

New Insights into the Epidemiology of Cancer at the State Center of Cancerology of Durango, Mexico

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ABSTRACT

The epidemiology of cancer continues to change. We evaluated changes in incidence, average life stage at diagnosis, as well as gender from 2018 to 2021 in Cancer at the State Center of Cancerology of Durango, Mexico (CECAN), and compared it with a work previously published in 2010 with dates from 2001 to 2003. For this, a retrospective and longitudinal study was carried out from January 2018 to December 2021 at CECAN in Durango, Mexico, to determine the morbidity of different types of cancer. We found that in this period a total of 3105 patients were attended; 197 pediatric patients, 1701 adult patients and 1207 senescent patients. In 34% of the cases, the main type of cancer in children was Acute Lymphoblastic Leukemia (ALL), being more frequent in boys than in girls. In adult patients, 1210 were women and 491 men, finding that the most common cancer was breast cancer with 41% of all cancers for this group. For the senescent group, breast cancer was the most frequent in women with 30%, while prostate cancer was the most frequent in men with 32%. There was a 115% increase in the total number of patients seen in the 2018-2021 period compared to those seen in the 2001-2003 period at CECAN-Durango. The number of female patients (62%) was higher than that of male patients (38%). There was a 116% increase in pediatric cancer cases compared to those reported in the 2001-2003 period. These results show us the significant increase in cancer of all types in our population and the need to take preventive measures against this disease.

Keywords: Cancer; Epidemiology; Mexico

Introduction

Cancer is one of the greatest challenges in public health. This disease is present and affects both developed and developing countries. The potential impact of cancer in the coming years, especially in the least developed countries, can have devastating consequences for the health systems. [1] Trends indicate that Central and South America regions may experience an increase to 1.7 million in cancer incidence and a doubled mortality rate (500,000 to 1 million) by 2030, [2] whereas for Mexico, the World Health Organization recorded 195,499 new cancer cases during 2020, [3] being breast and prostate cancer the main types of cancer in the adult population and ALL, the main type of cancer in the pediatric population. [3] In Mexico, out of every 100 hospital discharges due to cancer (malignant tumors), in a population ranging from 0 and 19 years, 73 are in lymphoid, hematopoietic or related tissues. Included in this population and as part of this classification is Acute Lymphoblastic Leukemia, which alone represents 61% (24,851) of the total cancer discharges (40,679). [4] It is important to point out that currently, the main public health problems in Mexico are chronic-degenerative diseases [1] however, (Partida V in 2005) [5] points out that factors in this country such as malnutrition, are generating a change in morbidity; this can be seen in the increase in cancer morbidity and mortality rates in Mexico and it is expected to increase in the coming years, mainly due to the aging of the population.[6] Even with these data, the studies that document the epidemiological state of cancer in Mexico are still scarce. Currently, Mexico does not have a specific cancer population registry; therefore, epidemiological data on the incidence and prevalence of the disease is necessary. It has been recommended that all new cases of different types of cancer

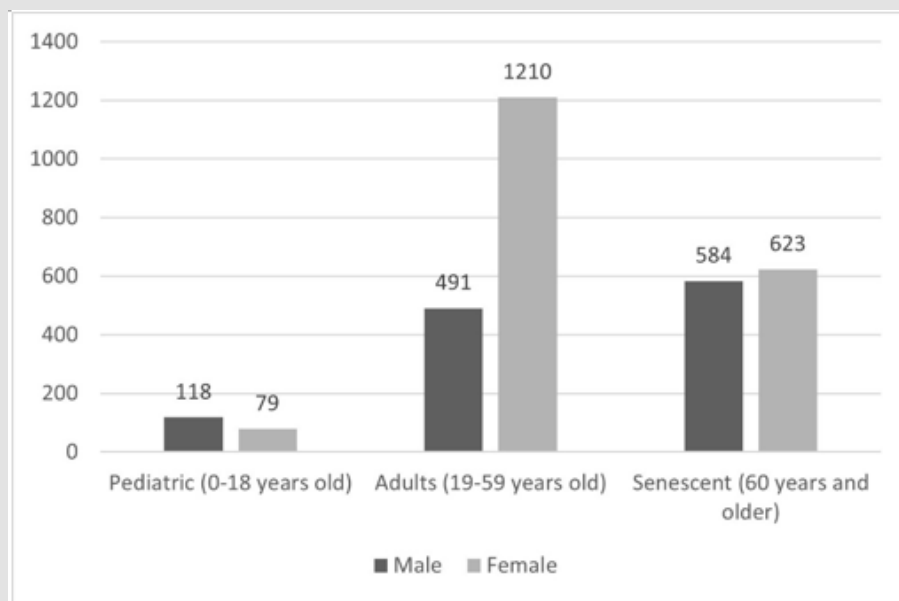
to be notified, [7] this is to establish public policies for the prevention and control of cancer. The purpose of this study was to conduct an investigation updated to 2022 and compare its results with the work previously published in this journal in 2010, entitled: Morbidity and Mortality from Cancer: experience of the State Center of Cancer from the SSA of Durango State, Mexico [8].

Methods

A retrospective and longitudinal study was carried out at the SSA Cancerology State Center (CECAN) in Durango, Mexico from January 2018 to December 2021. The clinical records of the patients treated at this center during the indicated period were reviewed. Data corresponding to the variables of interest were inserted into a data collection sheet, specifically designed for this research. In addition, a database was created with the purpose of analyzing and processing the information. All patients who had been treated in the aforementioned period were included. For the data analysis, a descriptive analysis of the morbidity of each type of cancer was carried out, using tables of frequencies and proportions, histograms, and figures, this in order to know the behavior of the different types of cancer according to the age and sex.

Results

The morbidity data of the patients who were admitted to CECAN-Durango from 2018 to 2021 were obtained. In this period, a total of 3105 patients were treated, including children, adults and senescent patients; of the total number of patients treated, 1,193 were male, which represented 38% of the total number of patients treated, while 1,912 were female, which represented 62% of the total population admitted in this period of time (Graph 1).



Graph 1: Patients Treated at Cecan-Durango From 2018-2021 Grouped By Life Stages And Sex.

Morbidity

Pediatric Stage

During the period of 2018-2021, 197 pediatric patients (0 to 18 years old) were treated, a greater number of cases were found in boys, with 118 cases than in girls with 79 cases. In (Figure 1A), the distribution of the main types of cancer in girls is observed, where the highest percentage of cancer cases was ALL with 34%, miscellaneous with 20%, osteosarcoma 8%, acute myeloblastic leukemia 6%, myelodysplastic syndrome 6%, Wilms tumor 6%, astrocytoma 4%, retinoblastoma 4%, Ewing's sarcoma 3%, biphenotypic leukemia 2%, acute monoblastic leukemia 1%, soft tissue sarcoma 1%, abdominal tumor 1%, conventional osteosarcoma 1%, malignant triton tumor 1%.

acute monoblastic leukemia 1%, soft tissue sarcoma 1%, conventional osteosarcoma 1%, abdominal tumor 1%, malignant triton tumor 1% and inflammatory myofibroblastic tumor 1%. In (Figure 1B), the distribution of the main types of cancer in boys is observed, where ALL was the most frequent cancer with 26%, tumors 11%, miscellaneous with 10%, Hodgkin's lymphoma 7%, astrocytoma 7%, osteosarcoma 6%, testicular cancer 5%, sarcoma 7%, myelodysplastic syndrome 4%, histiocytosis 4%, medulloblastoma 3%, acute myeloblastic leukemia 3%, neuroblastoma 2%, ependymoma 2%, hepatoblastoma 2%, glioma 2%.

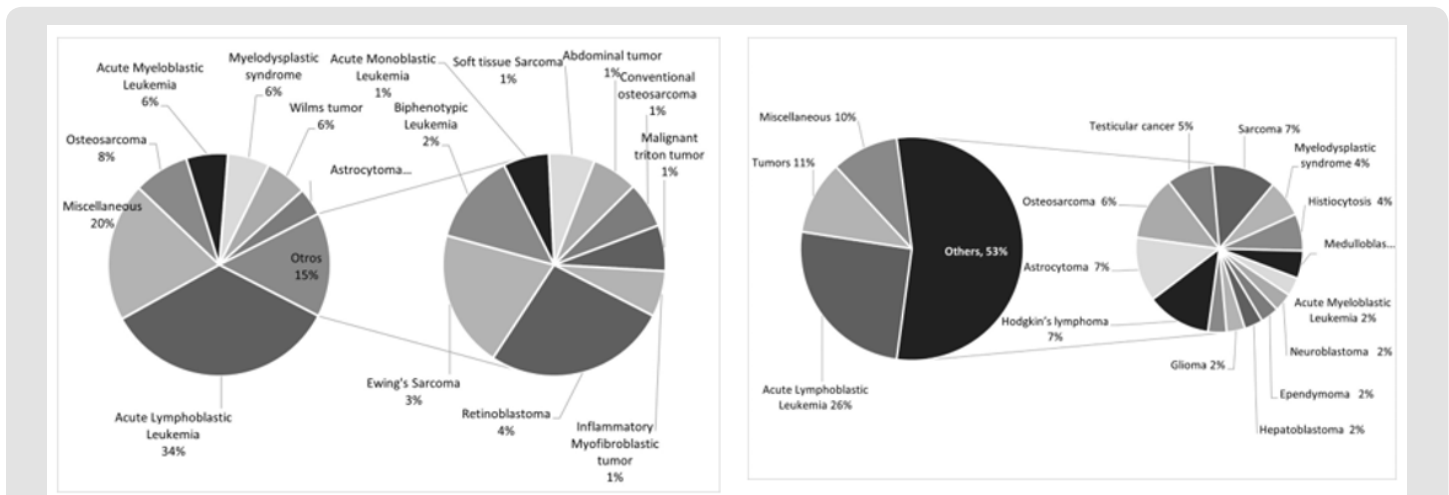


Figure 1:

1. 1A: Distribution of the Main Types of Cancer in Girls From 2018 to 2021.
2. 1B: Distribution of the Main Types of Cancer in Boys From 2018 to 2021.

Adulthood Stage

In the same period from 2018-2021, 1,701 adult patients were treated, between the ages of 19 and 59, of whom 1,210 were women and 491 men. (Figure 2A) shows the distribution of the main types of cancer in adult females, breast cancer ranked first in incidence with a total of 41%, in second place, cervical cancer with a 15%, miscellaneous 13%, endometrial cancer 5%, like ovarian cancer with a 5%, thyroid cancer 4%, tumors 4%, colon cancer 2% and renal cell carcinoma, rectal cancer, non-Hodgkin's lymphoma, Hodgkin's lymphoma, basal cell carcinoma, ALL, melanoma and liposarcoma all of these mentioned last with a 1%. In (Figure 2B) the distribution of the main types of cancer in adult males is observed. There was greater variability in the types of cancer with greater frequency, being the miscellaneous who had the greatest onset with 24%, testicular cancer with a 12%, prostate cancer 9%, tumors 7%, colon cancer

6%, non-Hodgkin's lymphoma 6%, rectal cancer 5%, gastric cancer 4%, Hodgkin's lymphoma 3%, sarcoma 3%, basal cell carcinoma 3%, ALL 3%, breast cancer 2%, glioblastoma multiforme 2%, lung cancer 2%, melanoma 2%, epidermoid carcinoma 2% thyroid cancer 2%, other leukemias 2% and esophageal cancer 1%. Senescence stage In the period between 2018-2021, 1207 senescent patients were treated, 584 men and 623 women. It can be observed that for women at the senescence stage, the most frequent type of cancer was breast cancer with 30%, miscellaneous with a 12%, cervical cancer 10%, endometrial cancer 9%, thyroid cancer 4%, basal cell carcinoma, lung cancer, rectal cancer, ovarian cancer and colon cancer with 3%, sarcoma 2%, multiple myeloma, thyroid cancer, epidermoid carcinoma, bladder cancer, renal cell carcinoma, liver cancer, vulvar cancer, adenocarcinoma, oral cancer, Hodgkin's lymphoma and skin cancer with 1% (Figure 3A).

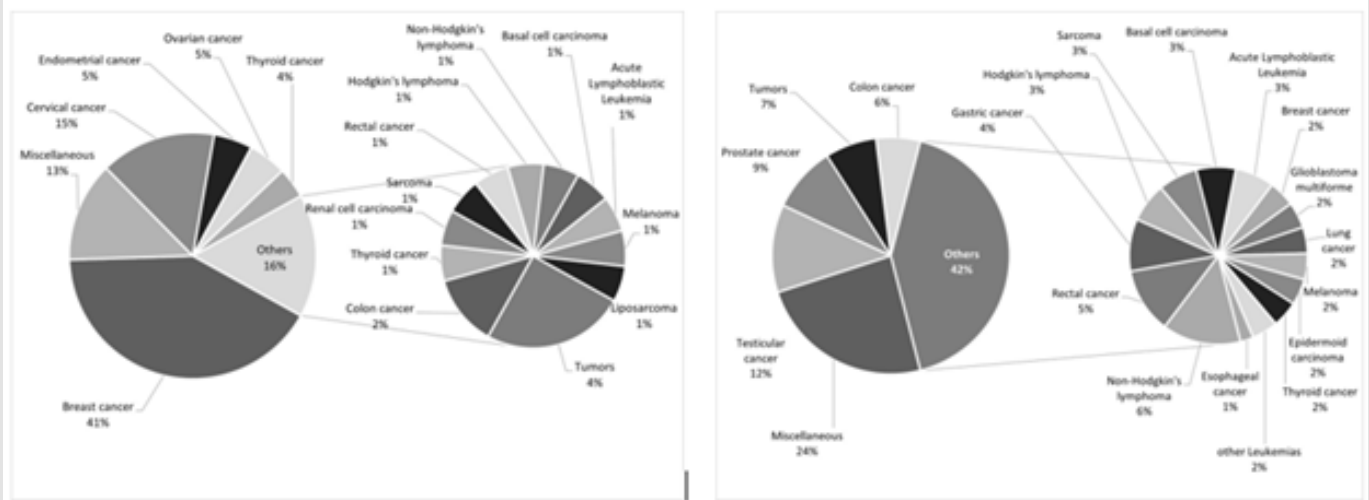


Figure 2:

- 2A: Distribution of the main types of cancer in adult females from 2018 to 2021.
- 2B: Distribution of the main types of cancer in adult males from 2018 to 2021.

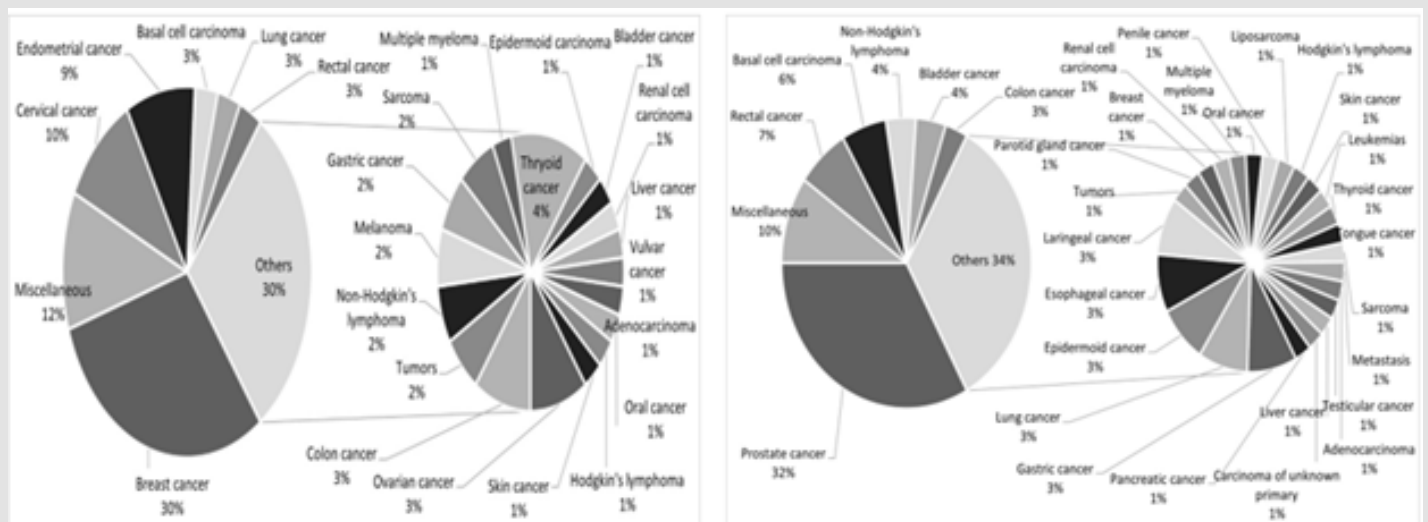


Figure 3:

- 3A: Distribution of the main types of cancer in senescent women from 2018 to 2021.
- 3B: Distribution of the main types of cancer in senescent men from 2018 to 2021.

On the other hand, for men in this age range, prostate cancer ranks first with 32%, miscellaneous with 10%, rectal cancer 7%, basal cell carcinoma 6%, non-Hodgkin's lymphoma 4%, bladder cancer 4%, epidermoid carcinoma, esophageal cancer, laryngeal cancer, tumors, parotid cancer, breast cancer, renal cell carcinoma, multiple myeloma,

oral cancer, penile cancer, liposarcoma, Hodgkin's lymphoma, skin cancer, leukemias, thyroid cancer, tongue cancer, sarcoma, metastasis, adenocarcinoma, testicular cancer, liver cancer, carcinoma of unknown primary and pancreatic cancer with 1% (Figure 3B).

Discussion

Cancer is a group of diseases that represents an important public health problem, Mexico is a country with upper-middle income, which is currently going through an epidemiological transition, where factors such as malnutrition play an important role in the morbidity of diseases such as cancer. [9,10] As reported by Lares-Asseff, et al. [8], from January 2001 to December 2003, a total of 1,445 patients of all ages were registered and treated at CECAN-Durango, of these 522 were men and 923 were women. On the other hand, in the current study carried out in the period from 2018 to 2021, a total of 3,105 patients of all ages were treated, of whom 1,193 were men and 1,912 were women. This data represent an increase of 115% of the patients seen in the period between 2018-2021 compared to those seen in the period 2001-2003 at CECAN-Durango. In the pediatric age, a total of 197 patients (from 0 to 18 years) were treated, with a greater number of cases found in boys with 118 cases than in girls with 79 cases. These data are interesting since, according to by Lares-Asseff, et al. [8] in the period between 2001-2003, a total of 91 patients were treated, 36 girls and 55 boys. These data represent an increase of 116% in pediatric cancer cases, being ALL the most frequent type of cancer in both sexes. In this sense, Mejía-Aranguré, et al. [11] reported that in Mexico in that year, the main type of cancer in pediatric patients residing in Mexico City was ALL, followed by acute myeloblastic leukemia, being the girls the ones that presented this disease in a greater proportion for both types.

In our study we have found that in Durango, the main type of cancer in children of both sexes is ALL, while in girls the second most frequent type of cancer is osteosarcoma and in boys Hodgkin's lymphoma. The male sex in the pediatric age were the one that presented the highest number of cancer cases in the period from 2018 to 2021 in Durango, this is interesting since Juárez Ocaña, et al. [12] reported a 1:1 relationship in terms of males and females and the presence of cancer in Mexico; this makes it clear that in Durango, there is a greater tendency to the presence of cancer in men. These findings are interesting since the Secretary of Health of Mexico reported in 2021 [13] that Durango is the state of the republic with the highest incidence of cancer in children throughout the country, with a rate of 189.53 cases per 100,000 inhabitants. For the adulthood stage, 1,701 patients were treated between the ages of 19 and 59, of which 1,210 were women and 491 men. The epidemiological study carried out by (Lares-Asseff, et al. [8]) at CECAN-Durango makes evident the increase in cancer cases two decades apart since in the period between 2001-2003, 940 adult patients were registered, which represents a 181% increase in cases compared to the 2018-2021 period. In addition, a considerable increase in the frequency of the most frequent type of cancer was documented, since in women in the period from 2001-2003, both cervical cancer and breast cancer represented a very similar number of cases (30% and 34% respectively), while from

2018 to 2021 breast cancer alone ranks first with 41% of cases and in second place is cervical cancer with 15% of cases.

Both breast cancer (29.9% of cancer cases in women in Mexico) and cervical cancer (8.9 of cancer cases in women in Mexico) at the country level also rank first and second respectively. [3] Worldwide, breast cancer ranks first in women (24.5%) and cervical cancer ranks fourth with 6.5%. [14] For the senescence stage, 1,207 senescent patients were treated, 584 men and 623 women. This represented an increase of 299% compared to what was reported by Lares-Asseff, et al. [8] For this stage of life we observe that leukemia decreased and miscellaneous that include skin cancer among others increased. In this context, the Secretary of Health of Mexico in 2020[15] published the latest epidemiological results in Mexico where it showed that for those under 20 years old, the incidence of skin cancer is 0.89/100,000 inhabitants, while for ages from 65 years old, the incidence of skin cancer is 63/100,000 inhabitants. Cinar D [16] reported that in the elderly, cancer is one of the predominant causes of mortality and morbidity, and its incidence increases with age. Sixty percent of all cancer cases and 70% of cancer-related deaths occur in patients 65 years of age or older. As we mentioned before, in the senescence stage, a considerable increase in cancer cases, especially prostate cancer, is observed, with 32% for men. This coincides with what was reported by Droz JP, et al. [17] since they mention that prostate cancer is a disease of older men; the median age at diagnosis is 68 years, and 75% of prostate cancer deaths occur in men ≥ 75 years. There is also evidence that older men are more likely to develop larger, higher-grade tumors than younger patients.

Conclusion

The increase in pediatric cancer from the period from 2001 to 2003 to the period from 2018 to 2021 was 116%, the most common type of cancer in children is ALL, while the largest number of cases occurs in males. For adulthood there is a very evident increase in cancer cases in women, since breast cancer ranks first for this age group, with 41% of cases. For the senescence stage there is an increase in cancer cases in male patients, with the increase being greater in prostate cancer and skin cancer.

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Disclosure of Interest

The authors report no conflict of interest.

Declaration of Data Availability

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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