

Temporal morbidity and mortality by breast neoplasm and its risk factors in women who live in the capital cities of the Southeast region of Brazil: 2008-2014**Tendência temporal da morbidade e mortalidade por neoplasia de mama e fatores de risco em mulheres residentes das capitais da região sudeste do Brasil: 2008-2014****Evolución temporal de la morbilidad y mortalidad por cáncer de mama y los factores de riesgo en mujeres que viven en la capital de la región sureste de Brasil: 2008-2014****Received: 10/02/2016****Approved: 25/06/2016****Published: 01/09/2016****Marco Aurélio Ferreira de Jesus Leite¹****Carlo José Freire de Oliveira²****Hugo Ribeiro Zanetti³****César Augusto França Abrahão⁴****Guilherme Moraes Puga⁵**

This study aimed to describe the rate of insufficiently active women, overweight, hospitalizations and deaths from cancer of the breast the capital of southeastern Brazil. This is quantitative research using computerized data from the Ministry of Health of Brazil, which are the Risk and Protective Factors Surveillance for Chronic Diseases Telephone Survey and Bank of the Unified Health System (SUS) Data focused on levels of physical activity, index body mass, number of hospitalizations and deaths from cancer of the breast between the period 2008 to 2014. Over the years analyzed there was a greater similarity in the changes in the percentage of women with overweight and the number of hospitalizations for breast cancer in all Southeastern capital. But overweight is a major risk factor for morbidity of mammary cancer in women living in Southeastern Brazil.

Descriptors: Breast neoplasms; Obesity; Sedentary lifestyle; Public health.

Este estudo tem como objetivo descrever a taxa de mulheres insuficientemente ativas, excesso de peso, internações e óbitos por neoplasia de mama das capitais da região sudeste do Brasil. Trata-se de pesquisa quantitativa utilizando dados informatizados do Ministério da Saúde, sendo estes os de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico e Banco de Dados do Sistema Único de Saúde com foco nos níveis de atividade física, índice de massa corporal, número de internações e óbitos por neoplasia da mama entre o período de 2008 a 2014. No decorrer dos anos analisados houve maior similaridade nas alterações do percentual de mulheres com excesso de peso e do número de internações por neoplasia da mama em todas as capitais do sudeste. Contudo o sobrepeso é um dos principais fatores de risco para morbidades da neoplasia mamaria em mulheres residentes da região sudeste do Brasil.

Descritores: Neoplasias da mama; Obesidade; Estilo de vida sedentário; Saúde pública.

Este estudio tuvo como objetivo describir la tasa de mujeres con insuficiente actividad, exceso de peso, hospitalizaciones y muertes por cáncer de mama en las capitales del sureste del Brasil. Esta es una investigación cuantitativa basados en datos informáticos del Ministerio de Salud del Brasil, siendo estos los de la Vigilancia de Factores de Riesgo y Protección por Enfermedades Crónicas por la Encuesta Telefónica y el Banco de Datos del Sistema Único de Salud (SUS) que se centró en los niveles de actividad física, índice de masa corporal, hospitalizaciones y muertes por cáncer de mama entre el período de 2008 a 2014. Lo largo de los años analizados hubo una mayor similitud en las alteraciones en el porcentaje de mujeres con sobrepeso y el número de hospitalizaciones por cáncer de mama en todas las capitales de los estados del sudeste. Sin embargo, el sobrepeso es un factor de riesgo para la morbilidad del cáncer de mama en las mujeres que viven en el sureste de Brasil.

Descriptores: Neoplasias de la mama; Obesidad; Estilo de vida sedentario; Salud pública.

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INTRODUCTION

Cancer is an important reason of concern for people all over the world, thanks to its high rate of morbidity and mortality. In Brazil, between 2014 and 2015, the incidence of cancer was of, approximately 576 thousand new cases. Breast cancer (BC) contributed to increasing this incidence. In 2015, this type of cancer had become the third with the greatest incidence in the country, with about 75 thousand cases¹.

Many are the factors which can provoke proliferative benign or malign lesions in the mammary gland and, depending on their origin, they can be classify as intrinsic or extrinsic. Age, gender, race and genetic composition constitute independent (intrinsic factors) and non-modifiable parameters². Extrinsic factors, such as diet³, level of physical activity⁴, smoking⁵, and the use of hormonal allopathics are conditioned and restrictively modified by one's lifestyle². In this regard, it can be observed that the interventions applied and destined to the modifiable factors are fundamental in the control of BC.

In recent decades, Brazil has acted through public policies to try and control the incidence of BC. Initially, in 1984, the Program for the Integral Assistance of Women's Health was launched. Its objective was to prevent the incidence of cervical and breast cancer, diseases which are given priority when it comes to assistance and monitoring actions in the country⁶. Afterwards, the Ministry of Health released, in 2005, the National Policy for Ontological Attention, which established that the control of cervical and breast cancer was a fundamental component that needed to be addressed in the health care plans crafted by the states and cities⁷. Even though there is no accurate assessment of their relevance, the search for healthy living conditions for the population in line with the monitoring of their health care by health professionals (doctors, nutritionists, physical education professionals, nurses, among others) is essential to the efficiency and effectiveness of these programs.

The primordial step towards a consolidation of intervention programs against BC is the existence of a demand and of concrete information that point to the main factors associated with the prognosis of the disease. It is also necessary to take into account the economic, social and cultural aspects of each locale. Cervical cancer mortality rates, for example, are associated with socioeconomic factors in the northeast region of Brazil⁸, and more recently, it was noted that BC has an inverse correlation to the fertility rate of the towns in the countryside of Brazilian states. This, however, was not true for capital cities.⁹

The great centers of the south and Southeast regions had a high rate of cancer mortality between 1980 and 1995, and it was suggested that, after this period, there would be a decrease in this death rate, not only in these regions, but throughout the entire country^{9,10}. Despite the importance of these data no other study was published to confirm such trend. Beyond this approach, there is a burgeoning number of studies that show the tendencies of modifiable risk factors, regarding hospitalizations and mortality by breast neoplasia in the regions south and Southeast in Brazil. This suggests that the conduction of new studies on the theme is necessary. Thus, the objective of this work was to describe the rate of physical inactivity, excess weight, hospitalization number and deaths caused by breast neoplasia in women who live in the capital cities in the Southeast region of Brazil.

METHOD

This is a quantitative, descriptive and exploratory research, whose data was obtained from a systematized search in electronic data banks, which were made available by the Ministry of Health, among which were: the Data Bank of the Unified Health System (DATASUS), and the Telephone Surveys for the Monitoring of Risk Factors and Protection against Chronic Diseases (VIGITEL). The collection of the data was standardized in the period between 2008 and 2014.

DATASUS contains information regarding the gender and age of the hospitalized patient, their diagnosis, hospitalization time, admission date and possible deaths occurred during hospitalization. In this study, only the following information were used: content (number of admissions, number of deaths, and mortality rate), period (year, between 2008 and 2014). Chapter CID-10 (II. neoplasms [tumors]), Morb List CID-10 (benign and malign breast neoplasia), age group (20 years old or older), gender (female), from the cities Belo Horizonte, Vitória, São Paulo e Rio de Janeiro.

VIGITEL uses probabilistic samples from the adult population (18 years old or older) who are resident in the capital cities of Brazilian states or in the Federal District, and registers their landlines. Annually, 5.000 landlines are randomly chosen from each place, and are separated in replicas (or sub-samples) of 200 lines each, so those lines can be verified to be eligible, that is, residential and active. Considering each eligible landline where contact was established with an adult who lives there, and they agreed to participate in the study, the randomized selection of the person who would participate in the study was conducted.

The questionnaire applied by VIGITEL is 94 questions long, and these are separated in the following modules: demographic and socioeconomic characteristics of the individuals, eating and physical activity standards, height and weight of participants, consumption of cigarettes and alcoholic beverages, self-evaluation of one's own health situation and morbidity. The questions are read on a computer screen and their respective answers immediately registered in an electronic medium, allowing for the automatic exclusion of questions no longer valid due to the answers of previous answers¹¹. In this study, the percent frequency of female adults was evaluated, considering 18 years old or older women, overweight (BMI above 25) and insufficiently active (less than 150 minutes of

moderate to vigorous physical activity a week), from the capital cities of the Southeast region of Brazil.

In analyzing the data, descriptive statistic procedures were used to establish the temporal tendencies of the frequencies of adult overweight women, insufficiently active, and the number of hospital admissions and deaths (absolute and percent) of women affected by benign or malign neoplasms between 2008 and 2014.

RESULTS

The number of hospital admissions and deaths of women with BC, together with the percentage of overweight and insufficiently active women in the region, between the years 2008 and 2014 is in Table 1. The city of Vitória, in 2013, had the highest number of admissions provoked by BC (n=6,566), however, Rio de Janeiro, in the same year, reported a higher number of deaths caused by BC (n=572). The percentage of overweight women in the region increased gradually from 2008 to 2014. Generally, the number of admissions caused by BC and excess weight increased as the years went by, in all capitals.

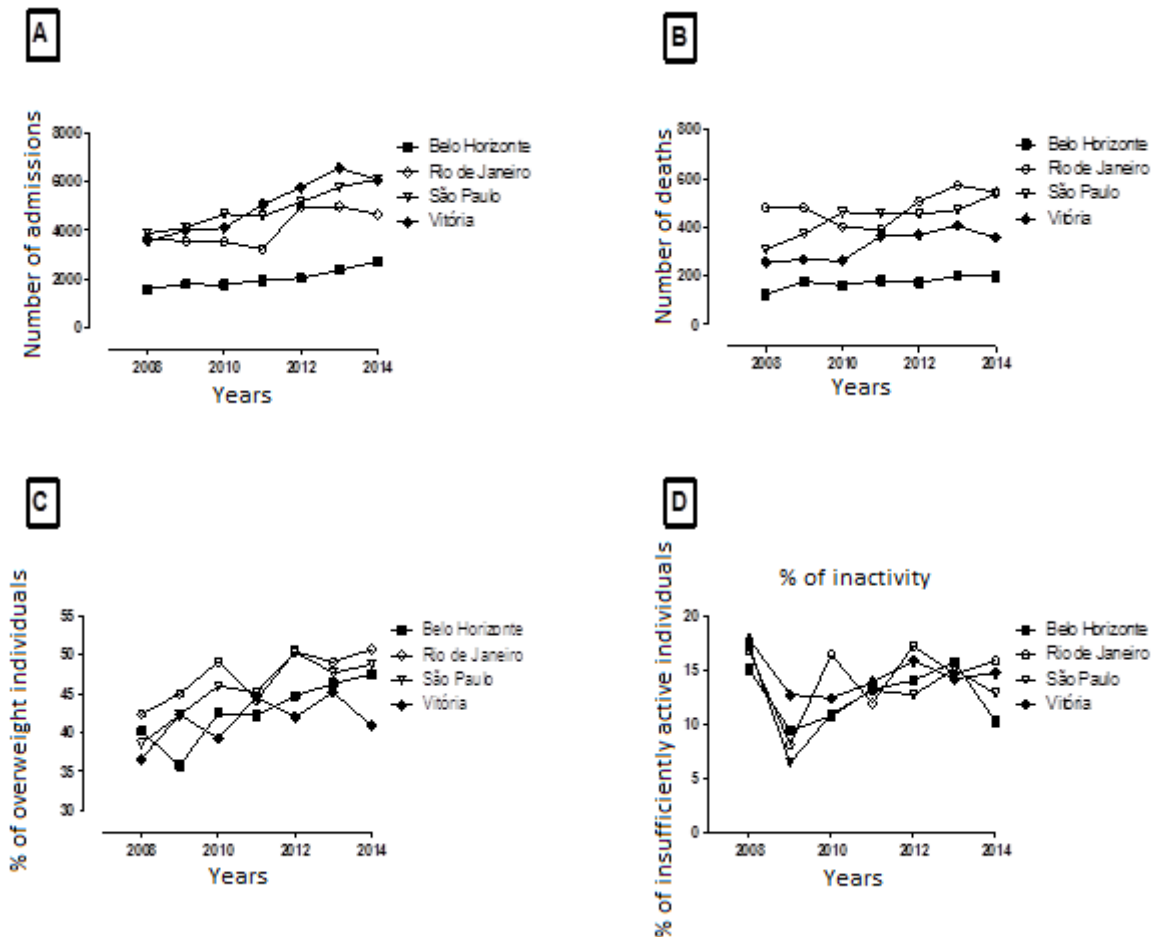
In turn, Image 1 shows the temporal tendency of the number of hospitalizations (Image A) and deaths (Image B) of women with BC, the percentage of overweight women (Image C) and insufficiently active (Image D) from the Southeast region of Brazil between 2008 and 2014. Regarding the percentage of women insufficiently active, irregular changes can be noted, with growing percentages in the early years (2008 and 2009), diminishing in the following years (2010 and 2011), and once again rising in the last years. In spite of the oscillation, all capitals had a smaller number of insufficiently active women in the first year analyzed (2008) than in the last one (2014). This estimate was the opposite of the one which investigated the percentage of overweight women. In that case, there were less overweight women in the first year analyzed (2008) than in the last (2014).

Table 1. Hospitalizations and deaths of women afflicted by BC, percentage of overweight women and insufficiently active women. Capital cities of the Brazilian Southeast region between 2008 and 2014.

Years per capital	Nº of Admissions	Number/Death rate (%)	Excess Weight (%)	Insufficiently Active (%)
Belo Horizonte				
2008	1,596	122 (7.64)	40.2	15.0
2009	1,780	176 (9.89)	35.8	9.4
2010	1,777	162 (9.12)	42.5	10.7
2011	1,942	181 (9.32)	42.2	13.2
2012	2,039	172 (8.44)	44.7	14.0
2013	2,367	199 (8.41)	46.3	15.7
2014	2,730	198 (7.85)	47.5	10.2
Vitória				
2008	3,549	256 (7.21)	36.6	17.8
2009	3,999	267 (6.68)	42.3	12.7
2010	4,097	261 (6.37)	39.3	12.4
2011	5,070	365 (7.20)	44.6	13.8
2012	5,759	370 (6.42)	42.0	15.8
2013	6,566	406 (6.18)	45.2	14.2
2014	6,076	356 (5.86)	40.9	14.7
São Paulo				
2008	3,878	310 (7.99)	38.6	17.1
2009	4,108	371 (9.03)	42.3	6.4
2010	4,674	462 (9.88)	46.0	10.9
2011	4,588	459 (10.0)	45.2	13.1
2012	5,158	452 (8.76)	50.4	12.7
2013	5,775	472 (8.17)	47.7	15.0
2014	6,104	537 (8.80)	48.8	12.8
Rio de Janeiro				
2008	3,688	480 (13.02)	42.4	16.7
2009	3,551	480 (13.52)	45.0	8.1
2010	3,526	401 (11.37)	49.1	16.4
2011	3,231	390 (12.07)	44.2	11.9
2012	4,978	506 (10.16)	50.4	17.2
2013	4,981	572 (11.48)	49.1	14.6
2014	4,667	544 (11.66)	50.7	15.8

Source: Data Bank of the Unified Health System and the Telephone Surveys for the Monitoring of Risk Factors and Protection against Chronic Diseases, from 2008 and 2014.

Image 1. Temporal tendency of the number of hospitalizations and deaths of women with BC when confronted with the percentage of women with excess weight and insufficiently active, in the capital cities of the Southeast region of Brazil, between 2008 and 2014



DISCUSSION

Considering the tendency for the increase in the incidence of BC in the Southeast region, and the scant information regarding the current risk factors that are relevant to this neoplasia in this region¹⁰, the rate of insufficiently active women and that of overweight women was descriptively connected to the data regarding hospital admissions and to the frequency of deaths by breast neoplasms (both benign and malign). The temporal analysis of data showed that the rate of insufficiently active women and the deaths of women by BC remained almost similar between the first and last year analyzed, despite the large fluctuations that took place during the period. However, the number of admissions caused by breast

neoplasms and the rate of overweight women have increased, and specifically, the number of admissions rose in an almost entirely progressive way.

Physical inactivity causes an increase in the adipose tissue of the body, and the activation of the pro-inflammatory process¹² favors the increase of free radicals, increasing the chances that DNA modifications happen during cellular mitosis, and therefore, that cancer emerges¹². On the other hand, higher levels of physical activity decrease the chances of development of breast neoplasms (even in individuals with BC family history), especially because it brings about a meaningful decrease in the serum levels of pro-inflammatory factors, and because it modulates the expression of estrogen and progesterone

receptors^{13,14}. These effects were proven in a study conducted in the United States, in which it was shown that women with a family history of cancer, who had already passed through their menopause, and did moderate to vigorous physical activity three times a week, are less likely to develop cancer than the insufficiently active group of women¹⁵. In spite of these evidences, in the present article, the changes in the rate of insufficiently active women did not accompany the change in the number of admissions by breast neoplasms, that is, the lower level of physical activity by women in the Southeast region of Brazil do not represent the main risk factor when it comes to morbidities and mortality by breast neoplasia.

The connection between excess weight and BC depends on the stage of a woman's life regarding menopause. Excess weight and obesity are associated with a diminished incidence of BC in women before menopause¹⁶, and to a greater incidence in women after menopause¹⁷. Image 1 shows the temporal tendency of the number of hospitalizations (Image A) and deaths (Image B) of women with BC, the percentage of overweight women (Image C) and insufficiently active (Image D) from the Southeast region of Brazil between 2008 and 2014. Regarding the percentage of insufficiently active women, irregular changes can be noted, with, high percentages in the early years (2008 and 2009), diminishing in the following years (2010 and 2011), and once again rising in the last years. In spite of the oscillation, all capitals had a smaller number of insufficiently active women in the first year analyzed (2008) than in the last one (2014). This estimate was the opposite of the one which investigated the percentage of overweight women. In that case, there were less overweight women in the first year analyzed (2008) than in the last (2014). The accumulation of adipose tissue during pre-menopause is capable of diminishing women's exposure to endogenous progesterone as well as to estradiol, due to the dysfunction of the

menstrual cycle caused by ovarian insufficiency.¹⁸

After menopause, when the adipose tissue becomes the main source of circulating estrogens, the association between excess weight and risk of BC becomes positive, the risk increasing together with the body mass index¹⁹. However, some evidence suggests that obesity could be a risk factor for the BC, whether the woman passed or not through menopause²⁰, suggesting that non-hormonal mechanisms have a role in the pathogenesis of BC. This evidence was observed in the present study, which denoted that the rate of overweight has risen along with the number of hospitalizations for breast neoplasms in women during the analyzed period. Researchers in France also did not stratify the sample according to menopause, and found the same result, which indicated that overweight women (BMI \geq 30) have a higher risk of developing BC than eutrophic women²¹.

This research showed that there was a progressive increase in the number of hospitalizations for breast neoplasia of women who reside in the capital cities of the Southeast region of Brazil over the years. The early detection of this neoplasm is associated morbidities and mortalities reduction will, however noted that the increase in hospitalizations for CM in women of the capitals of the Southeast region of Brazil is a result of the tracking programs at *pais*²².

The number of deaths by BC increased between the first (2008) and the last (2014) year in all the capitals of the Southeast which were analyzed, with few fluctuations during the period. With the advancement of new technologies, as well as through intervention strategies against the BC in the country, the growth of the mortality rate caused by the disease has increased little, decreasing in some years. It should be noted that each capital has a distinct amount of residents, that is, when the number of deaths by breast neoplasm is calculated as a percentage of the total population, São Paulo has the lowest proportional value. This is connected to an

easier access to the health system, mainly through the Unified Health System (SUS) in the city of São Paulo, which has become a center of reference regarding this²³.

The scarce amount of temporal tendency and/or epidemiological studies of the topics studied, together with the absence of inferential analysis are the possible limitations of this study. However, from the descriptive analysis it was possible to point out tendencies regarding excess weight, physical inactivity, hospital admissions and deaths by breast neoplasms in women in the capital cities of the Southeast region of Brazil in the period from 2008 and 2014. That data can contribute to manage the establishment of new public policies and specific preventive programs for the Southeast region. However, it is necessary for more specific studies, with stronger samples, to be conducted, in order to investigate the cause-and-effect relationship between excess weight and physical inactivity to the morbidities and mortality caused by BC in the Southeast region of the country.

CONCLUSION

The number of deaths caused by BC has increased from the first to the last analyzed years in all capitals. Houve tendência de aumento entre o número de internações por neoplasia da mama e o excesso de peso em mulheres residentes das capitais da região sudeste do Brasil.

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All authors contributed equally in the several stages of the development of the research, and in the writing and critical revision of the final version of the article.

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