

CANCER INCIDENCE IN NORTHERN CENTRAL MOROCCAN PATIENTS

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ABSTRACT

Purpose: Cancer remains a major health problem around the globe. Therefore, more efforts are needed to understand trends, causes, and distribution of cancer to control cancer epidemiology. The objective of this research was to investigate the association between cancer incidence and demographic and clinical data in Meknes, Morocco, North Africa.

Methods: A number of 1380 cancer patients were studied at the Oncology Center of Meknes, Morocco. The correlation between cancer incidence and demographic and clinical data were conducted using Sample Power for Statistical Power package.

Results: There was higher proportion of females among cancer patients. The 5 most common sites of cancer diagnosed in this population sample were: the breast cancer, followed by cervix, colon-rectum, bronchus and lung. The average length of treatment is 123.76 days. 45.3% of the patients were treated with chemotherapy. A significant ($p < 0.05$) association was found between cancer incidence and gender, age, cancer site, length of treatment, and type of treatment.

Conclusions: These significant associations between cancer incidence and demographic and clinical data will significantly contribute to our understanding of cancer incidence in this area as this study is the first report within population. This study will help for disease control, prevention, and management.

Keywords: Cancer incidence, Cancer site, Clinical data, Demographic data.

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INTRODUCTION

Cancer is among the leading cause of morbidity and mortality worldwide [1]. In 2012, an estimated of 14.1 million new cases of cancer occurred worldwide and 8.2 million cancer related deaths [1]. More than 60% of world's total new annual cases occur in Africa, Asia, Central, and South America. These regions account for 70% of the world's cancer deaths [1]. The four most common cancers occurring worldwide are lung, prostate, colorectal, stomach, and liver cancer [1]. It is now thought that many familial cancers arise, not exclusively from genetic makeup, but from the interaction between common gene variations and lifestyle and environmental risk factors [2]. Only a small proportion of cancers are strongly hereditary in that an inherited genetic alteration confers a very high risk. Cancer most commonly develops in older

people; 78% of all cancer diagnoses are in people 55 years of age or older. People who smoke, eat an unhealthy diet, or are physically inactive also have a higher risk of cancer [3-6]. The improvement in cancer survival reflects both the earlier diagnosis of certain cancers and improvements in treatment contribute to better cancer control and management. Survival statistics vary greatly by cancer type and stage at diagnosis [7].

Knowledge about the causes of cancer and interventions to prevent and manage the disease is extensively available. Cancer can be reduced and controlled by implementing evidence-based strategies for cancer prevention, early detection of cancer and management of patients with cancer [8]. Many cancers have a high chance of cure if detected early and treated adequately. For this very reason, in 2005 the Lalla Salma Foundation for the

Prevention and Treatment of Cancer was created in Morocco by Princess Lalla Salma and its main objective was to set up a national plan for the prevention and to fight against cancer in Morocco. Thus, the Oncology Center of Meknes was born in June 2014.

To improve cancer management in the region of Meknes, this study was conducted to analyze, retrospectively, data of patients with cancer and assess the incidence of cancer and its association with clinical and demographic characteristics during the period from January, 2015 to December, 2015 in 1380 patients in the region of Meknes, Morocco, North Africa.

METHODS

Data were collected retrospectively on 1380 consecutive patients with cancer between January and December 2015 at Regional Oncology Center of Meknes. In 2014, the total population of this region was estimated to be 632,079 inhabitants of which 257,579 in urban areas and 243,015 in rural areas. The region has 64 public health care facilities, 33 in urban and 31 rural areas, one regional hospital in Meknes and four local hospitals. The region included Meknes and 5 provinces (El Hajeb, Errachidia, Ifrane, Khénifra, and Midelt). The population of Meknes is predominantly urban (85.39%). The study was formally approved by the ethical committee at the University of Fez.

2.1 Study design

Data used in this study also included the following methods: demographic data; patient age, gender, and type of medical insurance, clinical data; type of therapy, length of treatment, and cancer site. This retrospective study involved 1380 patients with

cancer. Type of insurances were indicated below in the results section. A 45.3% of the patients were treated with chemotherapy, 42.9% of the patients were treated with radiotherapy, 0.8% received hormone therapy, and 3.4% of patients received a dosimetric scan. The average length of treatment was 123.76 days.

2.2 Statistical analysis

Statistical analyses were performed using SPSS Statistical program package, version 21.0. T-test test was applied to determine the level of significance between variables. Chi-square test (X² test) was employed to judge the level of significance of variables. Correlation between variables was set at p 0.05 level of significance.

RESULTS

A number of 1380 cancer patients were admitted, diagnosed, and treated at the Oncology Center of Meknes with 126 new cases in 2015. The incidence rate was 0.06 per 1000 population. Type of insurance were 93% of patients were holders of Health Card, 87% were holders of Medical Assistance System (RAMED) Health Card, 3 % were holders of The National Social Insurance Fund (CNOPS) Health Card, 2% were holders of the National Social Security Fund (CNSS) Health Card , and 1% were holders of the Royal Armed Forces (MFAR) Health Card. Patients who paid for insurance constituted only 7%. As shown from **Figure 1**, females represented a high significant proportion of cancer patients. The average age of patients was 56.58 years. The 5 most common sites of cancer diagnosed were breast (38.2%), cervix (11.4%), colon-rectum (6.7%), bronchus and lung (5.5%), and prostate (4.9%)(**Figure 2**).

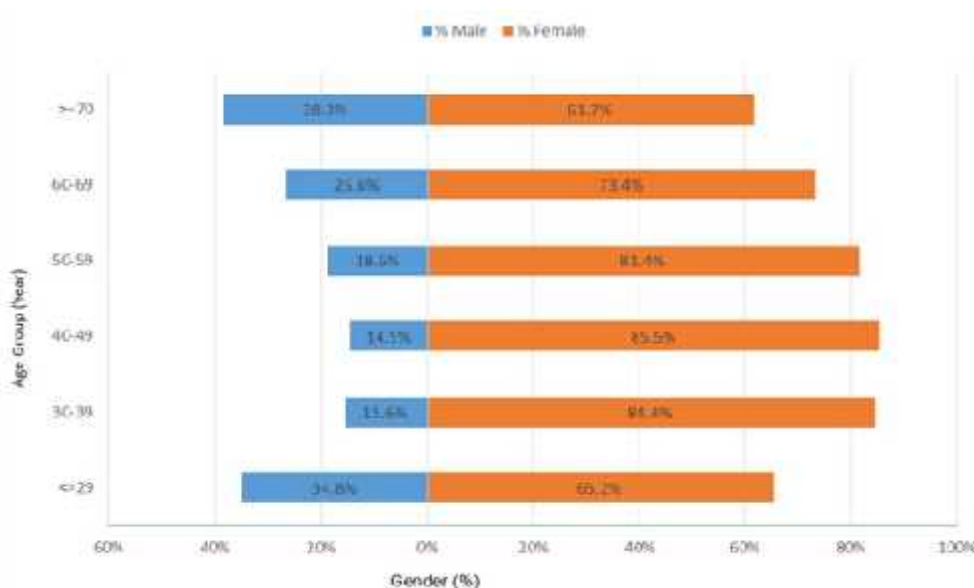


Figure 1. Age group and gender distribution of cancer patients at Regional Oncology Center of Meknes

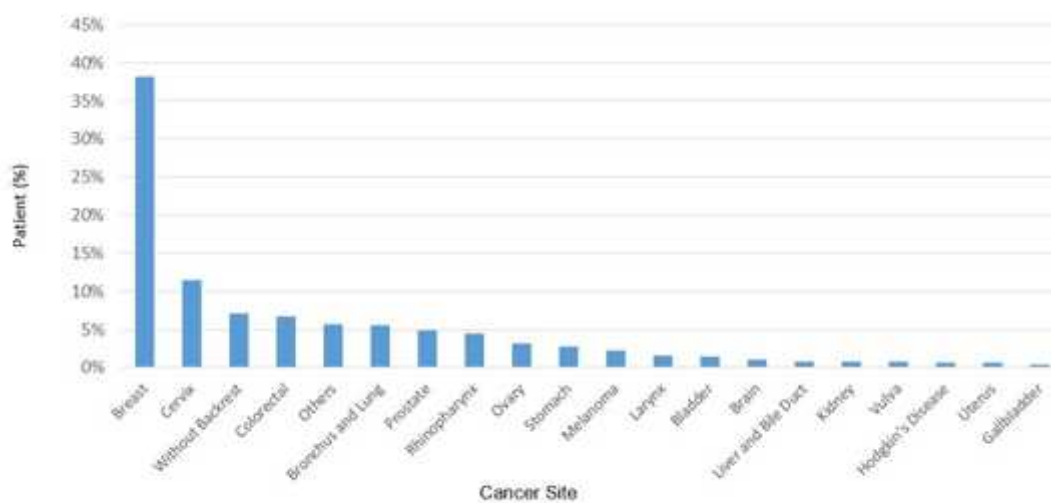


Figure 2. Cancer site distribution of cancer patients at Regional Oncology Center of Meknes

A significant correlation was found between gender and cancer site; gender and type of treatment; gender and length of treatment; type of treatment and cancer site; type of cancer and length of treatment; age and length of treatment; age and the cancer site; cancer site and length of treatment. Based on the correlations, it can be reported that

cancer site is significantly associated with gender. Breast followed by cervical cancer are most common in women. Lung cancer followed by prostate cancer occurs most often in men (**Figure 3**).

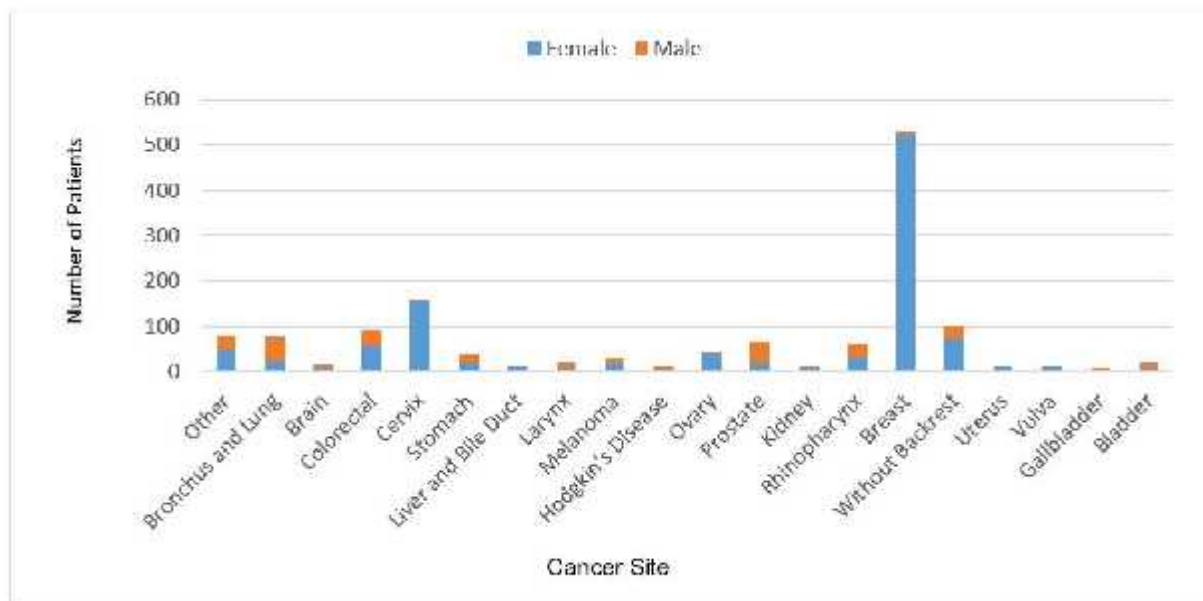


Figure 3. Cancer type and gender distribution of cancer patients at Regional Oncology Center of Meknes

A highly significant relation between gender and age, and women between 50 and 59 years old were the most affected by cancer, while the most affected men group was over than 70 years (Figure 1). There was a significant relation between gender and radiotherapy ($p=0.033$), but there was no significance between gender and chemotherapy ($p=0.422$). The length of treatment was also related to gender, most women spend much more time of treatment (ranged from 180 to 270 days), the majority of men spend less time (ranged from 30 and 90 days) at the oncology center. The type of treatment was also related to the tumor site, and radiotherapy was more commonly used for cervical cancer. There was a significant association between length and type of treatment. For most patients

treated with chemotherapy, the length of treatment varied between 180 to 270 days. As the age increased, the average length of treatment decreased consistently, indicating an inverse relationship between age and length of treatment. Breast and cervical cancer affected the age that ranged between 50 and 59 years and prostate cancer influenced the age that ranged between 60 and 69 years, and bronchus and lung affected people over 70 years. The length of treatment of lung and prostate cancers was shorter than breast and cervical cancer which are requiring a longer treatment between 90 to 180 for cervical cancer and between 180 and 270 for breast cancer (Figure 4).

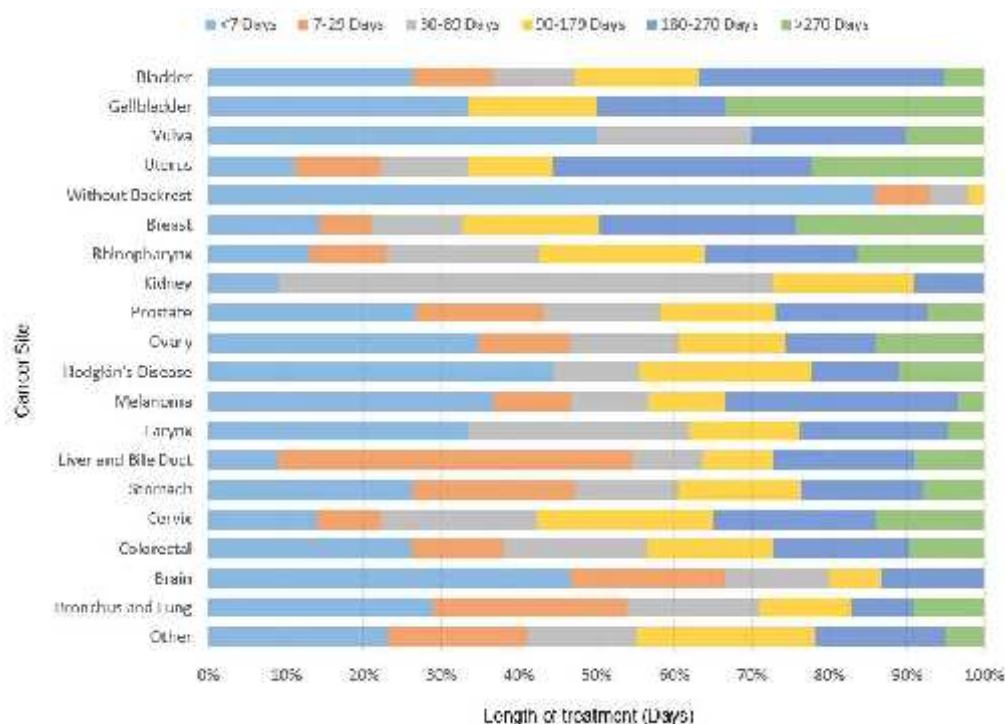


Figure 4. Cancer type and length of treatment distribution of cancer patients at Regional Oncology Center of Meknes

In this population, breast, cervix, without backrest, colon-rectal, bronchus and lung, and others were the observed type of cancers. In female, the highest was cancer incidence was recorded in breast, followed by cervix, and colon-rectal. In male, the most cancer incidence was observed in bronchus and lung followed by prostate, and colon-rectal.

DISCUSSION

Our study was the first to report the relationship between cancer incidence and demographic and clinical data features of 1,380 patients in the province of Meknes, Morocco, North Africa. In our region, in 2015, there were 710 new cases of cancer developed. This number represents 0.2% of the population of the region. According to the Cancer Registry of the Grand Casablanca Region (RCRC) 2004, the estimate of new cases of cancer currently in Morocco was 30,500/year [9]. In Meknes region, women were more affected by cancer compared to men which is different from the French epidemiological data published in 2014, where the number of new cases of cancer in metropolitan France was estimated 355,000, including 200,000 was observed in men and 155,000 was observed in women [10]. In 2015, nearly a quarter of a million new invasive cancer cases were diagnosed in Spain, almost 149,000 in men (60.0%) and 99,000 in women [11].

In our study the 5 most common sites of cancer diagnosed were breast, cervix, colon-rectum, bronchus and lung, and prostate. Our findings agreed with previous research where cervical cancer is the second most common cancer in women after breast cancer [1]. The most common cancer by gender was the breast cancer followed by cervix in women. In contrast, lung cancer was the most common in men followed by prostate cancer. These findings coincided with other national and international studies reported by the Grand Casablanca Register and WHO [1, 9]. Our findings were different from those of France, where in men, the three most frequent cancers were prostate (56,841 cases), lung (28,211 cases), and colon-rectum (23,266 cases) for solid tumors. In women, however, the most frequent cancers were breast cancer (48,763 cases), colon-rectum (18,926 cases) and lung cancer (11,284 cases) [10].

In our study, the average age of patients was 56.58 years. In the USA, age was a risk factor for breast cancer, the United States Preventative Services Task Force (USPSTF) recommends that women who are 50 to 74 years old to get a mammogram every two years [12]. According to the report of the Public Health England, cancer most often develops in the elderly. Nearly two thirds of cancer diagnoses occur in the over 65 and one third in people aged 75 and over [13].

A significant correlation was found between gender and age; cancer affected women at an earlier age than it does men. Women between the age of 50 and 59 were the most affected by cancer, while in men the most affected age group is over 70 years.

In United Kingdom, up to the age of 50, the risk of developing cancer is 1 in 35 for men and 1 in 20 for women [13]. Breast and cervical cancer in women in our region affected the age range between 50 and 59 years, a Cameroonian study reported a pyramidal aspect of the frequency of these types of cancer with a peak between 40-49 years [14]. In an Ivorian study, the same distribution was observed with a peak between 45-55 years [15].

Shariat et al. [16] reported the influence of gender on length of treatment of cancer, which coincided with our findings, and found that the length of treatment was gender-dependent with most women spending between 180 and 270 days of treatment. However, the majority of men spend between 30 and 90 days at the oncology center. In our study, the length of treatment also varied, depending on many factors such as cancer type, age which is consistent with those found by Shariat et al. [16].

One of the crucial steps towards the successful delivery of anti-cancer treatment is the optimal scheduling and sequencing of different therapeutic modalities, in particular radiotherapy and chemotherapy [17]. In our region, 45.3% of patients had received chemotherapy. In France, on the other hand, the development of oral forms of chemotherapy and the new drugs with a better tolerance profile are alternatives to classical hospitalization, and the management of side effects of treatments by support treatments widened the therapeutic possibilities even in the Elderly patient [18]. Radiotherapy was also a frequent cancer treatment concerning 42.9% of patients, but the therapy depended on the tumor site, gender, and length of treatment. Depending on the cancer case, other methods of treatments such as surgery and chemotherapy can be used [17].

In our study, there was a significant relationship between length of treatment and gender, cancer site, therapy, and age group. Chemotherapy lasted 2-3 sessions/weeks for 3-6 months; radiotherapy depended on the size, location, and aggressiveness of the tumor. Radiation therapy was usually, but not always, administered once a day, five times a week, and takes a few minutes each time which corresponds to the American therapeutic pattern [19]. There were no patients' records regarding the level of study, occupation, personal and family history of cancer. Ninety-nine (7.2%) of patients did not follow-up, i.e., patients for whom there is no information regarding their vital status or their

disease once the positive diagnosis has been made. This was a low rate compared with the study conducted at Bni Mallal [20] with a 48% loss of sight, and this can be explained by a well-organized program, easy access to treatment at the Meknes Oncology Center and a total care of patients who have benefited from Medical Assistance System (RAMED) Health Card. The rate of patients who have benefited from RAMED is 86.6%, this high rate shows the success of the system of care for the poor.

CONCLUSION

In this study we showed significant relation between gender and cancer site; age and length of treatment; type of treatment with the cancer site and length of treatment; age with length of treatment, and age with cancer site; and cancer site with length of treatment. The current findings will further help understand the cancer type, its distribution, and demographic and clinical features so health care can adopt effective preventive treatment measures to control and manage the disease.

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