Cancer mortality in Chiapas women aged 15-44 years during 2016-2020: Cancer in Chiapas women of childbearing age

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ABSTRACT
Introduction: Neoplasms are one of the leading causes of death worldwide, identifying trends in mortality is important for the establishment of prevention and diagnostic strategies in susceptible populations. Objective: To identify the main types of cancer in death women of reproductive ages in Chiapas, the socioeconomic factors, and mortality rates due to these causes. Materials and methods: Descriptive, retrospective cross-sectional, study, based on an analysis of national mortality databases. The universe corresponded to cancer deaths in Mexico during the period 2016-2020, the sample corresponded to cancer deaths in women in Chiapas aged 15 to 44 years in the same period. Results: 3.6% of deaths due to neoplasms in Mexico occurred in Chiapas (15,814). A total of 104 different types of cancer were registered in the state. The most frequent were malignant cervix tumors with 19.2% (n= 263), malignant breast tumor with 12.5% (n=171) and malignant stomach tumor with 9.1% (n=125). The specific mortality rate for cancer in the state in 2020 corresponded to 10.4 per 100,000 women. Conclusions: Cancer mortality at the state level has been maintained with minimal percentage differences each year (0.7%), but exceeds the projected at a national level. The most frequent types of cancer associated with deaths of women in Chiapas are cervical, breast, and stomach cancer.

Keywords: cancer, mortality, mortality registries.

1 INTRODUCTION

It was estimated that in 2020, 19.3 million new cases of cancer and 10 million deaths due to this cause were registered. For women, breast, cervical, colorectal, liver, and lung cancer (CA) are the most frequently diagnosed neoplasms and the leading causes of cancer-related deaths in this group[1].

The GLOBOCAN study reported that breast cancer mortality surpassed lung cancer, with breast cancer accounting for 1 in 4 cancer cases in women and 1 in 6 cancer deaths for this group[1 y 2]. Cancer incidence rates are higher in highly developed countries, which is strongly associated with the persistence of hormonal, reproductive, and lifestyle risk factors that leads to obesity and certain drug addictions[3, 4, 5 y 6]. The cases of colorectal and liver cancer are similar to breast and lung cancer, with the difference that, despite having a lower incidence, their mortality is higher[1].

Data available as of 2014 in Mexico, showed similar data regarding the most frequent types of cancers reported by GLOBOCAN in 2020, with the highest mortality rates at the national level in the female gender, corresponding to breast cancer (15.3%), cervical cancer (10.4%), liver and biliary tract cancer (8.0%) and stomach cancer (7.0%)[7].

Although the highest incidence frequencies are found in older adults, the study of the working age population is necessary since cancer diagnosed in young adults tends to have a worse prognosis[8], which results in a greater loss of life expectancy, a clear indicator of economic and social development in a population[9].

The analysis of mortality trends for this pathology is fundamental for the epidemiological characterization of vulnerable populations; therefore, the present analysis details sociodemographic characteristics in this specific group.

1.1 TARGET

To identify the main types of cancer in deceased women of reproductive age in Chiapas, socioeconomic factors, and mortality rates due to these causes.

2 MATERIAL AND METHODS

Descriptive, retrospective, cross-sectional study, based on an analysis of open data on deaths from the General Directorate of Health Information[10] and the Population Censuses 2016 and 2020 for the calculation of mortality rates[11,12]. Descriptive analysis was performed in the SPSS version 25 program. The working universe was cancer deaths in Mexico during the period 2016-2020, the sample to cancer deaths in women in Chiapas aged 15 to 44 years in the same period (n=1,369).

The variables determined were: national deaths (all causes), gender (female), registration entity (07, Chiapas), cause of death (C000-C97X), age (15 to 44 years), schooling (complete or incomplete, pre-school to postgraduate), affiliation (IMSS, ISSTE, PEMEX, Seguro Popular, private, SEMAR), occupation (according to registration), marital status (according to registration).

3 RESULTS

Table 1. Annual deaths and cancer mortality rate per 100,000 inhabitants in Chiapas, Mexico.

Year	Deaths from all causes		Cancer deaths		From 15 to 44 years old		*Mortality rate due to CA in women	**Mortality rate due to CA in men	*** CA mortality rate for both sexes
	Mexico	Chiapas	Mexico	Chiapas	Male	Female			
2016	685766	26140	82502	2681	187	268	10.00	7.37	8.72
2017	703047	26629	84142	3019		260	9.70	6.23	8.01
2018	722611	27213	85754	3193	235	273	10.18	9.26	9.74
2019	747784	27971	88683	3394	226	272	10.14	8.91	9.54
	1048575	38662	87499	3527			10.43	9.42	9.94

*Specific mortality rate per hundred thousand women, the total population based on which was calculated as 2,681,187 for 2016 to 2019 and 2,837,881 for 2020.

**Specific mortality rate per hundred thousand men, the total population based on which was calculated as 2,536,721 for 2016 to 2019 and 2,705,947 for 2020.

***Specific mortality rate per hundred thousand population, total population corresponded to 5,217,908 for 2016 to 2019 and 5,543,828 for 2020.

Source: own elaboration based on open data from DGIS: deaths, bases corresponding to 2016-2020, INEGI (2020) Population and Housing Census 2020, INEGI (2015) Intercensal Survey.

Table I shows how from 2016 to 2020, n=428,580 deaths were registered nationally due to neoplasms, of which, n=15,814 occurred in the state of Chiapas (3.68%). In the period studied, the highest mortality from these types of cancer occurred in 2020 for both sexes. The total number of deaths has increased annually, and the percentage differences in the mortality rate for women have not exceeded 0.73%. Of the annual state deaths from cancer, 8 to 9.9% occurred in this age group and study period, and 0.53 to 0.62 of deaths from cancer in Chiapas occurred in women (Table 2).

Table 2. Ratio and proportion of annual CA deaths in Chiapas from 2016-2020.

	The proportion of annual deaths by CA/ women 15 to 44 years old	The Ratio of deaths per CA/women	The Ratio of CA deaths/Men
2016	9.996	0.589	0.411
2017	8.612	0.622	0.378
2018	8.550	0.537	0.463
2019	8.014	0.546	0.454
	8.392	0.537	0.463

Source: own elaboration based on open data from DGIS: deaths, bases corresponding to 2016-2020.

Of the 483 causes of death associated with cancer coded in the national database, 104 different types of cancer were registered in Chiapas. There were n=1369 deaths due to cancer in this period in women between 15 and 44 years of age.

Of these, the most frequent were caused by malignant tumors of the cervix with 19.2% (n= 263), malignant breast tumor 12.5% (n=171) and malignant stomach tumor with 9.1% (n=125) (Table 3).

Leading causes of death from cancer in Chiapas women aged 15 to 44 years during 2016-2020 Table 3.

		N	%
1	Malignant tumor of the cervix, without further specification	263	19.2
2	Malignant tumor of the breast, unspecified portion		12.5
3	Malignant tumor of the stomach, unspecified portion		9.1
4	Malignant ovarian tumor		6.6
5	Acute lymphoblastic leukemia [ALL].		6.4
6	Malignant tumor, unspecified primary site		3.7
7	Leukemia, unspecified		3.5
8	Malignant tumor of the liver, unspecified	45	3.3
9	Malignant tumor of the colon, unspecified portion		3.0
10	Malignant tumor of the bronchus or lung, unspecified portion		2.2

Source: own elaboration based on open data from DGIS: deaths, bases corresponding to 2016-2020.

Figure 1. Main causes of death during 2016-2020

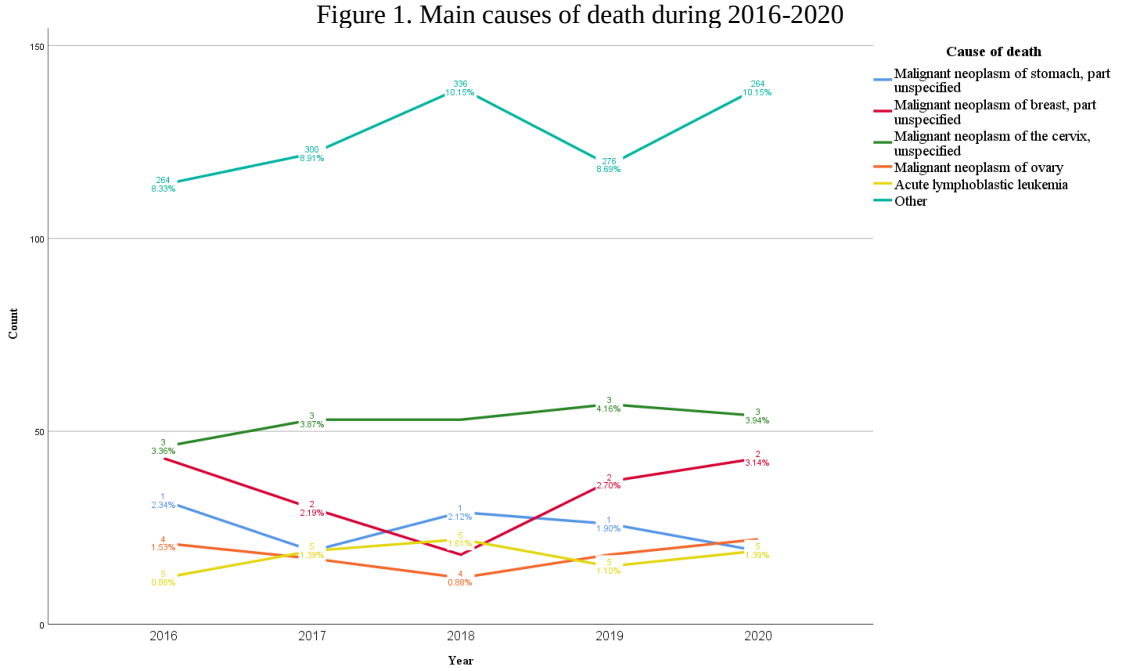
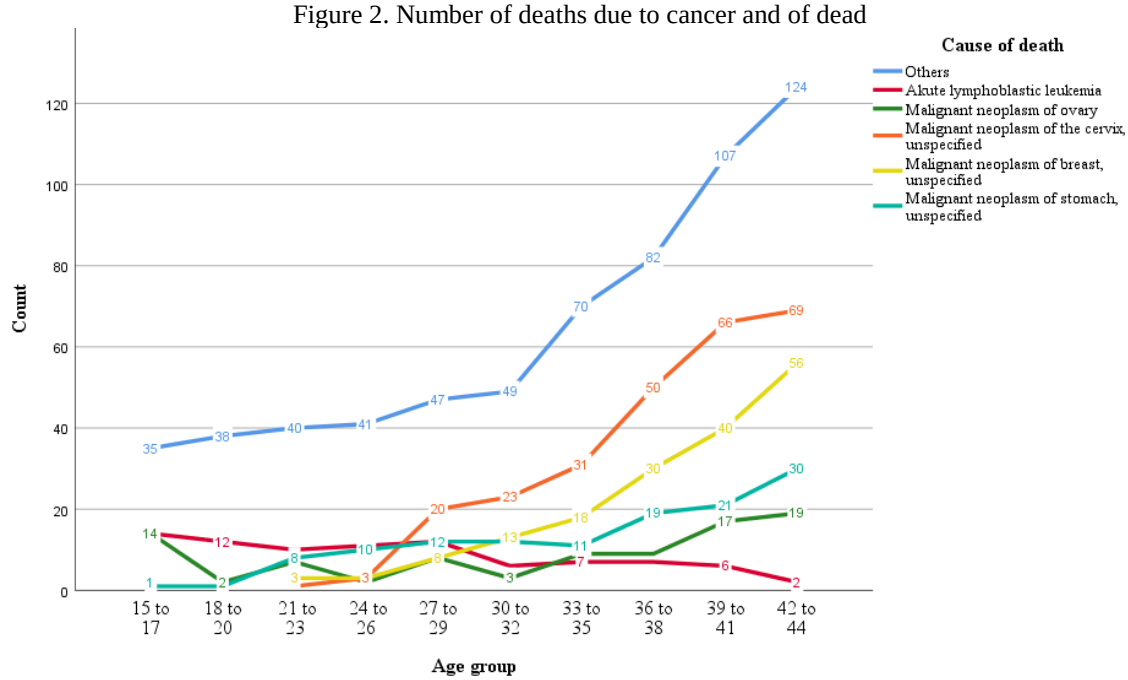


Figure 1 shows the main causes of death and their percentage concerning the total number of cases during the period studied. Malignant breast tumors are the group with the most evident annual increase. Percentages lower than 5% were collapsed and included in the other column in all figures.

Figure 2. Number of deaths due to cancer and of dead



As observed, the number of deaths due to cancer increases with the age of the deceased, with the average age being 34.39 years, with a standard deviation of 8.1 years (95% CI: 33.96-34.82) (Figure 2). The cancers that show the most evidence of this trend are cervical cancer and malignant breast tumor.

Figure 3. Education level by cause of death

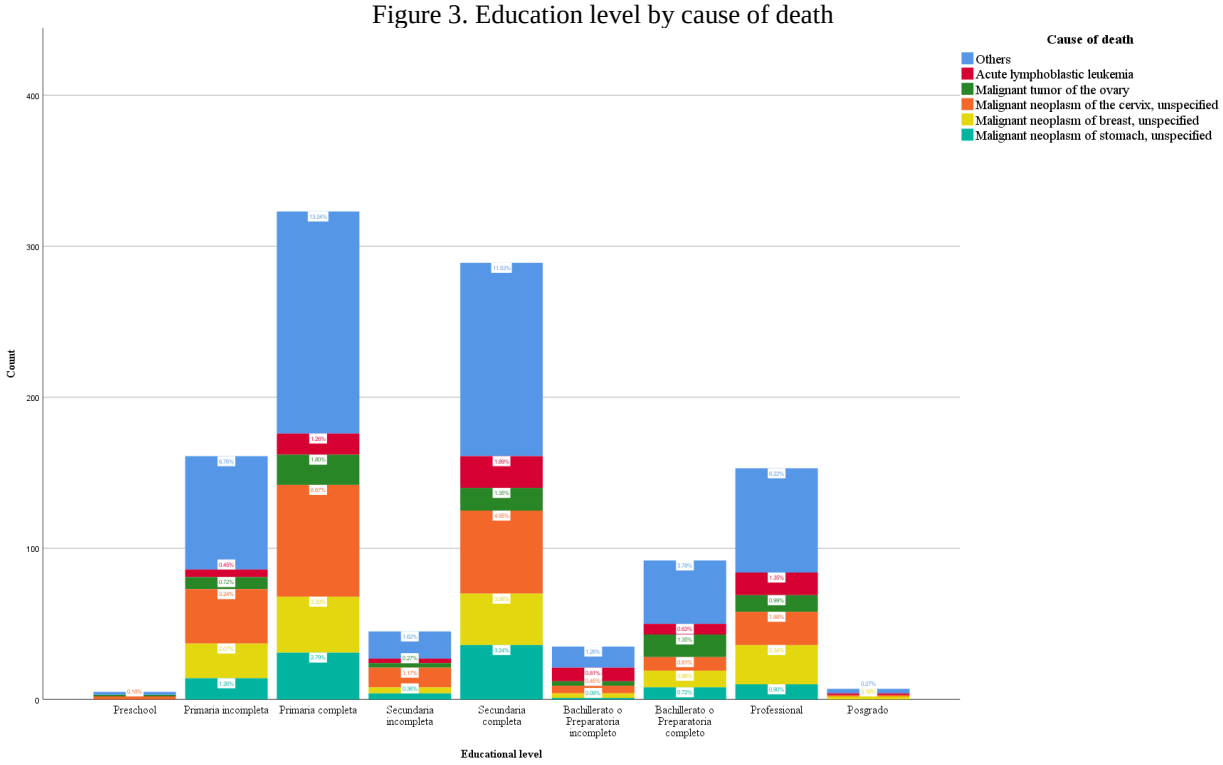
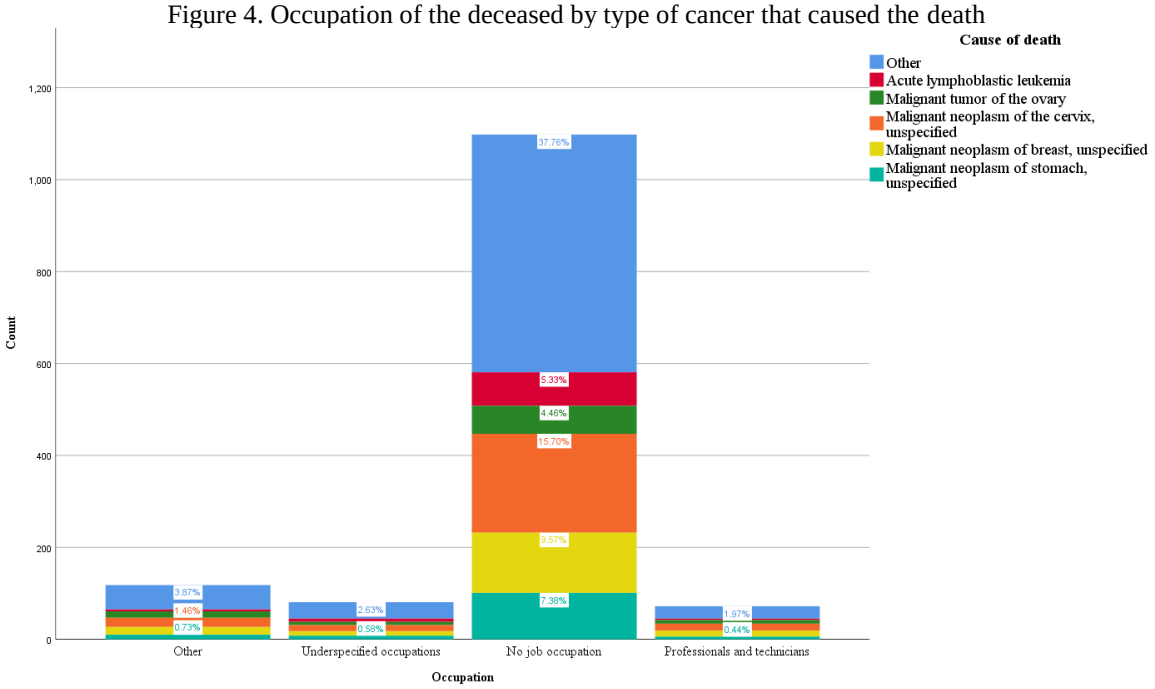


Figure 3 presents the level of education for the first five causes of death studied. In terms of schooling, the predominant educational level in patients who died of cancer in Chiapas was primaria completa (23.6% n=323), followed by secundaria completa (21.1% n= 289) and 14.8% (n= 203) with no schooling. By type of cancer, breast cancer, cervical cancer, and lymphoblastic leukemia stand out as those with higher than usual levels of education.

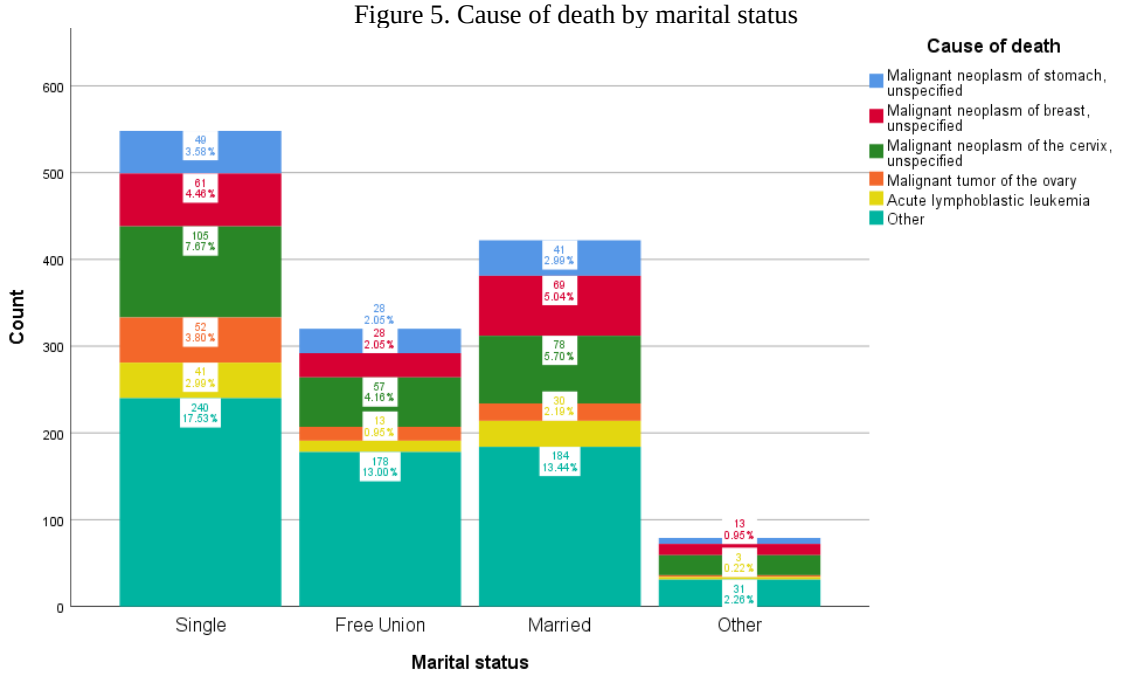
Of the patients who died of cancer, 36.6% (n=501) were beneficiaries of Seguro Popular, 28.5% (n=390) were not affiliated with any health service, and 15% (n=206) of the cases in this information could not be specified in the death registry.

Figure 4. Occupation of the deceased by type of cancer that caused the death



The great majority of deaths occurred in women who did not perform any remunerated activity, corresponding to 80.2% (n=1098) of these. Only 5.3% (n=72) of the women who died from this cause had a profession or technical career, with deaths from cervical and breast cancer accounting for the highest percentage of professionals (Figure 4).

Figure 5. Cause of death by marital status



Regarding marital status, 40% (n=548) of the women were single, 30.8% (n=422) were married and 23.4% (n=320) were in union. In the overall analysis, unmarried women presented more frequently with cervical, breast, and ovarian cancer. In married women, the most frequent causes of death were cervical, breast, and malignant tumors of the stomach. In the case of unmarried women, the most frequent cancers presented the same distribution as in married women (Figure 5).

4 DISCUSSION

As described in the literature, the main neoplasms associated with deaths in Mexico are lung, breast, colorectal, prostate, and stomach cancer[7]. The analysis made from the databases of deaths in the country reported a different reality for the state of Chiapas, where the most common neoplasms are cervical, breast, and stomach cancer, which coincides with the national statistics provided by the National Institute of Statistics and Geography (INEGI)[7] regarding the most common types of cancers in the female gender, although the order presented differs from the national one (breast, genital organs and digestive organs).

The percentage variation in the period 2016-2020 has been 0.7%, remaining stable, different from that referred by Aldalco et al[13], who in the period 2010-2015 detected a percentage difference greater than 1.27% at the national level.

Deaths from cancer in the female gender represented the highest mortality from cancer in Chiapas (from 0.53 to 0.62). In another study, it was observed that premature mortality from cancer in women is associated with breast tumors[14 y 15], in the present study we also observed deaths in reproductive ages, with breast cancer being one of the most frequent, in addition to the fact that, together with cervical cancer and stomach cancer, its frequency increases with age[16]. Nulliparity is an important risk factor for the development of breast and ovarian cancer, which could be reflected in its high frequency in single women; however, it has been documented that, in Mexican women, these risk factors are not always present[17,18].

A projection made for Mexico in 2017 regarding the specific mortality rate in the country projected a decrease in this, being less than 5 or 6 per 100,000 inhabitants[3], despite this, this analysis reported higher rates in the last five years for the female population of Chiapas (10, 9.70, 10.18, 10.14 and 10.43 for each year as of 2016).

Regarding cervical cancer and its associated socioeconomic factors, a higher incidence has been reported in other Latin American populations in women living in a union, with a predominant level of secondary education, housewives. and beneficiaries of a health service[19, 20]. In the present study, the

population belonged to a low socioeconomic level, with primary schooling, single, unpaid occupations, and a considerable percentage of them not affiliated with a health institution.

Previously, it has been documented that patients with stomach cancer and cervical cancer are usually from a low socioeconomic level, and their income negatively influences the nutritional quality of their diet (excess salt, deficiency of vitamins, antioxidants. and carotenoids), also noted that women with breast cancer came from high socioeconomic levels, with an opposite diet, high in alcohol, calories and excessive in saturated fats also predisposed them to higher risk[1, 21, 22, 23,24,25]. In this study, breast cancer was one of the most frequent cancers in women with undergraduate and/or graduate degrees, so it is expected that they are also more likely to belong to a higher socioeconomic level, with the nutritional possibilities and access to health services that this entails.

In Chiapas, cancers associated with low socioeconomic level are the most frequent, including low schooling and the high percentage of deaths without paid activities support this fact, since a large part of the population of Chiapas usually belongs to low socioeconomic strata, it was documented that in 2020, 75% of the population was in the category of poverty and only 7.1% of the population of the entity is considered not poor and not vulnerable[26], making them a risk group due to their sociodemographic characteristics.

Adalco et al[13] in their update on national mortality in 2015, found that most of the deaths registered were of patients affiliated with a health service. In Chiapas, it was found that a significant percentage of the population that died from cancer of reproductive age (28.5%) was not affiliated with health care services. This percentage is higher than the national percentage of 17% reported by Navarrete and Navarrete[14], which represents an important risk factor for late diagnosis and worse prognosis of patients[27].

5 CONCLUSIONS

- Based on the analysis performed, mortality from all causes in Mexico shows an upward trend.
- In Chiapas 104 different types were registered in the period 2016-2020, of the 483 causes of death associated with cancer coded in the national database.
- Cancer mortality at the state level has been maintained with minimal percentage differences each year.
- The most frequent types of cancer associated with deaths of women in Chiapas were: cervical, breast, and stomach cancer.
- The highest mortality in the period studied occurred in 2020.

- Cancer deaths increase with age, especially in the most common types of cancer, except for acute lymphoblastic leukemia.
- The predominant educational level in the population studied corresponded to primary education, with a considerable percentage of patients who had no schooling (higher than the national percentage).
- The most frequent marital status of the population studied was single. Cervical, breast, and ovarian cancer were found more frequently in them.
- In married women, the most frequent causes of death were cervical, breast, and stomach cancer.
- Most of the deceased women were not engaged in remunerated activities and slightly more than a quarter were not affiliated with health services.

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