Impact of COVID-19 on breast cancer screening in the Brazilian Unified Health System (SUS)

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ABSTRACT

Objectives: investigating the impact of the pandemic on breast cancer screening in the Unified Health System, in addition to comparing the data obtained from other countries. **Methods:** a quantitative cross-sectional observational study was carried out, with references from the Cancer Information System - SISCAN on the number of mammograms performed from 2014 to 2022 by women in Brazil. **Results:** data regarding mammography in the high-risk population showed a drop of 38,39% from 2019 to 2020. While in screening mammography, the decline was slightly more significant, at 39.18% in the same period. Regarding diagnostic mammography, the reduction was 33.15%, and in target population mammography, the peak was in 2019 with 2.721.075. On the other hand, the performance of mammography in patients already treated had a smaller decrease of 9.35%. **Conclusions:** there was a significant reduction in the number of mammograms performed in 2019 and 2020, which might lead to a late diagnosis of the disease and a worse prognosis.

Keywords: Breast neoplasms, Women, Mammography, COVID-19, Medical oncology.

INTRODUCTION

In December 2019, the World Health Organization (WHO) was notified of the presence of new cases of pneumonia in China caused by a new strain of coronavirus not yet registered. A few months later, the virus was identified as the new coronavirus, named SARS-CoV-2, responsible for the disease COVID-19, which spread throughout the world and, in March 2020, was characterized as a pandemic by the WHO[1]. In Brazil, the first case was reported on February 26, 2020, and since the first death, on March 17, until the last day of that year, 195,848 deaths were reported due to the disease[2,3].

COVID-19 is an infectious disease, in which one in six infected people becomes seriously ill, generating important systemic repercussions that can lead to death, especially in individuals with chronic diseases and other preexisting comorbidities[4,5]. In this way, community-based measures were implemented, such as social distancing, closing schools, reducing public transport, and encouraging people to stay home, in addition to stricter conduct such as the mandatory lockdown in several countries. Health services worldwide had to readjust their care to meet the demand to treat serious cases that required more attention and to avoid further contamination. Health professionals were recruited to work on the front line against the disease and hospitals reorganized their services, whose actions included the cancellation of numerous elective treatments related to other pathologies, to become field hospitals for COVID-19[6].

Furthermore, with strategies to reduce contamination by COVID-19, several routine procedures, such as cancer screening, were suspended in most countries. Some studies carried out at the time suggested that those infected with the virus and who had associated comorbidities could be at greater risk of death due to the high mortality rate observed in this group of patients, which affected the medical follow-up of cancer patients for fear of contamination. Also, a higher risk of death was observed in women with cancer and COVID-19[5]. In Brazil, for example, the José Alencar Gomes da Silva National Cancer Institute (INCA) recommended that health managers assessed the risks and benefits of screening services during the pandemic[7]. According to the WHO, the postponement of cancer screening occurred in more than 50% of the 155 countries surveyed[8].

Breast cancer is the most common and leading cause of death in women worldwide. Its

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https://doi.org/10.11606/issn.2176-7262.rmrp.2023.201567

care encompasses all levels of care and depends on the best interaction between them for an efficient result and guarantee of comprehensive care. The Unified Health System (SUS) offers care for the disease from prevention, and diagnosis to treatment and it is recommended to perform mammography in women aged 50 to 69 years, every two years. Screening the target population is fundamental so that the diagnosis of the neoplasm occurs at an early stage, allowing for more timely treatment and resulting in greater chances of cure[9,10].

During the pandemic, the literature pointed to a significant decrease in breast cancer screening in several countries. In the Netherlands, for example, the number of breast cancer diagnoses decreased by 50%[11]. In England, there was a decrease of 4,000 breast cancer diagnoses reported between January and June 2020 compared to 2019[12]. In Hubei, on the Chinese peninsula, it was found that only 5.2% of breast cancer diagnoses occurred during the first quarter of 2020, compared to 15.3% in other provinces[13]. According to the WHO, the main reasons for interruptions in screening were the readjustment of health services and the need for social isolation, culminating in this scenario[8]. Therefore, this study aims to investigate the impact of the COVID-19 pandemic on breast cancer screening in the SUS, in addition to comparing it with other countries.

METHODS

This is a quantitative and descriptive cross-sectional observational epidemiological study, with data from the Cancer Information System - SISCAN made publicly available and accessible at http://www2.datasus.gov.br/.

For the selection of the sample, it was requested to download the bases referring to the number of mammograms performed from 2014 to 2022, per patient, in Brazil, and in each Brazilian region, applying the following filters: year and month of reference by region; age group: 40 to 49 years old, 50 to 59 years old, 60 to 69 years old, 70 years old or older; clinical indication: diagnostic and screening mammography; type of screening mammography: target population, high-risk population, patients already treated for breast cancer. These filters are related to the information made available by the Ministry of Health in DATASUS. SISCAN considers a high-risk population, women with a family history of breast cancer. Also, the term target population is understood to be women aged between 50 and 69 years.

After sample selection, the databases containing each of the variables described above were coded in an Excel® spreadsheet (Microsoft, version 16) for the descriptive statistical analysis and comparison between regions.

The activities in this research did not involve experiments with people and/or animals. The data used are from public sources, made available by the Ministry of Health, in the DATASUS database. Thus, this work is exempt from an opinion by the Research Ethics Committee, supported by Resolution 510/2016.

RESULTS

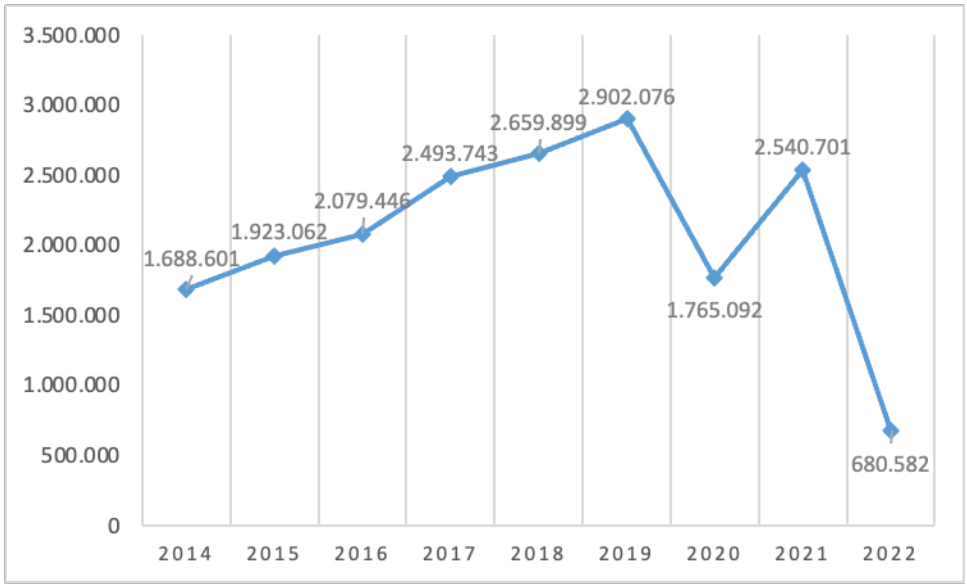
In 2014, 1,688,601 screening mammograms were performed in Brazil on women over 40 years old. The number of exams performed gradually increased until 2019, resulting in 2,902,076 exams and corresponding to 58.18% more mammograms. In the following year, there was a significant reduction, totaling 1,765,092 exams. When analyzed in percentage, the decrease in mammograms is even more evident, showing a drop of 39.18% from 2019 to 2020.

In 2021, the information collected already showed an increase in the number compared to 2020, totaling 2,540,701, but it did not meet the necessary demand to continue the trend seen before the pandemic. In 2022 up to April 15, 680,582 mammograms were performed, making a careful analysis impossible.

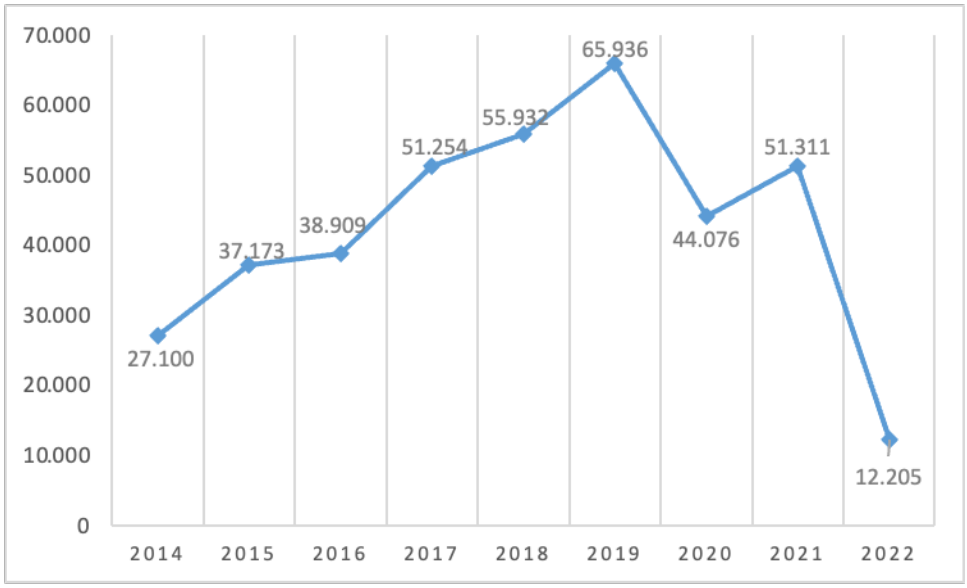
Graph 2 shows the number of mammograms performed by women aged 40 and over who had complaints. It was also possible to observe an increase of 143.30% in the numbers from 2014 (27,100) to 2019 (65,936), with a considerable drop of 33.15% in 2020 (44,076), increasing again in 2021 (51,311).

Graph 3 shows the number of mammograms performed for the population at high risk for developing breast cancer. There was an increase of 105.36% from 2014 (65,563) to 2019 (134,642). Between 2019 and 2020, the reduction of tests performed was 38.39%, again showing the influence of the pandemic period on these data. In 2021, the number of exams performed by this population was 123,206.

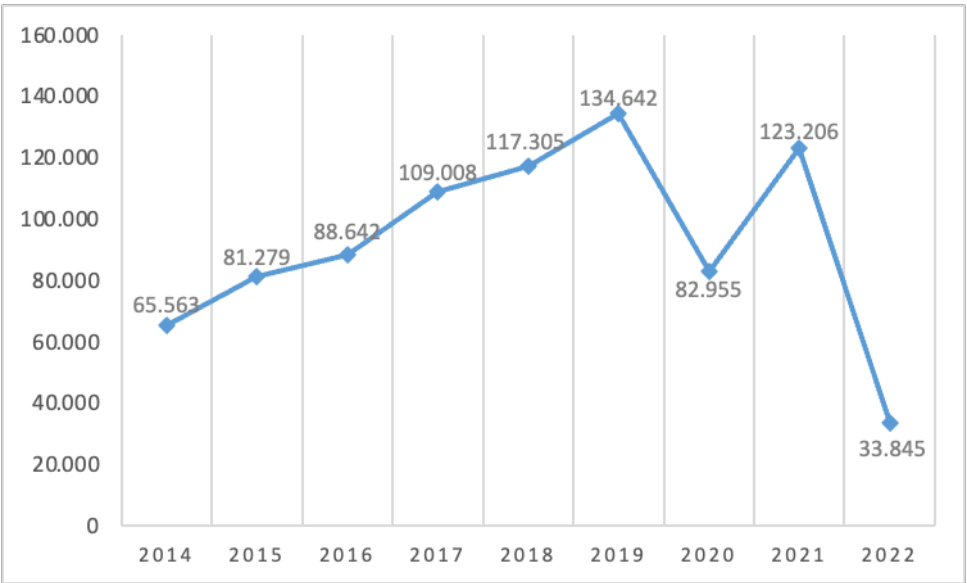
Regarding patients already treated, Graph 4 shows the same patterns observed previously with



Graph 1 - Screening Mammography of women from 40 years old, showing the total number of exams performed in Brazil between January 2014 to April 15, 2022.
Source: The authors.

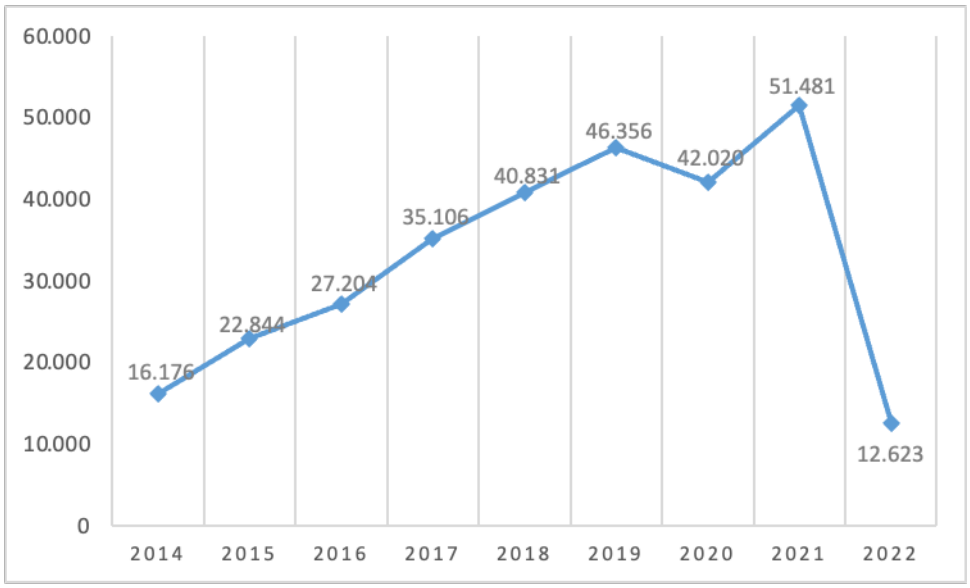


Graph 2 - Diagnostic Mammography of women from 40 years old, showing the total number of exams performed in Brazil between January 2014 to April 15, 2022.
Source: The authors.



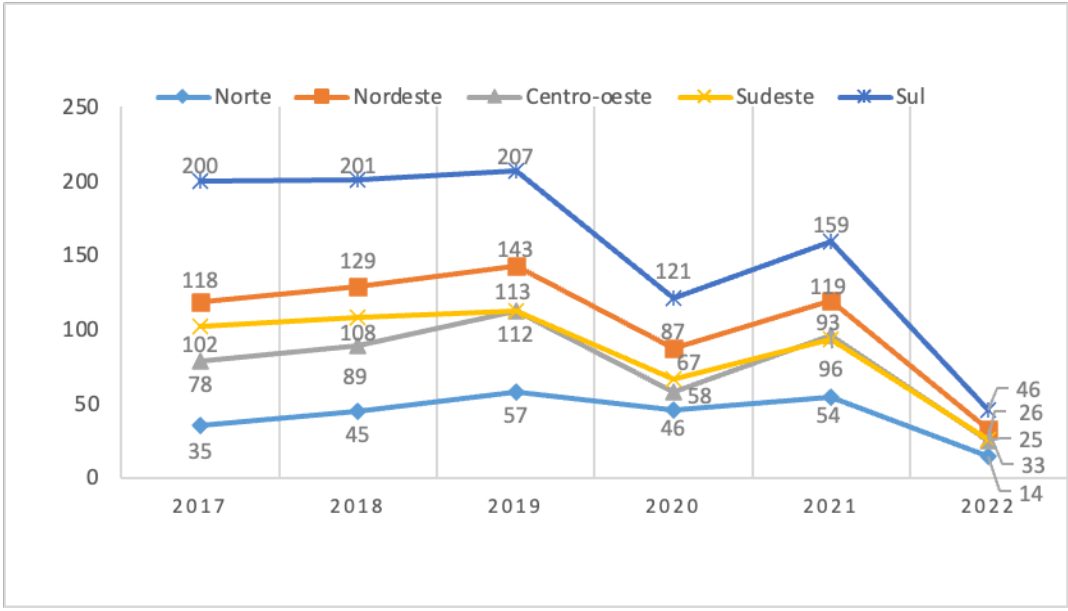
Graph 3 – Mammography High-Risk Population of women from 40 years old, showing the total number of exams performed in Brazil between January 2014 to April 15, 2022.
Source: The authors.

an increase of 186.57% between 2014 and 2019. However, the reduction that occurred from 2019 to 2020 was smaller in patients already treated compared to the other types of screening mammograms. Among the years mentioned, the drop was 4,365, representing 9.35%. In 2021, 51,481 tests were carried out, surpassing 2019, the pre-pandemic period.



Graph 4 - Mammography in Patients Already Treated of women from 40 years old, showing the total number of exams performed in Brazil from January 2014 to April 15, 2022.
Source: The authors.

To better elucidate the impact of the Covid-19 pandemic on breast cancer screening in the SUS, the number of exams performed between January 2017 and April 15, 2022, for each of the five regions, were evaluated and transformed into a coefficient for every 10,000 inhabitants, in order to allow comparisons between populations with different sizes. Therefore, it was observed that the South region had the highest rate of mammograms performed compared to the others, followed by the Northeast, Southeast, Midwest, and North (Graph 5). The peak of screening mammograms performed in the target population was in 2019, totaling 2,721,075 throughout Brazil. After the beginning of the pandemic, there was a decrease in all regions, increasing again in 2021.



Graph 5 - Mammography of the Target Population for every 10,000 inhabitants by region of Brazil of women aged 40 years and over, showing the total number of exams performed from January 2017 to April 15, 2022.
Source: The authors.

DISCUSSION

The present study shows a drop in breast cancer screening in all categories analyzed in 2020 and 2021, corresponding to the period of the COVID-19 pandemic. Data referring to mammography in the high-risk population showed a decrease of 38.39% from 2019 to 2020, while, in screening mammography, the decrease was slightly greater, reaching 39.18% in the same period. Regarding diagnostic mammography, the reduction was 33.15%. On the other hand, the mammography in patients already treated had a smaller decrease, of 9.35%. It is believed that this last data is due to the fact that women who had already been treated have more information about the disease, in addition to having periodic medical follow-ups to prevent relapses.

The postponement of breast cancer screening tests, resulting in the declines described above, was mainly due to the restructuring of health services that focused their efforts on fighting the pandemic. Health professionals were reallocated to meet the demands of caring for patients with COVID-19 and, over time, many of them became contaminated, even increasing mortality in this professional category[8,14]. Between March and April 2020, the Regional Nursing Councils estimated that 4,602 nurses were removed due to suspected COVID-19[15]. In addition, 20% of Brazilian doctors were removed from frontline services because they were aged 60 years or older, which is considered a risk factor, many others died after getting the disease – 893 deaths from the beginning of the pandemic to October 2021[1,.17]. Between January 2020 and May 2021, WHO believes that 80 to 180,000 health professionals died from the disease[18].

In this context, the oncology population proved to be extremely vulnerable. It was noticed that these patients had a higher risk of becoming infected and developing a more severe form of the disease, mainly as a result of the immunosuppression caused by chemotherapy[19]. In view of this, screening and early diagnosis of cancer during the pandemic were essential to enable timely treatment and a greater chance of cure[9,10]. However, a study carried out in a tertiary hospital that is a reference in oncology showed a 30% decline in oncology appointments and a 45% decline in chemotherapy sessions[20]. Another survey showed that among 27 patients with breast cancer who contracted COVID-19, 11 died. However, the analysis could not distinguish the cause of death since, in addition to cancer and infection, there were other associated comorbidities[21].

Other studies also demonstrated the same pattern seen in Brazil concerning the decline in mammograms in other countries. In Italy, for example, the reduction in breast cancer diagnoses was moderate in 2018-2019 compared to 2020, with a decrease of 26%[22]. In Croatia, there was a 24% reduction in breast cancer cases during April, May, and June 2020, compared to the same months in 2019[23]. In Taiwan, the decrease in the number of diagnoses was 22.2% comparing January to April of 2019 with the same period of 2020[24]. In New South Wales, the largest state in Australia, a study showed a 51.5% drop in mammograms performed from March to June 2020 compared to the same period in 2019[25].

The same trend was observed in other places worldwide. In Japan, 26.3% of a total of 1,874 women interviewed canceled or postponed their breast cancer screening appointments between April and May 2020[26]. During a lockdown period in France, there was a 20% drop with an increase of 48% after this period[27]. In Qatar, due to the suspension of preventive appointments, 100% of screening was no longer carried out when compared to 2017[28]. Between April 2019 and 2020, there was a 56% decrease in the number of diagnosed cases of the disease in women aged 50 to 69 years old in Belgium[29]. In Germany, comparing January to June 2020 and the same period in 2019, this drop was 12%[30]. And in South Africa, more specifically in Cape Town at Groote Schuur Hospital, a comparison was made between March 23 to June 23, 2019, and the same period in 2020, demonstrating that the total number of new breast cancers diagnosed has decreased by approximately 54%[31].

Analyzing SISCAN data regarding the BI-RADS classification of mammograms, an increase of 1576 inconclusive, suspicious, and highly suspicious radiological findings were observed between 2020 and 2021, with 1193 reports as BI-RADS 0, 264 as BI-RADS 4, and 119 as BI-RADS 532. Based on this information, one can see the importance of continuing with medical follow-up and follow-up of mammographic investigations, in order to guarantee a good prognosis.

The limitations of the present study are the underreported cases and the slowness in updating information on the database. It should also be noted that the numbers raised in 2022 were limited to April 15, making it impossible to carry out a careful analysis of the patterns after the decree ending the pandemic state of emergency in Brazil.

CONCLUSION

It is concluded, therefore, that during the Covid-19 pandemic there was a significant reduction in the number of mammograms performed by the Unified Health System, showing a pattern inverse to the upward trend that had been observed in previous years. Due to this situation, it is possible that the delay in screening and early treatment of cancer has a significant negative impact on its prognosis, with the need for more aggressive treatments and a higher risk of mortality, not only in Brazil but in all countries that registered screening declines with important consequences for world public health in the coming years.

It is known that there are various challenges faced by public health in caring for these patients during the pandemic. However, it is important that managers create strategies that prevent greater repercussions of this delay on women's health. At this moment, when vaccination has considerably reduced the number of virus infections, it is up to them to invest in campaigns to encourage the continuation of screening, in addition to carrying out thorough screenings to prioritize the care of patients with suspicious lesions, especially those with BI-RADS 0, 4, and 5.

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Authors' contribution:
Murat FAR, Faria NM and Gonçalves ACT were responsible for data acquisition and analysis, writing, interpretation of results, and revision of the article; Razera FPM was responsible for guidance, study design, interpretation of results, and review of the article; Razera APR was responsible for reviewing the article. All authors approved the final version of the manuscript.

This work did not receive any support or funding.

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Editor:
Prof. Dr. Felipe Villela Gomes

Received: aug 29, 2022
Approved: dec 13, 2022