and there are various myths that surround cancer especially as it relates to prevention and treatment.[43,44] All of the above factors are probable reasons for these findings. We recommend that cancer awareness and screening need to take a more aggressive form in Nigeria as symptomatic presentation also increases cancer-related morbidity and mortality. 40% of patients in the study were 'lost to follow-up' and only 21% completed treatments. The exorbitant costs of cancer care are unaffordable to many Nigerians, and this may result along with other factors in many patients cutting short their treatment plans or avoiding treatment altogether.[26]

In Nigeria, as noted earlier, health insurance coverage for cancer prevention and treatment is rare.[16,19] The lack of structured access and health infrastructure lead many individuals to delay treatment until they are symptomatic. Our results revealed a highly educated group, and an overwhelming majority of the patients were private (non-Health Maintenance Organization-HMO) and paid for their healthcare out of pocket. With the majority of the patients in our study being 'highly' educated, an indicator of elevated socioeconomic status, patients in our study were better positioned than most to afford care. However, many reported delays to treatment and/or incomplete treatment. Public healthcare financing is limited- as noted earlier, 77% of healthcare spending is out of pocket. Nigeria's middle class, approximately 23% of the population earns between $480 and $645 monthly,[45] and the minimum monthly wage is NGN30, 000 or $77.32.[46] Over 40% of Nigerians live below the poverty line.[47] With these numbers, it is no surprise that cost is a major issue in seeking cancer care in Nigeria and can be prohibitive to patients.[48]

Nearly half of the patients had previous contact with other healthcare systems abroad, this is a common practice with Nigerians who can afford the cost of treatment overseas.[49] The majority of the population does not have the luxury to access treatment abroad or have access to quality cancer care at a domestic private or teaching hospital. It is not unusual for families of individuals diagnosed with cancer to exhaust all of their life savings to pay for the cost of their treatment.[50]

The pluralistic system that includes standard, alternative and traditional health care delivery systems in Nigeria, all operating alongside one another may contribute to delayed treatments.[51,52] Many people seek pastoral care because they can't afford the cost of conventional therapy. Spiritual healing seems to be an alternative that many Nigerians use to address some of their health needs.[53] People realize that there are limited options regarding access to cancer care, and many feel more inclined to seek pastoral care when they receive negative diagnoses.

Study limitations

Our study was based on data solely derived from a single hospital-based cancer registry. Thus, it might not provide an accurate picture of the patterns in the general population. Our data is also derived from a private health care facility where most of the patients are of higher SES, and not reflective of the majority of the country. We were unable to provide mortality data as this was not captured in the cancer registry. The relatively small sample size and retrospective nature of our study are also limitations to this study and we recommend further studies to effectively document cancer trends in Nigeria. Due to the challenges of cancer registration, not all patients in the registry had data for each variable examined, therefore, we had some missing variable data for some patients.

Conclusions

This study highlights some of the problems in cancer care in Nigeria. Breast and prostate cancer were two of the most common cancers seen at this center and the majority of patients had advanced stage disease on initial presentation. The low rate of treatment completion may be related to affordability, thus emphasizing the need for healthcare financing innovations. Data such as those presented here should guide future research and policy directed toward comprehensive cancer control with a focus on public awareness and screening programs. There is an urgent need to strengthen public and private institutions, in the areas of research, patient care, and implementation of novel cancer control policies.

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