

Impact of the COVID-19 pandemic on breast cancer screening and early diagnosis

Impacto da pandemia da COVID-19 no rastreamento e no diagnóstico precoce de câncer de mama

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ABSTRACT

Objective: to analyze the impacts of the COVID-19 pandemic on breast cancer screening and early diagnosis. **Methods:** an ecological retrospective study of data from the Department of Informatics of the Unified Health System collected between 2016 and 2020 was carried out. The data collection was guided by a semi-structured script, and the impact of the pandemic on breast cancer screen and diagnosis was established by using a formula and comparing the period of interest to 2020. **Results:** in Brazil, there was a significant drop in mammograms performed during the COVID-19 pandemic, with a decrease of 361,855 exams from 2016 to 2020. Most diagnostic investigations were conducted with patients between 50 and 59 years, and there was a significant drop in mammograms in women aged under 40 years. **Conclusion:** the COVID-19 pandemic has negatively impacted screening and early diagnosis of breast cancer due to reduced availability. **Contributions to practice:** the study reinforces the importance of investing in public policies to face the pandemic scenario so that screening and treatment protocols be well targeted to guarantee better care for cancer patients.

Descriptors: Breast Neoplasms; Mammography; COVID-19; Early Diagnosis; Medical Oncology.

RESUMO

Objetivo: analisar os impactos da pandemia da COVID-19 no rastreamento e de diagnóstico precoce para o câncer de mama. **Métodos:** estudo ecológico com avaliação retrospectiva dos dados contidos no Departamento de Informática do Sistema Único de Saúde entre os anos de 2016 e 2020. A coleta foi norteada por um roteiro semiestruturado e o impacto da pandemia no rastreamento e no diagnóstico foi realizado por meio da aplicação de fórmula e da comparação com o ano de 2020. **Resultados:** no Brasil, houve uma queda significativa na quantidade de mamografias realizadas durante a pandemia da COVID-19, com diferença de 361.855 de 2016 para 2020. A idade de maior investigação diagnóstica foi entre 50 e 59 anos e a faixa etária com queda expressiva na realização da mamografia foi a de mulheres de 40 anos. **Conclusão:** a pandemia da COVID-19 impactou, negativamente, o rastreamento e o diagnóstico precoce para o câncer de mama devido à redução dos atendimentos. **Contribuições para a prática:** reforçar a importância de investimentos no campo de políticas públicas diante de um cenário pandêmico para que os protocolos de rastreamento e de tratamento já estejam bem direcionados a fim de garantir uma melhor assistência aos pacientes oncológicos.

Descritores: Neoplasias da Mama; Mamografia; COVID-19; Diagnóstico Precoce; Oncologia.

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Introduction

Breast cancer is one of the most relevant public health problems due to its magnitude related to the high incidence and mortality in females, following a worldwide trend⁽¹⁾. In general, the mortality range is lower than the incidence rate in all regions of the world due to higher breast cancer survival rates in developed regions. However, even within regions, there can be significant geographic differences in disease incidence and mortality patterns⁽¹⁻²⁾.

In Brazil, the occurrence of new cases of breast cancer has increased substantially. There are 66,280 new cases of this neoplasm each year of the triennium 2020-2022 in the country, with an estimated risk rate of 61.61 new cases per 100,000 women⁽³⁾.

The most used early cancer detection strategies are screening and early diagnosis. Screening consists of performing exams in the asymptomatic population to identify cancer or precursor lesions early, enabling changes in cancer prognosis⁽⁴⁾. Early diagnosis, on the other hand, refers to the knowledge of the population and professionals about the warning signs and symptoms of cancer and the organization of health services to diagnose clinically suspected cases early⁽⁵⁾.

Mammography is the method of choice for breast cancer screening. In Brazil, the recommendation is that this test is performed on a biennial basis in women aged 50 to 69 years, as this exam is considered effective in terms of early detection of breast cancer, early initiation of treatment, and better prognosis⁽⁶⁾.

There are particular challenges to the implementation of the Ministry of Health's guidelines for breast cancer screening, among them, the number of mammography machines, the need for a written request to perform the mammogram, the lack of effective active search of the target population, and the non-compliance in terms of age at onset and frequency of the examination between health agencies, which can hamper the implementation of an effective policy⁽⁶⁾.

In addition to the challenges above, there is the health crisis aggravated by the Severe Acute Res-

piratory Syndrome Coronavirus-2 (SARS-CoV-2) pandemic, having an indirect influence on the clinical management of oncological diseases, including breast cancer, due to screening exams being postponed, signs and symptoms being neglected, fear and confinement of patients, overload of the health system and cancellation of elective procedures, which were some of the problems faced during the pandemic⁽⁷⁾. The proposals for postponing procedures and treatment protocols followed a careful evaluation of the management of patients so that there were no severe damages in the follow-up and management of cancer patients.

In terms of tracking, it is believed that the pandemic will have major impacts on new cases due to delays in diagnosis and difficulties in defining the most appropriate treatment. These delays would imply an increase in cases diagnosed in later stages, with implications for survival and quality of life⁽⁸⁾.

This study is justified by the need to collect data for a better understanding of the impact of the Coronavirus Disease (COVID-19) pandemic on the number of mammograms performed in Brazil since, based on the results of this study, managers, and professionals will be able to fill gaps related to the early diagnosis of breast cancer. Thus, the information provided by the study may contribute to the management of breast cancer and be useful to discern the best guidelines to be applied, considering the patient's situation.

The objective of this study was to analyze the impacts of the COVID-19 pandemic on breast cancer screening and early diagnosis.

Methods

This is a retrospective ecological study on the rate of mammograms performed and breast cancer diagnoses among women in Brazil and its macro-regions.

The data collection took place from May to June 2021. An instrument with objective data on screening and early diagnosis was used. All data collected involved the period from 2016 to 2020 and were accessed

from the website of the Department of Informatics of the Unified Health System (DATASUS), in the Health Information section, under the “Epidemiology and Morbidity” category⁽⁹⁾.

The Cancer Information System was used to collect information related to mammograms, with data from the last update, on 06/15/2021, following these steps: cervix and breast cancer - “Mammography - by place of residence” and “Geographic coverage of Brazil by region, federative unit and municipality” options. Information was collected concerning the number of mammograms performed according to the Federative Unit of residence in Brazil, the age group of patients who underwent mammograms, and the clinical indication for mammography (divided into screening and diagnostic mammography).

As for the data related to breast cancer diagnoses, access to information on the “Time until the beginning of cancer treatment - PANEL - oncology” was done according to the Federative Unit of the diagnosis and by defining the diagnoses concerning the International Classification of Diseases, 10th revision (ICD-10). The ICD-10 code “C50 malignant breast cancer” was selected. The following information was extracted: number of diagnoses of malignant breast cancer per year, according to the country region, and age group at diagnosis.

After the data collection, the total number of mammograms performed per year was exported to

Excel 365 license 2021 to analyze the average number of mammograms from 2016 to 2019. Then, the percentage of reduction or increase was calculated by comparing the output with the number of exams performed in 2020 using the following formula: Impact = [(Final Value – Initial Value)/Initial Value]*100, in which the final value corresponded to 2020 and the initial value the prior average calculated. The difference could be positive or negative concerning the previous period.

The cutoff point from 2016 to 2019 was considered for the average calculation, given that the last guideline of the Brazilian Ministry of Health for breast cancer screening was published in 2015⁽¹⁰⁾. The aggregated data and information used in this study were provided by DATASUS, with no need for ethical approval by a research ethics board. The information from this website is in the public domain, with rights and confidentiality readily assured by the Notifiable Diseases Information System.

Results

The results point to a significant drop in mammograms across the country during the COVID-19 pandemic, with a lower result than in the prior four years. The Midwest region had the greatest decrease in mammograms (Table 1).

Table 1 – Impact on mammogram rates in Brazil, by region, during the pandemic, from 2016 to 2020. Fortaleza, CE, Brazil, 2021

Region	Year					Average	2020	Difference (±/%)
	2016	2017	2018	2019	2019			
North	43,973	70,645	91,035	117,647	80,825	91,772	+13.0	
Northeast	536,315	733,261	796,753	893,141	739,868	544,581	-26.0	
Southeast	822,064	991,319	1,063,324	1,129,113	1,001,455	683,361	-31.0	
South	653,243	702,707	698,937	724,929	694,954	432,695	-37.0	
Midwest	152,495	143,011	154,231	188,940	159,669	93,826	-41.0	
Total	2,208,090	2,640,943	2,804,280	3,053,770		1,846,235		

Source: Cancer Information System

The age group with a sharp drop in the number of mammograms in Brazil was that of women under 40 years old, totaling 38%. However, attention is drawn to the age group between 50-59 years, with a 30% decrease in the number of exams as these women are in the age range that is more vulnerable to the disease. When analyzing the same time interval regarding the

clinical indication, a significant drop in screening mammograms (30%) was observed (Table 2).

Table 3 presents data related to the early diagnosis and treatment of breast cancer in Brazil. During the COVID-19 pandemic, there was an increase in breast cancer diagnoses, with the most affected age group being women under 40 (31%).

Table 2 – Total mammograms performed in Brazil, by age group and clinical indication, from 2016 to 2020. Fortaleza, CE, Brazil, 2021

Variables	Year						Difference (±/%)
	2016	2017	2018	2019	Average	2020	
Age (years)							
<40	86,015	91,888	92,183	96,450	91,634	56,185	-38.0
40-49	642,123	693,812	756,283	831,266	730,871	511,990	-29.0
50-59	858,081	1,073,931	1,121,896	1,215,251	1,067,290	736,786	-30.0
60-69	493,394	636,415	683,716	751,314	641,210	450,305	-29.0
Total	2,208,312	2,641,299	2,812,155	3,068,792		1,859,379	
Clinical indication							
Diagnosis	49,736	64,509	68,532	79,413	65,548	52,193	-25.0
Screening	2,158,587	2,576,798	2,743,626	2,989,391	2,617,101	1,811,611	-30.0
Total	2,208,323	2,641,307	2,812,158	3,068,804		1,863,804	

Source: Cancer Information System

Table 3 – Diagnosis of malignant breast neoplasms in Brazil, by location, age group, and commencement of treatment, from 2016 - 2020. Fortaleza, CE, Brazil, 2021

Variables	Year						Difference (±/%)
	2016	2017	2018	2019	Average	2020	
Region							
North	1,350	1,304	1,391	1,773	1,455	1,757	+20.0
Northeast	8,034	7,734	8,762	10,406	8,734	10,093	+15.0
Southeast	16,508	16,044	16,328	20,819	17,425	19,005	+9.0
South	7,470	7,308	7,303	9,037	7,780	8,658	+11.0
Midwest	2,122	1,942	2,030	2,263	2,089	2,329	+11.0
Age group							
<40	3,733	3,372	3,854	5,079	4,010	5,267	+31.0
40-49	8,022	7,541	7,445	9,323	8,083	9,259	+14.0
50-59	9,651	9,440	9,530	11,615	10,059	11,096	+10.0
60-69	8,118	8,077	8,394	10,186	8,694	9,346	+7.4

Sources: Outpatient Information System through the Individualized Outpatient Production Bulletin and the High Complexity Procedure Authorization; Hospital Information System; Cancer Information System

Discussion

With the COVID-19 pandemic, elective care was suspended in most countries due to the prioritization of assistance to reduce the spread of SARS-CoV-2. Cancer screening services are among the most affected services⁽¹¹⁻¹²⁾.

The study findings showed that the number of mammograms in the northern region has remained increasing in the last four years, and, during the pandemic, it has remained above average, showing that the performance of exams remained stable. However, the other states had a significant drop in the rate of mammograms. The regions of the Brazilian federation with the greatest impact were the Midwest and South, respectively. This finding is worrisome as it indicates a reduced practice of breast cancer screening over the years.

An analysis carried out in one imaging service revealed the impacts caused by the pandemic and showed a reduction in the volume of mammograms (94% less than in 2019)⁽¹³⁾. Another investigation compared the performance of mammograms in 2019 and 2020 and found an overall reduction in imaging exams, corresponding to 78.9%, and in breast procedures in the first 90 days of social isolation compared to the year before the COVID-19 pandemic, also mentioning that the total number of women undergoing mammography was lower than that of the previous year (35%)⁽¹⁴⁾.

In Brazil, a technical note was published by the National Cancer Institute based on carefully analyzing actions to track the risks and benefits of screening mammograms in the COVID-19 scenario. This note informs that early detection actions must be developed and advises health care providers to postpone screening exams, including breast exams. However, performing elective procedures in general, including those after positive screening tests, would be the responsibility of services and health professionals, and the risks and benefits of such procedures should be carefully evaluated⁽⁷⁾.

A referral mastology service in Fortaleza was organized according to the Medical Society of Oncological Surgery, and patients were stratified by severity. Among the priorities were screening tests, which indicated possible breast cancer since delays in starting cancer treatment can raise the risk of death⁽¹⁵⁾.

Concerning screening actions, it is essential to ensure current recommendations, especially concerning the target population and the recommended periodicity. For breast cancer, biennial screening is recommended from 50 to 69 years⁽⁶⁾. During the pandemic, there was a reduction in the screening of women aged 40 or under in Brazil. The above issue may be explained by the fact that this age group is not the priority for breast cancer screening recommended by the Brazilian Ministry of Health. However, it is known that there are controversies since the Brazilian Society of Mastology, the Brazilian College of Radiology and Diagnostic Imaging, and the Brazilian Federation of Gynecology and Obstetrics Associations recommend the initiation of breast cancer screening annually from the age of 40⁽¹⁶⁾.

Considering the Ministry of Health's recommendations, we summed two age ranges (50 to 59 and 60 to 69 years) and observed a significant drop in the number of screening exams. However, as previously mentioned⁽⁷⁾, during the pandemic, it was necessary to maintain the safety of patients and health professionals, concomitantly with implementing protection and prevention protocols for COVID-19. It can be inferred that the impact of the pandemic on oncology will have negative results in the long term, given the number of patients who were left without their routine exams.

Concerning early diagnosis, the State of Rio de Janeiro adopted the following recommendations for community protection: uncontrolled epidemic phase – treating patients with a confirmed diagnosis of cancer, following up cancer patients, and categorizing cases of Breast Imaging Reporting and Data System (BI-RADS) 4 and 5 as highly suspicious; controlled epidemic phase – restricted screening to women who

have not been screened for more than two years or to those who belong to the target population but have never been screened; epidemic elimination phase – return to pre-pandemic recommendations⁽¹⁷⁾.

While there is no conclusive evidence for the screening of women younger than 50 years, strategies for the early diagnosis are beneficial and should include careful observation of signs and symptoms, including hard consistency breast lumps, lumps lasting for longer than one menstrual cycle, unilateral bloody discharge, eczematous skin lesions that do not respond to topical treatments, enlargement of axillary lymph nodes or enlargement of the breasts with edema, breast retraction, and change in nipple shape^(4,6).

Nevertheless, it is important to emphasize the reduction of bureaucracy during the COVID-19 pandemic and the ease of patient access to health care services by referral or through a simple call from the responsible professional, allowing rapid entry into breast cancer care protocols.

Study limitations

As the main limitation of this research, we highlight the impossibility of stating, with certainty, factors that, in addition to those highlighted by the guidelines, may, in the long term, interfere with the diagnosis and prognosis of patients, requiring further studies to measure, more precisely, the damage caused by the COVID-19 pandemic.

Contributions to practice

Faced with so many consequences that the COVID-19 pandemic has brought to the lives of thousands of people, especially cancer patients, it is necessary to reinforce the importance of investments in public policies so that, if another health crisis happens, the protocols of screening and treatment are already well targeted to ensure better patient care.

Thus, this article contributes to the practice

of nurses regarding the screening and diagnosis of breast cancer in Brazil, as these professionals need to obtain technical-scientific knowledge, especially regarding the Nursing consultation and the clinical examination of the breast in order to identify possible advanced breast cancer patients at an early stage. The study also highlights the need to develop permanent education programs that guarantee quality care in health services, contributing to public health.

Conclusion

The reduction in screening and early detection of breast cancer during the COVID-19 pandemic occurred in all regions of the country, mainly in the Midwest. When analyzing the number of mammograms and age groups, women aged 40 years or under had the lowest number of mammograms.

Despite the above, even with the reduction in the number of mammograms, women were not left unattended by health services, as there was an increase in breast cancer diagnoses. The above finding is a consequence of the guidelines proposed by the guidelines and guidelines developed during the COVID-19 pandemic, advocating targeted screening for more specific cases through a prior protocol made by national, international, and local institutions.

Authors' contribution

Data design, analysis, and interpretation: Corpes EF, Leite KM, Silva DM.

Writing and relevant critical review of intellectual content: Alves ACS, Castro RCMB, Rodrigues AB.

Approval of the final version to be published: Castro RCMB, Rodrigues AB.

Agreeing to be accountable for all aspects of the manuscript in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: Corpes EF, Castro RCMB, Rodrigues AB.

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