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Colorectal cancer mortality in women: trend analysis in Brazil and its regions and states

Mortalidade por câncer colorretal em mulheres: análise de tendência no Brasil, Estados e Regiões

Mortalidad por cáncer colorrectal en mujeres: análisis de tendencia en Brasil, Estados y Regiones

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ABSTRACT

Objectives: to analyze colorectal cancer mortality trends in women in Brazil and its regions and states. **Methods:** ecological, time-series study with trend analysis of deaths caused by colorectal cancer in women in Brazil and its regions and states between 2008 and 2019. Polynomial regression was used to treat the data. **Results:** 48,225 deaths of women caused by colorectal cancer were examined. There was an increasing mortality trend in Brazilian women, with regional differences that resulted from socioeconomic, political, and cultural inequalities. The South Region stood out with the highest rate (7.32) in 2008, which increased to 8.65 in 2019, followed by the Southeast Region, whose rates were 6.72 and 9.05 in 2008 and 2019, respectively. **Conclusions:** colorectal cancer mortality increased, which indicates the need to expand public policies oriented toward screening and early diagnosis of colorectal cancer in women.

Descriptors: Colorectal Neoplasms; Mortality; Women; Trends; Epidemiology.

RESUMO

Objetivos: analisar as tendências da mortalidade por câncer colorretal em mulheres no Brasil, Estados e Regiões. **Métodos:** estudo ecológico, de séries temporais, com análise de tendência dos óbitos por câncer colorretal de mulheres, no período de 2008 a 2019. Para análise de tendência, foi utilizado o modelo de regressão polinomial. **Resultados:** analisaram-se 48.225 óbitos de mulheres por câncer colorretal. Houve tendência crescente da mortalidade em mulheres brasileiras, com diferenças regionais, em razão das desigualdades nos padrões socioeconômicos, políticos e culturais. Destacando um aumento na Região Sul, com as maiores taxas, de 7,32 em 2008 para 8,65 em 2019, seguida pela Região Sudeste, com taxas de mortalidade por câncer colorretal de 6,72 e 9,05 em 2008 e 2019, respectivamente. **Conclusões:** observa-se um aumento das taxas de mortalidade por câncer colorretal, demonstrando a necessidade do incremento das políticas públicas direcionadas às estratégias de rastreamento e diagnóstico precoce do câncer colorretal em mulheres.

Descritores: Câncer Colorretal; Mortalidade; Mulheres; Tendencia; Epidemiologia.

RESUMEN

Objetivos: analizar las tendencias de mortalidad por cáncer colorrectal de mujeres en Brasil, Estados y Regiones. **Métodos:** estudio ecológico, de series temporales, con análisis de tendencia de decesos por cáncer colorrectal en mujeres, entre 2008 y 2019. Para análisis de tendencia se utilizó el modelo de regresión polinomial. **Resultados:** se analizaron 48.225 decesos de mujeres por cáncer colorrectal. Se observó tendencia creciente de mortalidad en las mujeres brasileñas, con diferencias regionales debidas a desigualdades de estándares socioeconómicos, políticos y culturales. Se manifiesta un aumento en la Región Sur, con tasa de 7,32 en 2008 incrementando a 8,65 en 2019, siguiéndole la Región Sudeste, con tasas de mortalidad de cáncer colorrectal de 6,72 y 9,05 en 2008 y 2019. **Conclusiones:** se observa aumento de tasas de mortalidad por cáncer colorrectal, demostrándose necesidad de incrementar las políticas públicas orientadas a estrategias de rastreo y diagnóstico precoz del cáncer colorrectal en mujeres.

Descriptores: Neoplasias Colorrectales; Mortalidad; Mujeres; Tendencia; Epidemiología.

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INTRODUCTION

Colorectal cancer (CRC) is a global public health problem[1]. Estimates for 2040 show that 7,647,039 women will be diagnosed with this disease and 3,110,710 will die because of it around the world[2]. A study indicated an increased CRC incidence worldwide, especially in countries with fewer health resources, such as those in Eastern Europe and Latin America[3].

In Brazil, according to the National Cancer Institute[4], the estimated incidence of new CRC cases in women for 2020 was 20,470, which accounted for 9.2% of cancer cases in women, a number surpassed only by breast cancer. The Information Technology Department of the Brazilian Unified Health System (DataSUS) showed that 9,885 Brazilian women died in 2019 as a consequence of the disease[5].

There has been a considerable increase in CRC cases in adults under 50 years old. The registered incidence represents an annual 2.9% growth among 20 to 39 and 40 to 49 age groups and up to a fivefold increase in the risk of developing CRC[6]. The likely causes for this increase are unknown[7], but they may be related to avoidable risk factors, including excessive alcohol consumption, unhealthy diet, sedentary lifestyle, obesity, and smoking[8]. They can also be associated with lack of early detection by means of screening[9]. Additionally, factors such as urbanization and pollution have been considered responsible for the overall increase in cancer incidence[10].

Studies have shown that mortality rates are relevant instruments for monitoring disease burden, and trends in different regions can be useful in the creation of strategies, programs, and health policies and lead to better disease control[10-11]. Trend analyses corroborate the collection of epidemiological data that can be used to carry out research programs and interventions in the early investigation of factors that determine cancer development[10].

A study showed that incidence rates in countries with transition economies keep growing, whereas those in most developed countries remain stable[12]. Data from 2008 indicated that CRC affected more women than men in Brazil, with an estimate of 13,000 new cases. The different results in each region highlighted the socioeconomic, political, and cultural differences between the areas. The fact that women seek help in health services more often than men can help justify the increased CRC mortality reported for the gender[13] and could even lead to early CRC diagnosis, with higher survival or healing prospects. This shows how important continuing education is to health professionals, including learning about protocols and public policies about CRC prevention, screening, and treatment[14]. To the best of our knowledge, there are no studies evaluating the trends in CRC in women in Brazilian states and examining age groups separately.

OBJECTIVES

To analyze CRC mortality trends in women in Brazil and its regions and states.

METHODS

Ethical aspects

Ethical aspects were observed. The study was developed in accordance with National Health Council Resolution no. 466, of December 12, 2012. The proposal was submitted for evaluation by the Human Research Ethics Committee at the State University of Maringá, and was later approved and received a favorable opinion. As the data would be extracted from a database, exemption from free and informed consent forms was requested and accepted.

Study design, period, and setting

This was an ecological, time-series study with a trend analysis of deaths caused by CRC in women in Brazil and its regions and states between January 2008 and December 2019. This period was chosen because of the adopted data analysis technique and the limited bibliography on the subject. The recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) initiative were followed in the assessment of methodological quality.

Population, inclusion and exclusion criteria

The population was made up of the cases of 48,225 deaths of women in the studied period. Collection of secondary data was carried out in the Mortality Information System (SIM, as per its acronym in Portuguese) on DataSUS. Codes C18, C19, and C20 of the International Classification of Diseases (ICD10) were considered. Calculation of CRC mortality rates in women consisted of obtaining the ratio between the number of deaths of women caused by this disease and the female population in that year and place by applying demographic information from the 2000 and 2010 censuses or using estimates and multiplying the results by 100 thousand. The inclusion criteria were women between 20 and 49 years old or 50 and 69 years old. These age groups were chosen in an attempt to avoid the inclusion of deaths caused by other problems that could lead to a false positive for CRC. Incomplete patient records were excluded.

Study protocol

Data collection occurred from October to December 2020. Data were extracted from DataSUS, inserted into Microsoft Office Excel spreadsheets, and organized by Brazilian region. The target group was women between 20 and 49 years old and from 50 to 69 years old. The choice of these age groups was justified by studies pointing out one as exposed to high risk of developing CRC and the other as showing higher prevalence of the disease.

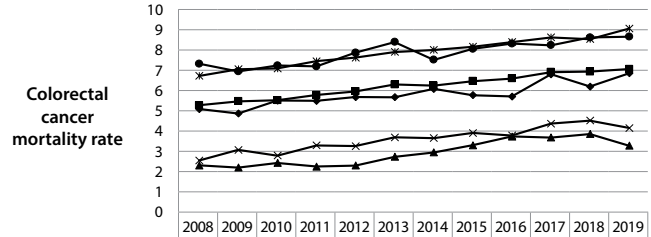
Results analysis and statistics

Polynomial regression was applied in trend analysis. In this model, CRC rates in women were considered as dependent variables (y), and year was the independent variable (x). It was centered for 2012 (x - 2012), and the time series was smoothed by using a three-moving average. The tested polynomial regression models were linear ($y = \beta0 + \beta1x1$), quadratic ($y = \beta0 + \beta1x1 + \beta2x2$), and cubic ($y = \beta0 + \beta1x1 + \beta2x2 + \beta3x3$), and the adopted level of significance of the model trend was $p<0.05$. Dispersion graphs, determination coefficients (r2), and residual plots (real assumption of homoscedasticity) were analyzed to choose the best model. All analyses were carried out in SPSS software,

version 20.1. When all criteria showed significance for more than one model and the determination coefficients were similar, the simplest model was chosen.

RESULTS

The present study analyzed 48,225 deaths caused by CRC in women in Brazil between 2008 and 2019. National CRC mortality rates grew from 5.28 deaths per 100 thousand women in 2008 to 7.06 deaths per 100 thousand women in 2019. All states showed an increase in the mortality rate over the years. The South Region had the highest CRC rate, which grew from 7.32 in 2008 to 8.65 in 2019, and was followed by the Southeast Region, with CRC rates of 6.72 and 9.05 in 2008 and 2019, respectively. In contrast, the North Region stood out with the lowest rates in the analyzed period (Figure 1).



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Brazil	5.28	5.47	5.52	5.78	5.96	6.30	6.24	6.46	6.59	6.91	6.93	7.06
North Region	2.32	2.21	2.44	2.26	2.31	2.74	2.96	3.31	3.74	3.69	3.86	3.29
Northeast Region	2.56	3.08	2.80	3.30	3.27	3.70	3.66	3.91	3.79	4.37	4.52	4.16
Southeast Region	6.72	7.05	7.09	7.45	7.62	7.90	8.00	8.16	8.39	8.62	8.53	9.05
South Region	7.32	6.94	7.23	7.19	7.86	8.39	7.51	8.05	8.31	8.23	8.61	8.65
Center-West Region	5.09	4.87	5.51	5.49	5.68	5.67	6.08	5.77	5.71	6.80	6.20	6.85

Figure 1 – Colorectal cancer mortality rates in women by Brazilian region, Brazil, 2008-2019

Polynomial regression analysis showed an upward trend for CRC mortality in women, with an average rate of 6.13 and an annual average rate increase of 0.17 (r^2=0.99). Overall, the states also had a consistent increase in mortality. The state of Acre, in the North Region, showed the highest average rate in the region (3.44), as well as the highest average increase (0.40; r^2=0.68), which was followed by a decrease (0.11). Pernambuco, a state in the Northeast Region, had the highest local average rate (4.21; r^2=0.94), whereas the state of Sergipe showed the steepest local increase (0.36; r^2=0.90). Rio de Janeiro was the state that showed the highest CRC mortality rate in Brazil (9.38) and the highest average increase in the mortality rate in the Southeast Region (0.26; r^2=0.97). In the Center-West Region, the Federal District had the highest mortality rate (6.45; r^2=0.04), whereas the state of Goiás showed the highest average increase (0.21; r^2=0.83). Rio Grande do Sul was the state in the South Region with the highest average rate (9.07; r^2=0.96) (Table 1).

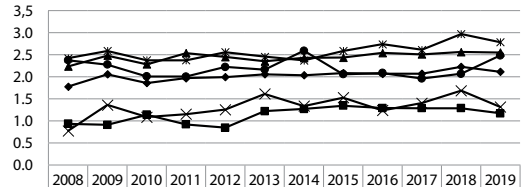
Analysis of CRC mortality rates in women in Brazil by age group indicated higher incidence in women between 50 and 69 years old. The rate in this group changed from 15.48 deaths per 100 thousand women in 2008 to 18.58 deaths per 100 thousand women in 2019. The rates found for the 20 to 49 years old age group were considerably lower, but also increased (from 1.79 in 2008 to 2.12 in 2019) (Figure 2).

Table 1 – Trends in colorectal cancer mortality rates in women by Brazilian region, Brazil, 2008-2019

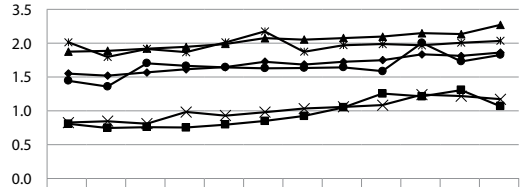
	Model	r^2	*p*	Trend
Brazil	y=6.13+0.17x	0.99	<0.001	↑
North Region	y=2.84+0.19x	0.92	<0.001	↑
Acre	y=3.44+0.40x-0.11x²	0.68	0.007	↑/↓
Amazonas	y=3.08+0.17x	0.88	<0.001	↑
Roraima	y=1.95+0.37x	0.88	<0.001	↑
Pará	y=2.82+0.19x	0.87	<0.001	↑
Amapá	y=1.75+0.24x	0.77	0.001	↑
Rondônia	y=2.91+0.19x	0.95	<0.001	↑
Tocantins	y=3.24+0.09x	0.23	0.158	-
Northeast Region	y=3.53+0.17x	0.99	<0.001	↑
Maranhão	y=2.33+0.14x	0.93	<0.001	↑
Piauí	y=3.35+0.18x	0.65	0.005	↑
Ceará	y=3.85+0.12x	0.87	<0.001	↑
Rio Grande do Norte	y=4.06+0.26x	0.96	<0.001	↑
Paraíba	y=3.02+0.18x	0.73	0.002	↑
Pernambuco	y=4.21+0.18x	0.94	<0.001	↑
Bahia	y=3.62+0.14x	0.95	<0.001	↑
Alagoas	y=2.56+0.18x	0.84	<0.001	↑
Sergipe	y=3.82+0.36x	0.90	<0.001	↑
Southeast Region	y=7.79+0.19x	0.99	<0.001	↑
Minas Gerais	y=5.69+0.19x	0.98	<0.001	↑
Espírito Santo	y=6.85+0.16x-0.04x²	0.85	0.001	↑/↓
Rio de Janeiro	y=9.38+0.26x	0.97	<0.001	↑
São Paulo	y=8.25+0.18x	0.97	<0.001	↑
South Region	y=7.77+0.15x	0.94	<0.001	↑
Paraná	y=7.48+0.12x	0.66	0.004	↑
Santa Catarina	y=6.00+0.12x	0.74	0.001	↑
Rio Grande do Sul	y=9.07+0.22x	0.96	<0.001	↑
Center-West Region	y=5.74+0.14x	0.95	<0.001	↑
Mato Grosso do Sul	y=6.38+0.07x	0.39	0.052	-
Mato Grosso	y=4.43+0.15x	0.79	0.001	↑
Goiás	y=5.76+0.21x	0.83	<0.001	↑
Distrito Federal	y=6.45+0.04x	0.04	0.595	-

There was an increase in CRC mortality rates in the Brazilian regions. In the age group from 20 to 49 years old, the regions kept a constant increase, except the Center-West Region, which showed a reduction. The South Region had the highest average mortality rate (2.54), and Rio Grande do Sul was the state in the region that presented an intermediate proportion (2.84). The states of Pernambuco e Paraíba showed the highest incidence in the Northeast Region (1.59 and 1.56, respectively), although a decrease was recorded in the latter. In the Southeast Region, the highest increase was in the state of Rio de Janeiro (2.66). Acre stood out in the North Region with the highest incidence (1.96) (despite a reduction) and the highest annual average (0.20; r^2=0.011), whereas the state of Mato Grosso do Sul stood out in the Center-West Region (2.40). The country as a whole showed a remarkable upward trend in the age group from 50 to 69 years old.

In general, Brazilian regions showed an upward trend in CRC mortality rates in women ($p<0.05$). Espírito Santo and Paraná were the only federative units with an upward trend followed by a reduction, and a downward trend followed by an increase was found only in the Federal District. In the North Region, Amazonas had the highest rate (10.49), whereas the highest annual average increase was observed in Roraima (1.12; r^2= 0.61). Tocantins was the only state in the Region that showed a constant trend. However, its average mortality rate was the highest (90.50). In the Northeast Region, Sergipe had the highest average rate (11.81)



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
North Region	0.94	0.92	1.15	0.93	0.85	1.23	1.28	1.35	1.30	1.30	1.29	1.18
Northeast Region	0.78	1.37	1.10	1.16	1.26	1.62	1.34	1.54	1.24	1.41	1.70	1.33
Southeast Region	2.25	2.49	2.29	2.55	2.46	2.36	2.44	2.45	2.55	2.52	2.58	2.56
South Region	2.43	2.60	2.39	2.39	2.57	2.47	2.38	2.60	2.75	2.62	2.98	2.80
Center-West Region	2.39	2.29	2.02	2.02	2.23	2.18	2.60	2.07	2.10	1.97	2.08	2.49
Brazil	1.79	2.07	1.87	1.98	2.00	2.07	2.05	2.09	2.08	2.08	2.24	2.12



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
North Region	8.04	7.43	7.56	7.48	7.94	8.45	9.21	10.46	12.50	12.09	13.03	10.66
Northeast Region	8.23	8.44	8.07	9.80	9.26	9.77	10.30	10.56	10.81	12.36	12.14	11.67
Southeast Region	18.71	18.85	19.15	19.42	19.86	20.71	20.51	20.73	20.94	21.45	21.29	22.68
South Region	20.10	17.93	19.13	18.63	20.08	21.71	18.70	19.66	19.84	19.64	20.05	20.33
Center-West Region	14.43	13.55	17.00	16.61	16.40	16.27	16.30	16.41	15.82	20.02	17.27	18.25
Brazil	15.48	15.17	15.64	16.09	16.42	17.23	16.82	17.21	17.46	18.31	18.09	18.58

Figure 2 – Colorectal cancer mortality rates in Brazilian women by age group. (A) Women from 20 to 49 years old. (B) Women from 50 to 69 years old, Brazil, 2008-2019

and the highest annual average increase (0.79; r^2=0.73), a result shared by Rio Grande do Norte. Rio de Janeiro stood out in the Southeast Region with the highest rate and the highest annual average increase (22.98; r^2=0.94). In the South Region, the highest average rate was found in Rio Grande do Sul (27.72), and Paraná was the only state in the Region that showed an annual decrease (0.12; r^2=0.84). The Federal District and Goiás were the federative units in the Center-West Region with the highest average rate (18.29) and the highest average increase (0.49; r^2=0.78), respectively (Table 2).

DISCUSSION

Studies on mortality rate trends are important in the execution and monitoring of public policies, because they provide managers with resources to put into practice coping strategies to deal with diseases. Specifically, knowledge about geographic patterns and temporal trends of diseases in different regions are useful for designing, implementing, and assessing cancer control programs[15].

Brazilian regions show differences regarding health services and access to them. This diversity can considerably affect the knowledge about educational and preventive practices, which markedly delays early diagnosis and treatment[16].

Brazilian states in the five regions showed an increase in CRC mortality rates in women. The highest numbers were found in

Table 2 – Trends in colorectal cancer mortality rates in women by Brazilian region and age group, Brazil, 2008-2019

	20 to 49 years old				50 to 69 years old			
	Model	r^2	*P*	Trend	Model	r^2	*p*	Trend
Brazil	y=2.03+0.02x	0.95	<0.001	↑	y=16.71+0.32x	0.99	<0.001	↑
North Region	y=1.13+0.04x	0.77	0.001	↑	y=9.24+0.62x	0.90	<0.001	↑
Acre	$y=1.96+0.20x-0.09x^2$	0.72	0.011	↑/↓	y=7.24+0.93x	0.58	0.011	↑
Amazonas	y=1.29+0.01x	0.03	0.649	-	y=10.49+0.70x	0.86	<0.001	↑
Roraima	y=0.61+0.15x	0.70	0.003	↑	y=7.31+1.12x	0.61	0.008	↑
Pará	y=1.08+0.04x	0.75	0.001	↑	y=9.05+0.70x	0.85	<0.001	↑
Amapá	y=0.91+0.18x	0.85	<0.001	↑	y=5.33+0.41x	0.49	0.024	↑
Rondônia	y=1.01+0.02x	0.07	0.445	-	y=10.05+0.58x	0.72	0.002	↑
Tocantins	y=1.41+0.06x	0.36	0.067	-	y=90.50+0.05x	0.01	0.801	-
Northeast Region	y=1.32+0.04x	0.73	0.002	↑	y=9.92+0.12x	0.99	<0.001	↑
Maranhão	y=0.86+0.03x	0.42	0.042	↑	y=7.02+0.48x	0.89	<0.001	↑
Piauí	y=1.17+0.02x	0.07	0.445	-	y=9.30+0.49x	0.71	0.002	↑
Ceará	y=1.30+0.02x	0.28	0.112	-	y=10.99+0.29x	0.86	<0.001	↑
Rio Grande do Norte	y=1.47+0.01x	0.01	0.800	-	y=11.31+0.79x	0.95	<0.001	↑
Paraíba	$y=1.56+0.11x-0.03x^2$	0.60	0.017	↑/↓	y=7.53+0.39x	0.77	0.001	↑
Pernambuco	y=1.59+0.05x	0.60	0.009	↑	y=11.29+0.43x	0.94	<0.001	↑
Bahia	y=1.46+0.03x	0.50	0.021	↑	y=10.19+0.31x	0.89	<0.001	↑
Alagoas	y=0.96+0.06x	0.57	0.012	↑	y=7.43+0.48x	0.80	<0.001	↑
Sergipe	y=1.22+0.15x	0.90	<0.001	↑	y=11.81+0.79x	0.73	0.002	↑
Southeast Region	y=2.45+0.02x	0.75	0. 001	↑	y=20.18+0.31x	0.98	<0.001	↑
Minas Gerais	y=2.00+0.03x	0.83	<0.001	↑	y=14.54+0.33x	0.92	<0.001	↑
Espírito Santo	y=2.29-0.01x	0.05	0.521	-	$y=18.85+0.27x-0.11x^2$	0.61	0.038	↑/↓
Rio de Janeiro	y=2.66+0.01x	0.15	0.262	-	y=22.98+0.50x	0.94	<0.001	↑
São Paulo	y=2.59+0.02x	0.46	0.031	↑	y=21.75+0.24x	0.89	<0.001	↑
South Region	y=2.54+0.04x	0.78	0.001	↑	y=19.57+0.10x	0.36	0.067	-
Paraná	y=2.50+0.001x	0.00	0.959	-	$y=20.60+0.21x-0.12x^2$	0.84	0.001	↑/↓
Santa Catarina	y=2.15+0.03x	0.35	0.069	-	y=15.30+0.07x	0.12	0.317	-
Rio Grande do Sul	y=2.84+0.09x	0.89	<0.001	↑	y=27.72+0.17x	0.63	0.006	↑
Center-West Region	y=2.17-0.01x	0.02	0.698	-	y=16.48+0.29x	0.77	0.001	↑
Mato Grosso do Sul	y=2.40-0.04x	0.14	0.285	-	y=17.19+0.10x	0.06	0.505	-
Mato Grosso	y=1.81-0.02x	0.57	0.012	↓	y=12.52+0.45x	0.68	0.004	↑
Goiás	y=2.20+0.02x	0.07	0.444	-	y=16.13+0.49x	0.71	0.002	↑
Distrito Federal	y=2.32-0.01x	0.02	0.710	-	$y=18.29-0.47x+0.31x^2$	0.78	0.005	↓/↑

the South Region, followed by the Southeast Region. This result indicates that the population in these areas has greater access to health services, treatments, and technologies, but is also more exposed to risk factors, such as a diet poor in fiber and vegetables, with excessive amounts of red or processed meat. A study showed a growing increase in CRC mortality in these regions, with high mortality rates, similar to those in highly industrialized countries. Despite technological developments and advanced treatments, CRC mortality rates remain high[17].

A mortality trend study involving the 133 intermediate regions of Brazil showed that people who live in smaller municipalities usually travel to bigger nearby cities to seek medical treatment. The study reported a growing increase in CRC mortality rates, which has been probably caused by dietary patterns, excessive consumption of red meat, and sedentary lifestyle[11].

The patients analyzed in rural areas in the state of California, United States, were more likely to receive a late CRC diagnosis and have less access to treatment[18]. A study in France examined the geographic access, from home to the reference center, as well as patients' comorbidities, to find out if these factors hindered treatment and impacted CRC mortality rates. It is believed that the increase in these rates can reflect the lack of infrastructure in intermediate and poorer regions[19].

Although the highest mortality rates have been observed in developed countries, poor and developing countries already account for 80% of the burden of noncommunicable diseases worldwide, and cancer will be the main health problem and cause of death in the next decades in these places[20].

The results of the present study indicated a gradual increase in CRC mortality in women from 2008 to 2019. Another study showed that the CRC mortality rate increased from 6.9 in 1996 to 8.2 in 2012, with the rate growing in the female population and the disease being the fifth and third most common cancer type, respectively, in these years[21].

A study by Global Burden Disease in 188 countries reported that in 2013 the CRC incidence rate in women was lower in South Asia and Sub-Saharan Africa (6.95 and 5.49) and higher in Australia, North America, and Western Europe. It was the cancer type with the highest incidence in Japan and the most common cause of death in Spain, Portugal, Sweden, Norway, and Japan. Cancer incidence trends are mainly informative from both the health system and scientific standpoints and can help plan resource application, originating assumptions regarding factors that boost changes[10].

The present study presented data on CRC mortality in women from two age groups by Brazilian region and state. Regional distribution and trends can reflect socioeconomic and racial disparities, among others. In addition to socioeconomic and modifiable factors, which include diet and life habits, cultural influence plays an important role in early cancer screening and diagnosis. A study showed that these factors, together with lack of adherence to screening and insufficient access to health services, are directly related to the development of several types of cancer[22].

The present study showed a constant increase in the 20 to 49 years old age group and a considerable rise in the 50 to 69 years old age group, with growing and relevant data. Another study showed different results, with a higher percentage in the age group from 40 years old and high rates up to 55 years old[23]. The increase in number of CRC cases in younger people can be related to habits such as sedentary lifestyle, inadequate diet, smoking, and difficulty accessing early screening and diagnosis.

Specifying the set of social and environmental elements that originate risk factors and identifying age-period-cohort patterns of adult mortality can contribute to choosing the adequate strategy to prevent mortality and understanding how to reduce it, since this parameter substantially varies with age. The highest mortality rates related to degenerative diseases and cancer are found in older populations rather than in young adults[24].

The present study used secondary data. Although cancer records are considered the gold standard for surveillance of this disease, the quality of the records may vary considerably between Brazilian regions.

Study limitations

Underreporting of cancer cases or deaths and a high proportion of undefined codes can originate record data that do not reflect the actual cancer burden. Orienting and reorienting health teams can improve reporting quality.

This limitation was not relevant enough to affect the results. The collected data were submitted to robust statistical tests that allowed to better understand the studied phenomenon.

Contributions to the nursing, health, or public policy area

Academic research is fundamental for guaranteeing a continuous evolution of knowledge and nursing practices. The present study contributed by pointing out the need to expand public policies in basic health units and orient CRC screening and early diagnosis strategies toward women in different Brazilian regions.

CONCLUSIONS

There was an increase in the CRC mortality trend in women in Brazilian states. The Southeast and South Regions stood out, with the highest growth in mortality rates. The increase observed in the 20 to 49 years old age group was constant, but an even more relevant increase occurred in the 50 to 69 years old age group. Therefore, there is a clear need to expand public policies oriented toward CRC screening, and these should take into account the scenario in the different Brazilian regions. It is also necessary to consider the frequent changes in course in the habits of the population and in socioeconomic and cultural development. By investing in early diagnosis and following a screening protocol oriented toward the mentioned age group in basic health units, it is possible to reduce CRC incidence and mortality rates.

SUPPLEMENTARY MATERIAL

https://doi.org/10.48331/scielodata.GNSKUB

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