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Health Access and Mortality by Cervical Cancer: Regional Patterns and Temporal Trend

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Abstract

Background: Cervical Cancer (CC) is the leading cause of cancer death in developing countries. It is a morbidity very incident in the poorest population, being a marker of economic disparity. In this way, it is important to elucidate the epidemiological patterns of regions that have not, yet, been studied.

Objective: To evaluate the epidemiological pattern of cervical cancer in the ABC region.

Method: An ecological study, which evaluated the temporal trend of CC between the years 2000 to 2012 in the ABC, Southeast and Brazil regions. Estimating the trend with the national standard rates for each location and age group, with a confidence level of 95% and the statistical program was Stata version 11.0®.

Results: For age groups from 50 years to 54 years and 55 years to 59 years, the age in the Southeast region (β: -1.65, p=0.007, β: -1.75, p<0.001, respectively) 0.90, p=0.023, β: -0.68, p=0.04, respectively), there was a significant reduction in mortality. The incidence in the ABC region presented an increase in the age range from 55 years to 59 years (β: 6.08, p=0.021). While in the Southeast and in Brazil there was a significant decrease in all ages.

Conclusion: Mortality rates and hospitalization for CC followed a downward trend in the Southeast region and in Brazil. However, when studying the ABC, we can note that public health measures are still necessary so that their results follow the national trend.

Keywords: Cervical cancer; Cervical cancer; Epidemiology; Mortality

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Introduction

Cervical Cancer (CC) is the leading cause of cancer death in developing countries, with high incidence and mortality rates due to poor access to appropriate therapies [1-3]. Despite its relatively simple prevention, it is a morbidity that affects young women and, especially, with a high level of poverty, and is thus an important marker of economic disparity [4]. CC treatment is complex, leading women to physical and psychological damage, compromising quality of life even after complete remission [5-7]. Due to the precariousness of primary care in some regions of Brazil, CC treatment is often incomplete due to poor patient adherence [8].

In this sense, it is important to know the epidemiological panorama of a disease that impairs the quality of life of many women and has a marked social profile in areas of economic differences, such as the Region of Grande ABC in Sao Paulo [9,10]. Although the ABC Region has such obvious socioeconomic dichotomies, CC studies in this region are still a gap to be studied [11].

Therefore, the objective of our study is to analyze the behavior of mortality and hospital admissions for cervical cancer in the region of ABC, Southeast and Brazil as a whole, between the periods 2000 to 2012.

Materials and Methods

This is an ecological study, which evaluated the temporal trend of cervical cancer between the years 2000 to 2012 in the region of the ABC, Southeast region and Brazil.

The ABC region is composed of 7 municipalities, Santo Andre, Sao Bernardo, Sao Caetano, Maua, Diadema, Ribeirao Pires and Rio Grande da Serra, being an important industrial pole of Brazil and composing the metropolitan region of Sao Paulo. However, it is a region with large socio-

Table 1: Estimate Linear regression of mortality * by cervical cancer According to the ABC region, Southeast region and Brazil, Between Years of 2000 a 2012.

Age groups-Age (years)	Mortality-ABC		Mortality-SE		Mortality-Brazil	
	β (CI 95%)	p*	β (CI 95%)	p*	β (CI 95%)	p*
25 years to 29 years	-0.13 (-0.64; 0.37)	0.57	0.13 (-0.02; 0.28)	0.088	0.25 (0.08; 0.41)	0.01
30 years to 34 years	0.08 (-0.66; 0.83)	0.81	0.23 (-0.06; 0.52)	0.108	0.49 (0.25; 0.73)	0
35 years to 39 years	-0.42 (-1.88; 1.04)	0.54	-0.26 (-0.67; 0.15)	0.191	0.27 (-0.07;0.63)	0.12
40 years to 44 years	-0.11 (-1.30; 1.09)	0.85	-0.84 (-1.25; -0.45)	0.001	-0.34 (-0.74; 0.06)	0.09
45 years to 49 years	0.32 (-0.90; 1.5)	0.57	-1.60 (-2.27; -0.94)	<0.001	-0.67 (-1.40; 0.11)	0.09
50 years to 54 years	1.50 (0.05; 2.93)	0.04	-1.65 (-2.75; -0.54)	0.007	-0.90 (-1.64; -0.15)	0.02
55 years to 59 years	1.91 (0.67; 3.16)	0.01	-1.75 (-2.6; -1.20)	<0.001	-0.68 (-1.36; 0.00)	0.05
60 years to 64 years	0.66 (-0.95; 2.27)	0.39	-2.10 (-2.67; -1.54)	<0.001	-0.88 (-1.30; -0.46)	0

***Standardized by age according to the world population of the World Health Organization.
B: Regressao; r^2: Predictive capacity; 95% CI: Confidence Interval of 95%.
Source: Mortality Information System (SIM). Data provided by the Informatics Department of the Unified Health System (Datasus-www.datasus.gov.br). Ministry of Health, Brazil.

economic disparities between municipalities, which makes it difficult for universal and quality access to the public system [9].

The research is composed of all deaths recorded by the Cervical Cancer Information System (SIM) for cervical cancer in women between 25 years and 64 years of age, who are submitted to a Pap smear, used for the screening and diagnosis of CC, in the period from January 1, 2000 to December 31, 2012, in residents of the ABC region of Sao Paulo, Southeast Region and Brazil [12,13].

Information from the Department of Informatics of the Unified Health System (DATASUS - www.datasus.gov.br) was used, and health data are available on all municipalities in Brazil. DATASUS is a free access database and represents the main source of health information in the country [14].

The distribution of hospitalization rates and mortality from cervical cancer according to the topographic location of the uterine lesion was codified by the 10th International Classification of Diseases (ICD) [15]: C53 - Malignant neoplasm of the cervix.

- The collection of information on deaths by CC followed the following steps: Access to mortality data was based on the following sequence within the DATASUS system:Vital statistics;
- Mortality between 2000 and 2012;
- General mortality;
- Geographical coverage.

The deaths related to each code were extracted stratified according to the following variables:

- Age group (ranging from 25 years to 64 years, divided into age groups every 5 years);
- Location (Region);
- Year (2000 to 2012).

In order to collect data on the population, censuses and intercensal projections were made available by the Brazilian Institute of Geography and Statistics (IBGE), available on the DATASUS website, following the following sequence within the DATASUS system:

- Demographic and socioeconomic;
- Resident population;
- Censuses (1980, 1991, 2000 and 2010), Contagem (1996) and intercensorial projections (1981 to 2012), according to age, sex and domiciliary situation;
- Geographical coverage.

The crude mortality rates were calculated by 100,000 women, by age group, year and region studied. At the end of the gross rate estimation, based on the age distribution of the World Health Organization population, mortality went through the standardization by age using the direct method [16]. The hospitalizations are presented according to the list of tabulations for morbidity offered in the Hospital Information System (HIS), according to the technical norms made available by the system.

The HIS provides demographic and clinical data, based on the Hospital Hospitalization Authorization (HHA), allowing to describe the hospital morbidity and mortality in the scope of the SUS's own services, however , the present study will include the hospitalizations of the population that uses private health insurance [17].

Information on UCC hospitalizations was stratified according to variables:

- Region;
- Morbidity list CID- 10 (Malignant neoplasm of the cervix);
- Age group.

To evaluate the trend of mortality and hospital admissions of this neoplasia in the period studied, they used linear regression models. It was also estimated the trend with the national standard rates for each location and age group, with a confidence level of 95% and the statistical program Data Analysis and Statistical Software for Professionals (Stata) version 11.0®.

This study was based on secondary data, not being able to identify the individual and the data are available on the internet in a free and unrestricted way, there was no need for this research to be sent to the Research Ethics Committee for its appreciation, as expressed in resolution 466/2012.

Results

There was a significant increase ($p<0.05$) in the association

Table 2: Estimate Linear regression the hospital admissions by cervical cancer According to the ABC region, Southeast region and Brazil, Between Years of 2000 a 2012.

Age groups-Age (years)	Hospitalization-ABC		Hospitalization-SE		Hospitalization-Brazil	
	β (CI 95%)	p*	β (CI 95%)	p*	β (CI 95%)	p*
25 years to 29 years	-0.28 (-2.33; 1.77)	0.77	-0.60 (-3.87; 2.66)	0.692	-1.34 (-5.61; 2.93)	0.505
30 years to 34 years	-0.34 (-3.65; 3.00)	0.82	-3.03 (-5.65; -0.40)	0.027	-4.42 (-8.77; -0.07)	0.047
35 years to 39 years	2.30 (-1.87; 6.47)	0.25	-11.64 (-14.38; -8.89)	<0.001	-13.49 (-19.33; -7.64)	<0.001
40 years to 44 years	-3.38 (-8.81; 2.05)	0.2	-21.27 (-24.91; -17.64)	<0.001	-22.58 (-32.98; -12.18)	0.001
45 years to 49 years	-0.11 (-4.52; 4.30)	0.96	-24.37 (-30.19; -18.56)	<0.001	-27.14 (-41.08; -13.21)	0.001
50 years to 54 years	1.79 (-5.71; 9.28)	0.61	-15.87 (-20.72; -11.02)	<0.001	-16.86 (-26.69; -7.03)	0.003
55 years to 59 years	6.08 (1.10; 11.05)	0.02	-10.60 (-14.33; -6.86)	<0.001	-9.45 (-14.52; -4.37)	0.002
60 years to 64 years	4.86 (-0.90; 10.63)	0.09	-8.56 (-11.00; -6.13)	<0.001	- 5.86 (-8.80; -2.91)	0.001

*Standardized by age according to the world population of the World Health Organization.
B: Regressao; r^2: Predictive capacity; 95% CI: Confidence Interval of 95%.
Source: Hospital Information System (SIH/SUS). Data provided by the Informatics Department of the Unified Health System (Datasus-www.datasus.gov.br). Ministry of Health, Brazil.

between cervical cancer mortality in the ABC region between the age groups: 50 years to 54 years (95% CI 0.05, 2.93) and 55 years to 59 years (CI 95% 0.67, 3.16) (Table 1).

Southeastern mortality presented a decreasing and significant trend (p <0.05) in the age groups between 40 years and 44 years (95% CI -1.25; -0.45); 45 years and 49 years old (95% CI -2.27; -0.94); 50 years and 54 years (95% CI -2.75; -0.54); 55 years and 59 years old (95% CI -2.6; -1.20); 60 years and 64 years (95% CI -2.67; -1.54) (Table 1).

Mortality in Brazil behaved differently among the age groups. There was a significant increase (p<0.05) in the ranges between 25 years and 29 years (95% CI 0.08, 0.41) and 30 years and 34 years (CI 95% 0.25, 0.73), however for the age groups 50 years and 54 years (95% CI -1.64; -0.15); 55 years and 59 (CI 95% -1.36; 0.00) and 60 years and 64 years (CI 95% -1.30; -0.46) there was a significant decreasing trend (p<0.05) (Table 1).

Admission for cervical cancer in the ABC region showed a significant (p<0.05) trend only in the age range between 55 years and 59 years (95% CI, 1.10, 11.05). On the other hand, hospitalizations of this morbidity in the Southeast region showed a significant decreasing trend (p<0.05) in the age groups between 30 years and 64 years. In Brazil, there was a repetition of this pattern of significant decreasing hospitalizations (p<0.05) between the ages of 30 years and 64 years (Table 2).

Discussion

The analysis of mortality from cervical cancer showed an interesting and worrying fact. While mortality from this disease follows a downward trend in Brazil and the Southeast, it is not observed in the region of the ABC, which has this index following an increasing tendency to pass the years studied when taking into account the age groups of 50 years to 54 years and 55 years to 59 years.

This can be explained by the measurements of general practitioners and not the oncologist of the ABC Region. These professionals are responsible for the first care of cancer patients, but they are not very aware of the measures recommended by the therapeutic and prevention consensuses, such as the protocols established in the diagnostic colposcopy and cancer control [18]. In fact, only 37% of the physicians in this region adopt the measures recommended by the INCA and about 24% show deficient attitudes according to a study, which may affect the prognosis of patients who already have an unfavorable outcome when the measures are correct [12,13,19,20].

In the case of Brazil as a whole and in the Southeast, mortality may follow a decreasing trend due to the adequacy of secondary prevention measures [2]. Such measures would more significantly affect regions with the greatest inequalities, such as in Brazil and the Southeast, contributing to the elimination of negative outliers present in unequal populations, which is less observable, although relevant, in smaller and more homogeneous regions such as ABC [7,17].

A similar scenario was observed with hospital admissions that presented a growing and significant trend in the ABC region for the 55 years to 59 years age groups. While the same was not observed for the Southeast and Brazil, where, for practically all the age groups, a downward trend was observed.

This trend in the ABC region can be explained by increased coverage and diagnosis of this morbidity in the study period. This has already been observed in other developing countries, where increased incidence was accompanied by the application of more comprehensive screening methods [6].

Moreover, it is of paramount importance if we consider that the resident population of the ABC region, as it happens in the metropolitan region of Sao Paulo, demands many public health services. This can increase queuing and waiting time within the public network by up to 80 minutes compared to the private network, which may discourage a continuous follow-up of patients wishing to perform screening for cervical cancer, accumulating cases for more advanced age groups [4,21]. In addition many women are unaware or disliked of the Pap smear, which may distract them from medical services for a long time, corroborating the appearance of cancer at later ages, as observed in the present study [22,23].

This study has some limitations. This is due to his Transversal method which, like any study with this drawing, presents a lack of the lack of causal relations. Moreover, because it is an ecological study, there is the ecological fallacy, in which the nature of the individuals is deduced by inferences about the group that these individuals belong to [24-26].

Conclusion

There was a significant increase in the association between cervical cancer mortality in the ABC region between the ages of 50 years to 54 years and 55 years to 59 years, which did not occur in the other regions studied, in which there was a decrease. This should be taken into account for public health proposals at the regional level, in order to understand the reason for this disturbing variation in the ABC of Sao Paulo.

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