https://doi.org/10.1590/1980-549720220009.supl.1

ORIGINAL ARTICLE / *ARTIGO ORIGINAL*

Potential years of life lost to cancer in Mato Grosso, stratified by sex: 2000 to 2019

Anos potenciais de vida perdidos por câncer em Mato Grosso, estratificados por sexo: 2000 a 2019

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ABSTRACT: ***Objective:*** To estimate the potential years of life lost (PYLL) to cancer in the State of Mato Grosso, from 2000 to 2019, stratified by sex, according to age groups and cancer types. ***Methods:*** It is a quantitative study with an ecological approach developed from secondary data, using the PYLL and its derivatives. ***Results:*** In the period analyzed, deaths from cancer in Mato Grosso resulted in 680,338 PYLL before the age of 80, with a variation of 82.5%. Of this total, 52.7% were assigned to males. The rate of the PYLL for cancer before the age of 60 was 70.9% in males, and 80.1% among women. The rates of PYLL increased in the period and showed slightly higher values in males. In the analysis according to age group, the rates of PYLL were also higher in males, except between the ages of 30 and 49. Lung cancers and lymphomas/leukemias resulted in greater losses of PYLL among men and female specific cancers (breast, cervical and uterine, and ovarian cancer) accounted for 36.26% of the PYLL among women, with variability per age groups. ***Conclusion:*** In Mato Grosso, the PYLL indicator for cancer presented unfavorable evolution between 2000 and 2019, with greater damage for males and for the younger population. Leukemias, lymphomas, and lung and breast cancers were the main causes for the PYLL.

Keywords: Cancer. Potential years of life lost. Premature mortality. Health indicators. Epidemiology.

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Conflict of interests: nothing to declare. **Financial support:** Mato Grosso State Health Department, for funding the extension project "Surveillance of Cancer and associated factors: updating of population-based and hospital records" (contract 088/2016); Public Labor Ministry of the 23rd Region for funding the research project "Cancer and associated factors: analysis of population-based and hospital records" (technical cooperation agreement 08/2019).

RESUMO: ***Objetivo:*** Estimar os anos potenciais de vida perdidos por câncer no estado de Mato Grosso, no período de 2000 a 2019, estratificando os dados por sexo, segundo faixas etárias e tipos de câncer. ***Métodos:*** Trata-se de um estudo quantitativo, com abordagem ecológica a partir de dados secundários, utilizando-se o indicador anos potenciais de vida perdidos e seus derivados. ***Resultados:*** No período analisado, as mortes por câncer em Mato Grosso resultaram em 680.338 anos potenciais de vida perdidos antes dos 80 anos, com variação de 82,5%. Desse total, 52,7% foram atribuídos ao sexo masculino. O peso dos anos potenciais de vida perdidos por câncer antes dos 60 anos foi de 70,9% no sexo masculino e 80,1% entre as mulheres. As taxas de anos potenciais de vida perdidos aumentaram no período estudado e apresentaram valores ligeiramente mais elevados entre os homens. Na análise segundo faixas etárias, as taxas de anos potenciais de vida perdidos também foram maiores entre os homens, exceto entre 30 e 49 anos. Os cânceres de pulmão e linfomas/leucemias resultaram em maiores perdas de anos potenciais de vida entre os homens, e os cânceres de especificidade feminina (mama, colo e corpo do útero e ovário) responderam por 36,26% dos anos potenciais de vida perdidos entre as mulheres, com variabilidade por faixas etárias. ***Conclusão:*** Em Mato Grosso, o indicador anos potenciais de vida perdidos por câncer apresentou evolução desfavorável entre 2000 e 2019, com maior prejuízo para o sexo masculino e para a população mais jovem. As leucemias, linfomas e cânceres de pulmão e mama foram os principais responsáveis pelos anos potenciais de vida perdidos.

Palavras-chave: Câncer. Anos potenciais de vida perdidos. Mortalidade prematura. Indicadores de saúde. Epidemiologia.

INTRODUCTION

Cancer is an important cause of morbidity and mortality in the world, regardless of the level of human development. In 2020, in the world population, cancer deaths were estimated at 10 million[1], representing an increase of 49.0 and 22.0% in relation to the estimates of 2002 and 2012, respectively[2,3].

Asia recorded 58.3% of deaths in 2020, while Europe and the Americas accounted for 19.6 and 14.2% respectively. The worldwide cancer mortality rate was higher among men when compared to women (120.8 and 84.2 per 100,000 inhabitants, respectively), in part because of differences in the distribution of cancer[1].

In Brazil, in 2019, there were 232,040 deaths from cancer, of which 52.4% were men. The mortality rate was 98.48 per 100,000 inhabitants, with variation between the sexes: 116.39 among men and 85.38 among women. In Mato Grosso, in the same year, there were 2,483 deaths from cancer, with a higher frequency among men (58.2%). The mortality rate per 100,000 inhabitants went from 77.35 in 2009 to 94.87 in 2019[4].

The use of global cancer mortality rates provides an incomplete picture of the impact of the disease on society, as the estimates do not capture the magnitude of the impact resulting from deaths at younger ages. From this perspective, the indicator potential years of life lost (PYLL) has been used to estimate the impact of early cancer deaths in relation to the life expectancy of a given population, as it incorporates the age of death and not just its occurrence, enabling a better understanding of its economic and social implications[5]. In addition, the indicator highlights the loss of life resulting from certain types of cancer, which occur

at younger ages, even if more infrequent[6,7]. Thus, the use of the PYLL indicator is recommended for the qualification of cancer deaths, in order to support interventions in specific risk groups and help improve the use of existing resources[8].

Despite its importance, the PYLL indicator has been little used in national studies to analyze the impacts of the global burden of cancer on premature mortality[9-11]. Aiming to expand the understanding of the subject, the objective of this study is to estimate the PYLL of cancer deaths in the state of Mato Grosso, ranging from 2000 to 2019, stratified by sex, age group and types of cancer.

METHODS

This is a descriptive and quantitative study on cancer mortality in the state of Mato Grosso (MT), Brazil. This state is made up of 141 cities and known as the "country's granary", for leading the production of soy, corn, cotton and cattle herd, so that agribusiness represents 50.5% of the state's Gross Domestic Product (GDP)[12]. The population of Mato Grosso was estimated at 3.5 million inhabitants in 2019, representing 1.7% of the Brazilian population and 21.4% of the Central-West region[13]. Due to its wide territorial extension (903,207 km^2), its population density is only 3.9 inhabitants per km^2.

Data on PYLL was collected in the Online Atlas of Mortality, available in the website of the National Cancer Institute (NCI) [4], where it is possible to access them by period, geographic location, sex, age limit and topography. The NCI estimates PYLL based on the method proposed by Romeder and McWhinnie[14], which consists of subtracting the age at which one died from the chosen age limit. In this study, deaths between the ages of 1 and 79 were considered, and the age limit of 80 years was adopted, considering it to be more inclusive and closer to the estimated life expectancy at birth of Brazilians in 2019 (76.6 years old) [15]. PYLL and indicators derived from it were stratified by sex, age group and cancer types.

The PYLL proportion was obtained by dividing the number of PYLL in each category and the total PYLL, multiplied by 100. The average PYLL per death was calculated by dividing the total PYLL by the number of corresponding deaths in each segment. The average age at which the deaths occurred was also estimated by subtracting the average PYLL from the adopted upper limit. Aiming at comparability with populations of different age structure, the PYLL rate was calculated by dividing PYLL by the corresponding population, multiplied by 1,000 inhabitants. The values of the resident population and of the intercensus estimates, necessary for the calculation of the rates, were obtained in the censuses carried out in 2000 and 2010 by the Brazilian Institute of Geography and Statistics[13].

For the quinquennium (2000–2004; 2005–2009; 2010–2014; 2015–2019) the averages of the indicators were estimated, as well as the percentage variation, obtained by the mathematical formula: (EV/IV–1) x 100, in which: EV=end value of the period; IV=initial value of the period. Data was processed using the program Microsoft Excel®.

This study is part of the research "Cancer and associated factors: analysis of population-based and hospital records" carried out in partnership with the Mato Grosso State Health Department (SES-MT) with funding by the Public Labor Ministry of the 23rd Region. This research was approved by the Research Ethics Committee of the Universidade Federal de Mato Grosso (CEP-SAÚDE/UFMT), under opinion number 4,858,521 from 07/20/21.

RESULTS

Between 2000 and 2019, there were 295,276 deaths of residents in Mato Grosso, of which 39.572 (13.4%) were due to cancer, representing a risk of death of 60.8/100,000 inhabitants. Of these deaths, 33,916 (85.8%) were of people aged between 1 and 79 years and 55.0% were male. The sex ratio over the study period was 1.37 male cancer deaths for every female death.

Cancer deaths in Mato Grosso between 2000 and 2019 resulted in 680,338 PYLL before the age of 80, with a variation of 82.5%. Of these, 358,205,00 (52.7%) were attributed to males, corresponding to 10.07% more than female PYLLs. In the total population, the age groups that most contributed to the losses were 50-59 years and 40-49 years (27.3% and 21.3%, respectively). In females, the age group from 40 to 59 years accounted for half of the PYLL (50.7%), while in males, the highest frequencies of PYLL were observed between 50 and 59 years old (28.8%) and 60 and 69 years old (22.7%) (Table 1).

Still in relation to Table 1, in regard to the PYLL rates per 1,000 inhabitants, the age groups from 60 to 69 years old and from 50 to 59 years old presented the highest values in the total population (41.9 and 31.8, respectively), as well as in both sexes. Except between 30 and 49 years old, in the other age groups, the PYLL rates were higher in males, with greater surpluses in the 70 to 79 years and 15 to 19 years, which exceeded the female rates by 66 and 62%, in that order.

As shown in Table 2, both the total population and both sexes, showed an increase in the PYLL averages every quinquennium. On the other hand, there is a reduction in the average PYLL per death between 2000 and 2019, in both sexes (around 16.0% - data not shown); however, more PYLL per death were lost among women when compared to men (22.36 versus 18.76). The average age of death from cancer was 62.34 years in the total population, with a gradual increase in both sexes. Regarding the average rate of PYLL per thousand inhabitants, there was a percentage change of 40.23% in the period (Table 2), and the rates tended to be slightly higher in males (Figure 1).

Among men, deaths from lung cancer, lymphomas/leukemias and stomach cancer resulted in a higher number of PYLL, representing 11.8, 11.5 and 8.2%, of the total, respectively. Among women, deaths from female-specific cancers (breast, cervical and uterine and ovary) were responsible for 36.3% of the PYLL, especially lymphomas and leukemias, which had the third highest proportion of PYLL (9.1%). The male PYLL rate

Table 1. Number of deaths, potential years of life lost, proportion of potential years of life lost and rate of potential years of life lost due to cancer, according to sex and age group in Mato Grosso, 2000-2019.

Age Group (years)	Males				Females				RPYLL	Total	
	Deaths	PYLL	PYLL %	PYLL rate*	Deaths	PYLL	PYLL %	PYLL rate*		%	PYLL rate*
1–4	121	9,196.0	2.6	4.3	101	7,676.00	2.4	3.7	1.16	2.5	3.9
5–9	101	7,221.5	2.0	2.6	88	6,292.00	2.0	2.4	1.08	2.0	2.5
10–14	106	7,049.0	2.0	2.5	88	5,852.00	1.8	2.1	1.19	1.9	2.3
15–19	183	11,254.5	3.1	3.9	106	6,519.00	2.0	2.4	1.62	2.6	3.0
20–29	417	22,518.0	6.3	4.0	379	20,466.00	6.4	3.8	1.05	6.3	3.4
30–39	666	29,304.0	8.2	5.9	1,080	47,520.00	14.8	10.1	0.58	11.3	6.5
40–49	1,887	64,158.0	17.9	16.3	2,368	80,512.00	25.0	22.1	0.74	21.3	16.1
50–59	4,305	103,320.0	28.8	39.2	3,445	82,680.00	25.7	34.4	1.14	27.3	32.8
60–69	5,810	81,340.0	22.7	57.0	3,680	51,520.00	16.0	39.0	1.46	19.5	41.9
70–79	5,711	22,844.0	6.4	35.3	3,274	13,096.00	4.1	21.2	1.66	5.3	22.9
Total	19,307	358,205.00	100	12.0	14,609	322,133.00	100	11.4	1.05	100.0	10.2

*per 1,000 inhabitants.
PYLL: potential years of life lost.

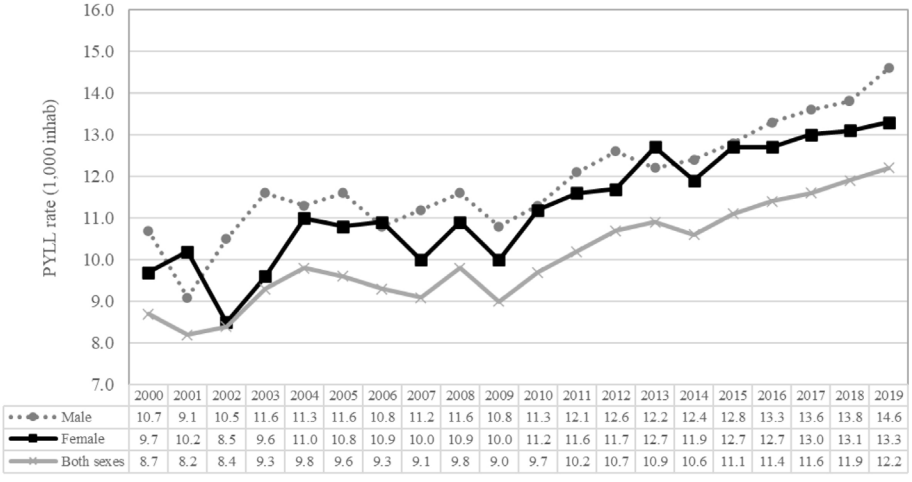
was higher than the female rate in all types of cancers evaluated, especially esophageal and stomach cancers, whose rate ratios were 4.50 and 1.98, in that order. In both sexes, the highest averages of PYLL per death were observed for leukemias/lymphomas and brain cancer, with the former accounting for the loss of more than three decades of life. On the other hand, female-specific and brain cancers generated losses of more than two decades of life (Table 3).

Leukemias, lymphomas and brain cancer were the main causes for the PYLL in the age group from 1 to 19 years. In the young adult population (20 to 39 years old), leukemias and lymphomas led the losses, whereas among adults aged 40 to 59 and the elderly, lung cancer was the most responsible for the PYLL. For young adult men, leukemias, lymphomas and brain cancer were the most important in the calculation of the PYLL, while in the age group starting from 40 years of age, lung and stomach cancers were among the most responsible for the PYLL. Particularly, among elderly men, prostate cancer had the second highest proportion of PYLL. Among adult women (20 to 59 years old), breast and cervical cancer were the most responsible for the PYLL; among the elderly, breast cancer maintained the lead, followed by lung cancer (Figure 2).

Table 2. Average and variation (%) of deaths and indicators of potential years of life lost due to cancer, according to sex and period. Mato Grosso, Brazil, 2000 a 2019.

Period	Average					Variation (%)*		
	Deaths	PYLL	PYLL/ death	Average age of death	PYLL rate	Deaths	PYLL	PYLL rate
Males								
2000–2004	703	14,168.70	20.16	59.86	10.64	25.12	16.80	5.61
2005–2009	857	16,310.30	19.04	60.96	11.20	4.67	-0.69	-6.90
2010–2014	1,047	18,962.70	18.15	61.84	12.12	28.27	16.72	9.73
2015–2019	1,254	22,199.30	17.70	62.32	13.62	15.70	14.15	11.72
2000–2019	965	17,910.25	18.76	61.25	11.90	111.54	76.89	36.45
Females								
2000–2004	507	12,195.60	24.04	55.98	9.8	29.26	24.68	13.40
2005–2009	631	14,439.80	22.92	57.08	10.52	7.26	-0.93	-7.41
2010–2014	809	17,614.20	21.77	58.24	11.82	12.95	12.46	6.25
2015–2019	975	20,177.00	20.70	59.03	12.96	6.40	6.62	4.72
2000–2019	730	16,106.65	22.36	57.65	11.28	117.90	83.41	37.11
Total Population								
2000–2019	1,696	29,571.83	17.64	62.34	10.20	114.19	82.50	40.23

*Percentage variation between the first and last year of each period.
PYLL: potential years of life lost.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Male	10.7	9.1	10.5	11.6	11.3	11.6	10.8	11.2	11.6	10.8	11.3	12.1	12.6	12.2	12.4	12.8	13.3	13.6	13.8	14.6
Female	9.7	10.2	8.5	9.6	11.0	10.8	10.9	10.0	10.9	10.0	11.2	11.6	11.7	12.7	11.9	12.7	12.7	13.0	13.1	13.3
Both sexes	8.7	8.2	8.4	9.3	9.8	9.6	9.3	9.1	9.8	9.0	9.7	10.2	10.7	10.9	10.6	11.1	11.4	11.6	11.9	12.2

PYLL: potential years of life lost.
Source: Mortality Information System/Ministry of Health (MIS/MS)

Figure 1. Rate of potential years of life lost (per 1,000 inhabitants) by cancer and sex. Mato Grosso, 2000 a 2019.

Table 3. Number of deaths, potential years of life lost, proportion of potential years of life lost, rate of potential years of life lost, average potential years of life lost due to death, and average age at death, according to selected cancer types and sex. Mato Grosso, 2000–2019.

Types of cancer	Males						Females						Total	
	# of deaths	PYLL	%	Rate*	PYLL per death	Average age	# of deaths	PYLL	%	Rate*	PYLL per death	Average age	%	Rate Average
Esophagus	1,190	21,640.0	6.0	0.72	18.18	61.82	263	4,474.5	1.4	0.16	17.01	62.99	4.42	4.50
Stomach	1,782	29,543.0	8.2	0.99	16.58	63.42	741	14,169.0	4.4	0.50	19.12	60.88	7.39	1.98
Colorectal	1,044	19,993.5	5.6	0.67	19.15	60.85	960	18,222.5	5.7	0.64	18.98	61.02	6.47	1.05
Liver/Vesicle	1,159	20,750.5	5.8	0.69	17.90	62.10	912	16,099.0	5.0	0.57	17.65	62.35	6.23	1.21
Bronchi/ Lungs	2,764	42,456.0	11.8	1.42	15.36	64.64	1,426	24,041.5	7.5	0.85	16.86	63.14	11.25	1.67
Brain	894	25,145.5	7.0	0.84	28.13	51.87	703	20,044.5	6.2	0.71	28.51	51.49	7.64	1.18
Lymphomas/ Leukemia	1,247	41,120.0	11.5	1.37	32.98	47.02	907	29,378.5	9.1	1.04	32.39	47.61	11.92	1.32
Prostate	2,118	18,912.0	5.3	0.63	8.93	71.07	-	-	-	-	-	-	3.20	-
Female breast	-	-	-	-	-	-	2,255	54,110.0	16.8	1.91	24.00	56.00	9.15	-
Cervical	-	-	-	-	-	-	1,463	37,657.0	11.7	1.33	25.74	54.26	6.37	-
Uterine and ovarian	-	-	-	-	-	-	1,129	25,016.0	7.8	0.88	22.16	57.84	4.23	-

*Rate of potential years of life lost per 1,000 inhabitants.
PYLL: potential years of life lost.

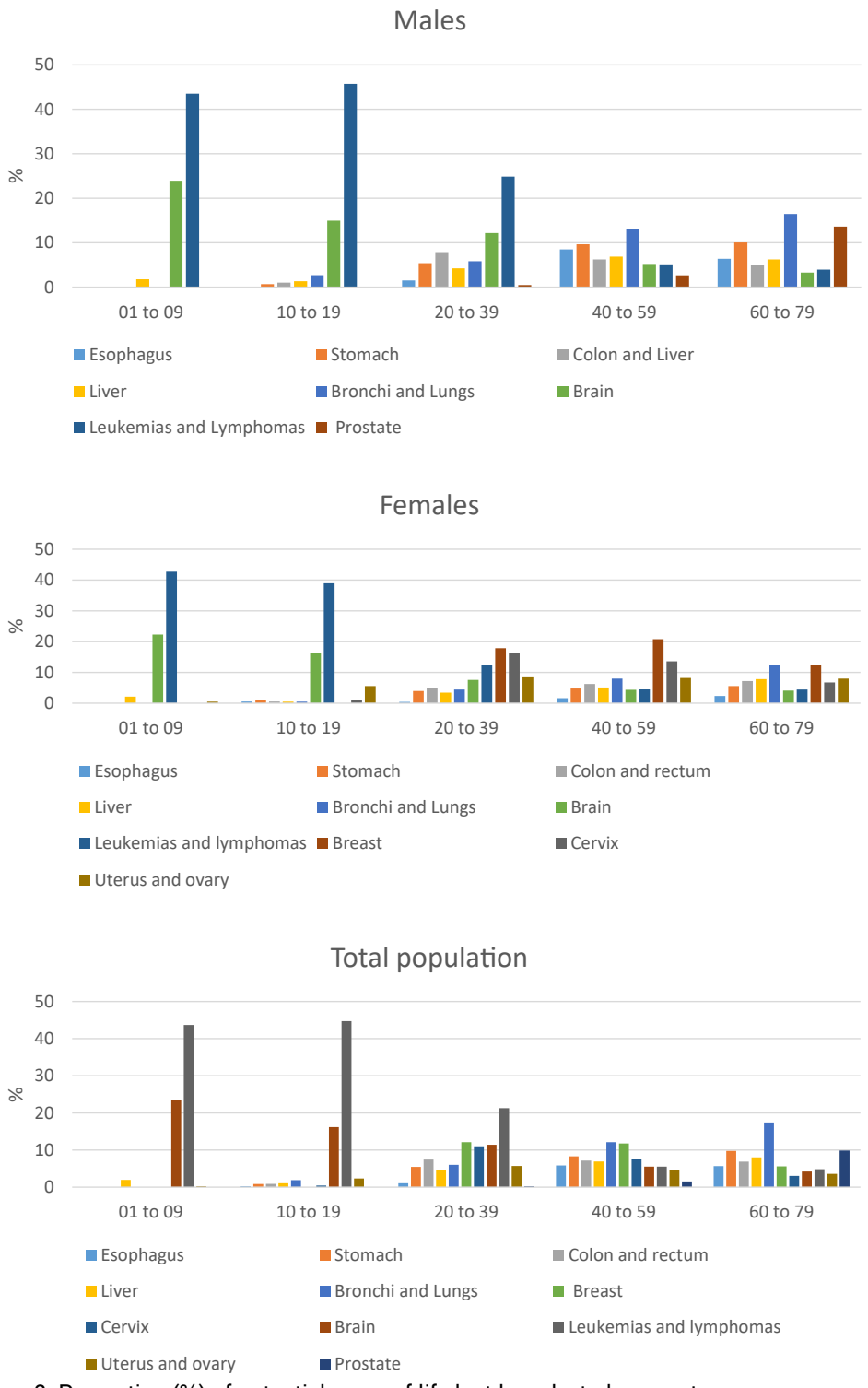


Figure 2. Proportion (%) of potential years of life lost by selected cancer types, age group, sex and total population. Mato Grosso, 2000–2019.

DISCUSSION

The results of this study reveal the magnitude of premature mortality from cancer in the state of Mato Gross, from 2000 to 2019. The gross increase in PYLL in the period, also verified in another study[7], may be associated with the growth of the population of Mato Grosso, since an increase in PYLL is expected as the population grows[16]. Between 2000 and 2019, the population of Mato Grosso increased by 39.1%[13], which has been attributed, in part, to the intense migratory flow generated by agribusiness and its indirect effects on municipal economies, especially in the strengthening of the tertiary sector[17]. In addition, the demographic transition is underway in the state, and there was a 93% growth in the elderly population between 2000 and 2019[13].

Both in the gross calculation of the PYLL and in its expression in rates, there is a male surplus. In the analysis according to age groups, the only exceptions were those between 30 and 39 and 40 and 49 years, in which the risk of loss of potential years was greater among women, depending on the weight of breast and cervical cancer, which were the most frequent in these age groups, matching the current scenario of cancer epidemiology[18].

In relation to analyzes according to age groups, another finding that draws attention is the weight of cancer mortality before the age of 60, the age that marks the beginning of old age in Brazil. Among men, 70.9% of PYLL were related to the population between 1 and 59 years old, and among women this proportion was even higher (80.1%). Considering the premature mortality criterion defined by the World Health Organization (WHO), which ranges from 30 to 69 years old, in Mato Grosso, most PYLLs referred to this age group, with 77.6% among men and 81.5% among women. Although the average age at which deaths occurred has increased over 20 years, leading to a decrease in PYLL per death every quinquennium, this set of indicators allows us to affirm that men and women generally die very early from cancer in Mato Grosso. For men, mortality becomes more expressive from the age of 40, while, among women, from the age of 30.

While anyone can develop cancer, the risk of being diagnosed with the disease increases substantially with age[19]. Individuals aged 65 and over account for 58% of newly diagnosed cancers in developed countries and 40% in developing countries[20]. In the past, low survival rates for most cancers have resulted in cancer being viewed as a "death sentence"[21]. However, in recent years, cancer mortality has declined as a result of improvements in preventive, diagnostic, and therapeutic interventions[22,23], although an increase in the incidence of the disease is observed as a reflection of different factors, such as increased life expectancy, population growth and the increasing adoption of behaviors associated with cancer, including smoking, physical inactivity and "Westernized" diets[24]. In this scenario, the challenge imposed on the state of Mato Grosso is to match its economic and population growth[17] with improvements and expansion of preventive and therapeutic interventions, to reduce the burden of early mortality from cancer.

In Brazil and Mato Grosso, the cancer care network is not sufficiently structured to ensure adequate care for the entire population that needs it. There is a shortage of certain types of

specialists, essential for the provision of quality cancer care, in addition to the limitations and deficiencies of primary health care in the early identification of suspected cases of cancer. This reveals the need for measures that promote the education and training of professionals working in primary care and directly in cancer care[7,25]. In Mato Grosso, an aggravating factor is the centralization of the network in the capital, with few services offered in other cities, making access to an early diagnosis and timely treatment difficult[26]. Therefore, it is essential that the state government policy reinforces the health regionalization process to enable access to outpatient and hospital care and diagnostic support to the population of more distant and underserved regions[27].

In addition to the deficient oncology network, Mato Grosso has another particularity that may be associated with the PYLL due to cancer in its younger population: namely, the high exposure to pesticides, since the state is one of the largest consumers in the country[28]. The evidence accumulated to date suggests that the relationship between cancer morbidity and mortality and the use of pesticides should not be rejected, although further studies are needed[29,30]. In Mato Grosso, the presence of pesticide residues with a potential health risk has already been detected in urine and blood samples of workers and residents of a city with high production of soy[31], revealing an environmental exposure that goes beyond the limits of the plantation, either through inhalation of such substances or the consumption of contaminated food and water[32]. Therefore, it is essential to improve surveillance initiatives in relation to the use of pesticides and their environmental and health impacts[30].

Regarding the types of cancer that most contributed to the PYLL, lymphomas, leukemias and brain cancer stand out, especially among children and teenagers, of both sexes, and in young adult men, matching the reality of other locations[33,34].

Lung cancer was the most responsible for the potential loss of years among men aged 40 to 59 years, as well as among elderly men. Among elderly women, this cancer was the second most responsible for early mortality, staying behind of only breast cancer. Lung cancer is the leading cause of cancer death in men in 93 countries and in women in 28 countries, in part due to its high lethality[1,35]. However, there is a great variability in lung cancer rates by region, which largely reflects the behavior of the tobacco epidemic and its differences in the historical patterns of exposure, including the intensity and duration of smoking, the type of cigarettes and the degree of inhalation[35]. In Brazil, despite advances in the fight against smoking in recent decades, the habit of smoking is still an important public health problem, which requires vigilance and social control through the strengthening of actions such as educational activities and control of the marketing, commercialization and consumption in public places[36].

As for stomach cancer, its greater importance in early male mortality is noted, especially after 40 years of age. Globally, stomach cancer ranks fifth in incidence and fourth in mortality, with rates twice as high in men as in women[1]. Gastric cancer incidence and mortality have declined dramatically worldwide in recent decades as a result of the socioeconomic development that has reduced the infection by *H. pylori*. However, this decline has been uneven across regions, probably as a result of immigration and poverty[37]. A meta-analysis confirmed

that eradicating *H. pylori* infection would significantly reduce the burden of gastric cancer, and the promising vaccine against *H. pylori*[38] could make gastric cancer a rare disease[37].

Breast cancer led the loss of potential years of life in adult and elderly women. Among women, it is the most diagnosed cancer in the world and the leading cause of cancer death in 110 countries. The regions with the highest breast cancer mortality rates reflect a weak health system and gaps in population awareness, early detection and timely treatment[1]. Breast cancer is influenced by genetic, behavioral, hormonal and environmental factors[39], and it remains a challenge to establish primary prevention programs that reduce modifiable risk factors, such as excess body weight, alcohol consumption, physical inactivity and low adherence to breastfeeding, among others[1]. Added to this are the controversies and limitations associated with mammographic screening[40].

Cervical cancer was the second most responsible for the PYLL in adult women. Worldwide, it is the fourth leading cause of cancer death among women, and, in 36 countries, it occupies the first position, showing a strong relationship with socioeconomic status[1]. Considering that cervical cancer can be easily prevented through vaccination against the human papillomavirus – HPV (primary prevention for pre-teens and teenagers) and cervical screening (secondary prevention for women), the WHO called for action to expand the control of this cancer, with the goal of reducing its incidence to less than four cases per 100,000 inhabitants[41]. However, the target for HPV vaccine coverage has not been reached in several regions of Brazil, including Mato Grosso, especially regarding the second dose[42]. It is important to highlight the importance of vaccination actions in schools, in agreement with intersectoral health education strategies and reinforced by the use of social networks, which guarantee the dissemination of clear and reliable information about vaccination, in order to combat fake news and expand adherence by the target population and those responsible[43]. In addition, coverage of the Pap smear has also remained below the recommended[44], and awareness-raising through different social media, active search and opportunistic screening (for example, among women with other morbidities who regularly attend health services) have been shown to be important in increasing adherence to the exam[45].

Based on recent worldwide estimates, prostate cancer was the second most frequent cancer and the fifth leading cause of cancer death among men in 2020; for 48 countries, it ranks first in causes of mortality[1]. However, the present study revealed that its contribution to the PYLL in the total male population was one of the lowest (5.28%), mainly because its mortality was concentrated in the elderly population. In the age group of 60 years or older, however, prostate cancer contributed with 13.63% of the PYLL, second only to lung cancer, corroborating that advanced age is its main risk factor[46]. The decrease in mortality from prostate cancer observed in recent years[47] has been mainly related to early detection and advances and greater access to treatment forms. However, the contribution of the prostate-specific antigen (PSA) screening in reducing mortality is still controversial[47,48].

Among the limitations of this study, we highlight the use of secondary data, which depend on the quality of the records, and the difficulty of comparing the results with those of other locations, due to methodological differences related to the period of analysis, age

limit, among others. Despite its limitations, clarifying the differences in years of life lost due to cancer among the residents of Mato Grosso may be useful for planning actions aimed at minimizing the high burden of preventable cancers, especially in younger populations. In addition to the need to improve and expand the oncology network and to qualify professionals, other strategies such as raising the awareness of cancer prevention and control measures, promoting healthy behaviors, screening for certain types of cancer and increasing vaccination coverage are particularly important in this context.

ACKNOWLEDGEMENTS

To the Public Labor Ministry of the 23rd Region; to the Mato Grosso State Health Department and Institute for Collective Health of UFMT, for the physical space.

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Received on: 08/22/2021
Reviewed on: 10/28/2021
Accepted on: 12/13/2021
Preprint: 04/25/2022
https://preprints.scielo.org/index.php/scielo/preprint/view/4007

Author's contributions:: Galvão, S.M.: formal analysis, conceptualization, writing – original draft, writing – review & editing, investigation, methodology, validation, visualization. Atanaka, M.: writing – review & editing, validation, visualization. Sousa, N.F.S.: writing – review & editing, validation, visualization. Galvão, N.D.: project administration, data curation, investigation, funding acquisition, resources, supervision, validation, visualization.