



Profile of oncological and breast repair surgeries in northern Brazil: Analysis of the last decade

Perfil das cirurgias oncológicas e reparadoras de mama no norte do Brasil: Análise da última década

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■ ABSTRACT

Introduction: Late breast cancer diagnosis increases the number of surgeries, resulting in high mortality and unsightly results. Therefore, the institution of breast reconstruction procedures is essential. **Method:** Descriptive, quantitative, and retrospective study on authorizations for hospital admission of patients undergoing breast surgical procedures in oncology from 2011 to 2020, whose data were obtained from the DATASUS platform. **Results:** 7,529 breast cancer surgeries and 1,949 reconstructive surgeries were performed in the North Region. There was an increase in the number of procedures throughout the decade. In all states, it is possible to notice the difference in the number of municipalities of residence compared to the municipalities of hospitalization. **Conclusion:** It is necessary to establish oncological reference centers, guaranteeing individualized treatment and breast reconstruction.

Keywords: Breast neoplasms; Mastectomy; Reconstructive surgical procedures; Mammoplasty; Epidemiology.

■ RESUMO

Introdução: O diagnóstico tardio do câncer de mama eleva o número de cirurgias, resultando em alta mortalidade e resultado pouco estético. Assim, é fundamental a instituição de procedimentos de reconstrução mamária. **Método:** Estudo descritivo, quantitativo e retrospectivo sobre as autorizações de internação hospitalar de pacientes submetidos a procedimentos cirúrgicos de mama em oncologia, no período de 2011 a 2020, cujo dados foram obtidos na plataforma DATASUS. **Resultados:** 7.529 cirurgias de câncer de mama e 1.949 cirurgias reparadoras foram realizadas na Região Norte. Houve aumento do número de procedimentos ao longo da década. Em todos os estados é possível perceber a diferença no número de municípios de residência, comparado aos municípios de internação. **Conclusão:** Necessita-se instituir centros de referência oncológica, garantindo tratamento individualizado e a reconstrução mamária.

Descritores: Neoplasias da mama; Mastectomia; Procedimentos cirúrgicos reconstrutivos; Mamoplastia; Epidemiologia.

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INTRODUCTION

Considering its worldwide distribution, breast cancer is the most common cancer among women¹. In Brazil, excluding non-melanoma skin tumors, this cancer ranks first in all regions, resulting in an estimated risk of 61.61 new cases for every 100 thousand

women¹. In a Brazilian historical series, mortality rates from this malignancy show an upward trend, with the North Region showing accelerated growth rates, which constitutes a public health problem².

Breast cancer treatment is based on clinical and surgical^{3,4}. The latter is subdivided into a conservative approach, reserved for cases of early diagnosis, and a

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radical technique, invasive surgery, for more advanced cases³⁻⁶. Despite the various therapeutic possibilities, high mortality results from the low opportunity for access to screening, which results in late detection, radical treatment, and a poor prognosis³⁻⁵.

It is observed that late diagnosis increases the number of surgeries, especially mutilating surgeries, such as radical mastectomies, which have chronic pain and swelling as sequelae, with high mortality and unaesthetic results that affect the quality of life³⁻⁷. Psychological disorders, changes in self-image and self-esteem, a sense of loss of femininity, and emotional and social changes are common and affect family and work life, in addition to implying greater expenses with treatments³⁻⁸.

Therefore, it is essential to refine surgical techniques and implement breast reconstruction procedures, combining principles of oncological surgery and plastic surgery⁴⁻⁶. Breast implants, tissue expansion techniques, and myocutaneous flaps are examples of reconstructive surgeries⁴⁻⁷. In this context, the Breast Reconstruction Law (Law No. 12,802/2013)⁹ guaranteed the right to perform the procedure for mastectomized patients, aiming to minimize the physical and emotional impact and improve quality of life⁵⁻⁷.

Despite the guaranteed right, few women treated surgically for cancer have access to breast reconstruction, one of the main factors being the small number of structured public reference services, as well as the small number of surgeons specializing in oncoplasty in the public health system^{5, 6,8,10,11}.

In this context, despite the clinical-epidemiological relevance of this topic for women's health, no current research was found in the literature on the distribution of these surgeries in the North Region.

OBJECTIVE

To analyze the profile of breast cancer surgeries and breast reconstruction surgeries performed in the Northern Region of Brazil, in the public health network, from 2011 to 2020.

METHOD

Descriptive, quantitative and retrospective study whose data were obtained from the databases of the Hospital Information System of the Unified Health System (SIH/SUS), available at the Information Technology Department of the Unified Health System (DATASUS), at the electronic address <https://datasus.saude.gov.br/aceso-a-informacao/producao-hospitalar-sih-sus/>, with access date on 11/11/2021.

All approved hospital admission authorizations (AIH) of patients undergoing breast surgical procedures

in oncology in the North Region were analyzed from 2011 to 2020.

The procedures under analysis were subdivided into two groups:

- 1 - Breast cancer surgeries (code 0416120032 - simple mastectomy in oncology; 0416120024 - radical mastectomy with axillary lymphadenectomy in oncology; code 0416120059 - breast segmentectomy/quadrantectomy/sectorectomy in oncology; code 0416020216 - unilateral axillary lymphadenectomy in oncology; code 0416020062 - unilateral radical axillary lymphadenectomy in oncology; code 0416020054 - bilateral radical axillary lymphadenectomy in oncology; code 0416120040 - resection of non-palpable breast lesion with marking in oncology) and
- 2 - Breast plastic surgery (code 0410010090 - post-mastectomy reconstructive breast plastic with prosthesis implant; code 0410010073 - non-aesthetic female breast plastic surgery). The surgical procedure codes are described in Table 1.

Table 1. Surgical procedure codes by surgery group.

Surgical procedure codes	Surgical procedure codes
0416120032/0416120024	Mastectomies in oncology
0416120059	Segmentectomy/ quadrantectomy/ breast sectorectomy in oncology
0416020216/ 0416020062/ 0416020054	Axillary lymphadenectomies in oncology
0416120040	Resection of non-palpable breast lesion in oncology
0410010090/ 0410010073	Breast plastic surgery

Source: data extracted from DATASUS.

The data were tabulated and categorized according to the municipality, federative unit, region, and year of service. The incidence coefficient was distributed by equal frequencies and calculated by dividing the absolute number of procedures in each municipality by the respective resident population and multiplied by 100,000. The number of the resident population was collected from the Population Estimates Study, available on the DATASUS online platform. In order to illustrate the data, the TabWin v4.15 program, available on DATASUS, was used to create maps referring to the North Region.

This research was based on information contained in a public domain secondary database, with no need to submit it to the Research Ethics Committee.

RESULTS

In the period from 2011 to 2020, 7529 breast cancer surgeries were performed in the North Region. Of this total, radical treatment, simple and radical mastectomies, was the most frequent surgical procedure, corresponding to 61.1% of total surgeries, followed by conservative treatment, including segmentectomy/quadrantectomy/sectorectomy, corresponding to 23% of surgeries. Resection of non-palpable breast lesions in oncology accounted for 11.5% of surgical cases, and axillary lymphadenectomies totaled 4.23% (Table 2).

Regarding the year in which breast surgeries were performed, an increase in the number of procedures was noted throughout the decade. 2020 showed a slight reduction in surgeries compared to the previous year (Figure 1).

When it comes to mortality due to the surgical procedure, bringing together all the surgery codes mentioned, 22 deaths were recorded, 68.1% of which were notifications in the state of Pará, followed by Amazonas (22.7%), Tocantins and Rondônia, both with 4.5% of deaths. Acre, Amapá, and Roraima states did not report deaths from breast cancer surgeries in the period analyzed.

There were a total of 1949 procedures in the North Region for reconstructive breast plastic surgeries. The state that most reported this procedure was Pará (31%), followed by Amazonas (25%), Rondônia (15%), Amapá (8%), Tocantins (8%), Acre (6%) and Roraima (4%) (Table 2).

Regarding the year this procedure was carried out, the years 2018 and 2019 were those with the highest number of notifications. Conversely, 2011, 2012, and 2020 showed a drop in the total number of reports of reconstructive surgeries (Figure 2).

The map described compares the incidence rate of breast plastic surgeries by place of residence and by place of hospitalization for each federative unit in the Northern Region. Of 450 municipalities in the country's north, 191 municipalities correspond to notification by residence, and only 40 report hospitalizations for reconstructive plastic surgery.

In all states, it is possible to notice the difference in the number of municipalities of residence compared to the number of municipalities of hospitalization. For example, it is clear that, in the state of Amazonas, 21 municipalities reported as places of residence, but only 5 municipalities as places of hospitalization. The

same happened in the state of Rondônia, contrasting 38 municipalities of residence and 4 municipalities of hospitalization. The state of Pará, numerically more expressive, contrasts 74 municipalities of residence against 21 of hospitalization (Figure 3).

Likewise, the map below compares the incidence coefficient of breast surgeries in oncology by place of residence and by place of hospitalization for each federative unit. A greater number of municipalities are notified regarding place of residence, compared to the small number of municipalities notified by place of hospitalization for each state. For example, in Pará, 134 municipalities were notified as the place of residence, compared to 2 municipalities notified as the place of hospitalization. In the state of Rondônia, 51 municipalities of residence were notified against 2 municipalities of hospitalization; the same happened in the state of Amazonas, contrasting 49 municipalities of residence compared only to the municipality of Manaus, the only place of hospitalization notified (Figure 4).

DISCUSSION

Between 2011 and 2020, 61.1% of surgeries corresponded to radical approaches and only 23% to conservative approaches. This same proportion was found in a reference hospital in Paraíba study, in which 68.8% of patients underwent radical surgical treatment¹³. Regarding the national scenario, a survey found that of the total number of breast cancer surgeries performed in the country between 2015 and 2020, 43% corresponded to some type of mastectomy¹².

This large percentage of radical treatment is justified by the significant proportion of breast cancer cases classified as advanced disease – stages II and III – before the start of treatment, this being even more significant in the North Region when compared to the rest of the country (50.1%)¹²⁻¹⁴. As a result, the difficulty in accessing public health services, the lack of information about the importance of self-care, and the geographical distance from reference centers increase the time between suspicion and diagnostic confirmation, worsen the clinical picture, and support more invasive therapeutic measures, unfavorable aesthetic results and worse prognosis^{2,12-14}.

The need to carry out radical treatment for a patient with breast cancer implies greater risks and morbidity^{2,12,14}. A series of studies have proven the large window of time that exists in post-treatment with a radical approach and the body acceptance process⁴⁻⁸. Many mastectomized women, sometimes associated with difficulties in accessing multidisciplinary treatment, develop chronic post-traumatic stress

Table 2. Surgical procedures for breast cancer and breast reconstruction by federative unit in the Northern Region of Brazil between 2011 and 2020.

Procedures/Federative Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL	%
MASTECTOMIES	375	324	399	391	385	489	559	563	571	549	4605	
Acre	23	9	12	8	10	16	18	12	15	24	147	3%
Amapá	2	6	0	0	1	3	10	12	17	16	67	1%
Amazon	137	129	137	93	72	133	175	157	191	170	1394	30%
Pará	165	134	172	200	184	202	227	221	179	174	1858	40%
Rondônia	8	0	26	44	62	66	74	79	82	91	532	12%
Roraima	12	16	9	15	21	18	15	23	23	25	177	4%
Tocantins	28	30	43	31	35	51	40	59	64	49	430	9%
SEGMENTECTOMY/QUADRANTECTOMY/ SETORECTOMY	26	16	96	124	137	233	236	255	339	277	1739	
Acre	0	0	4	9	1	6	12	6	1	0	39	2%
Amapá	3	0	2	0	1	1	2	7	9	16	41	2%
Amazon	6	0	13	13	32	81	86	81	130	125	567	33%
Pará	0	0	29	51	44	92	76	87	120	65	564	32%
Rondônia	1	1	8	4	14	18	25	24	17	9	121	7%
Roraima	6	9	7	4	8	7	9	7	6	9	72	4%
Tocantins	10	6	33	43	37	28	26	43	56	53	335	19%
RECONSTRUCTIVE BREAST PLASTIC	136	132	166	222	170	151	234	294	310	134	1949	
Acre	19	5	14	18	17	15	21	6	5	4	124	6%
Amapá	16	19	18	20	15	16	25	18	23	4	174	9%
Amazon	22	43	54	95	54	54	41	50	50	28	491	25%
Pará	30	29	28	41	56	44	51	134	126	76	615	32%
Rondônia	35	15	11	6	17	14	48	65	75	16	302	15%
Roraima	3	13	21	8	1	3	16	9	4	1	79	4%
Tocantins	11	8	20	34	10	5	32	12	27	5	164	8%
AXILLARY LYMPHADENECTOMIES IN ONCOLOGY	15	28	20	20	29	51	54	29	40	33	319	
Acre	0	1	0	0	0	1	0	2	1	1	6	2%
Amapá	0	0	0	0	0	1	2	0	3	0	6	2%
Amazon	7	9	7	3	2	9	9	4	7	11	68	21%
Pará	2	7	4	3	8	17	15	11	14	2	83	26%
Rondônia	0	2	1	8	10	13	10	5	5	13	67	21%
Roraima	2	1	0	1	3	4	7	5	4	3	30	9%
Tocantins	4	8	8	5	6	6	11	2	6	3	59	18%
RESECTION OF NON-PALPABLE BREAST LESION	63	56	71	48	37	66	62	102	174	187	866	
Acre	0	3	27	12	8	11	22	51	38	39	211	24,4%
Amapá	1	0	0	0	1	0	0	1	0	0	3	0,3%
Amazon	46	33	28	16	14	17	14	7	7	4	186	21,5%
Pará	0	2	2	3	3	0	1	2	2	1	16	1,8%
Rondônia	0	1	2	2	9	36	19	37	124	139	369	42,6%
Roraima	0	2	3	4	0	0	0	0	0	0	9	1,0%
Tocantins	16	15	9	11	2	2	6	4	3	4	72	8,3%
GRAND TOTAL	615	556	752	805	758	990	1145	1243	1434	1180	9478	

Source: data extracted from DATASUS.

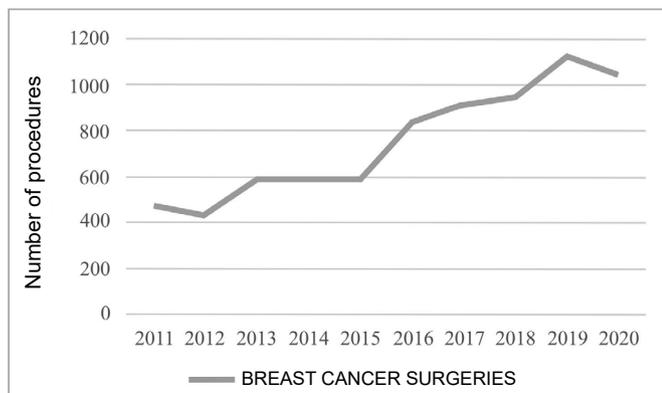


Figure 1. Number of breast cancer surgeries reported in the North Region from 2011 to 2020, according to the year of the procedure.

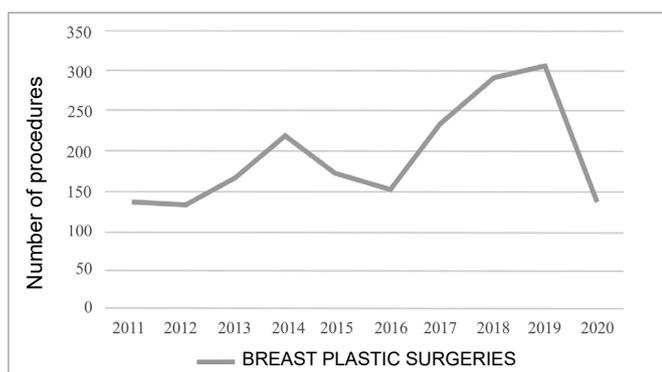


Figure 2. Number of reconstructive breast plastic surgeries reported in the North Region from 2011 to 2020, according to the year of the procedure.

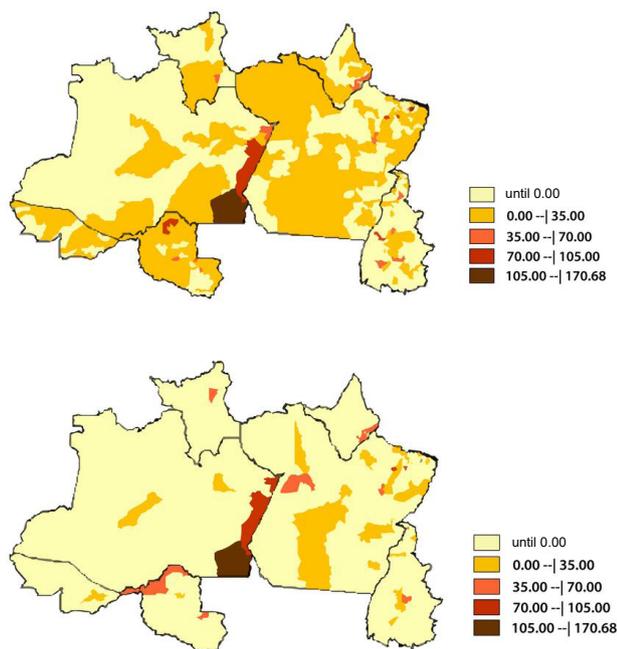


Figure 3. Incidence coefficient of reconstructive breast plastic surgeries reported in the North Region by place of residence and by place of hospitalization from 2011 to 2020 per 100,000 inhabitants. Above, spatial distribution of surgeries by place of residence; below, spatial distribution of surgeries by place of hospitalization.

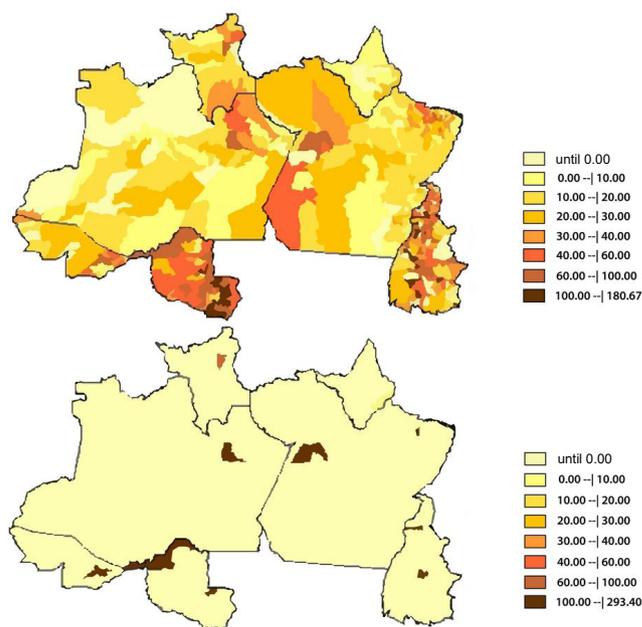


Figure 4. Incidence coefficient of breast surgeries in oncology reported in the Northern Region by place of residence and by place of hospitalization from 2011 to 2020 per 100,000 inhabitants. Above, spatial distribution of surgeries by place of residence; below, spatial distribution of surgeries by place of hospitalization.

and psycho-emotional and psychosocial disorders, especially related to the body and social expectations of femininity, which impact the course and adherence to adjuvant treatment^{4-8,15}. Due to this, the need to invest in screening and early diagnosis, aiming at conservative treatment, as well as guaranteeing access to the multidisciplinary team to improve quality of life during treatment is understood.

During the period analyzed, a growth rate of 1500% in breast surgeries was noted, justified by the increasing incidence of this type of cancer in the country¹. The estimate is 66,280 new cases for each year of the 2020-2022 period¹. There was a reduction in elective surgeries in 2020, resulting from the COVID-19 pandemic, which had a negative impact on medical services around the world¹⁶⁻¹⁸. There was a greater impact on reconstructive surgeries, which, in the face of a pandemic scenario, are not considered a priority and can be performed late.

Regarding mortality due to surgical procedures, the low number of absolute deaths associated with surgery is evident. Although the surgical procedure is responsible for low mortality resulting from the surgical procedure directly, breast cancer, when untreated or diagnosed in advanced stages, is responsible for the first cause of death in the Brazilian female population, with an increasing trend over the last decades^{1,14}, with an estimated death risk of 16.16 per 100 thousand women, which scales its magnitude as a public health problem^{1,2,12,14}.

With advancements in medicine and understanding global health care, reconstructive surgeries have gained great visibility¹⁹. In Brazil, Federal Law N°. 12.802⁹ recognized the obligation to offer breast reconstructive surgeries for mastectomized patients and must be offered by all SUS institutions^{3,5,9}.

Despite this great achievement, its applicability is still lacking, insufficient to match the number of mastectomies performed with breast reconstruction^{3,20,21}.

This is justified by the low number of reconstructive surgeries found in the study compared to the number of oncological surgeries. In a study of the Brazilian panorama of breast surgeries, a similar result was found, in which only 20% of Brazilian women had the guaranteed right to plastic surgery with post-mastectomy breast implants, with the North Region having the lowest number of reconstructive surgeries (1.79%)¹².

The 2017-2019 triennium was responsible for the highest number of surgeries, which can be justified by the guarantee of the Breast Reconstruction Law, starting in 2013⁹. Otherwise, the years 2011, 2012, and 2020 marked a lower number of surgeries. Changes in hospital management, reduction of surgeons specialized in oncoplasty, and reduction in funds allocated to this area in the public health system are possible causes of this decrease. Another factor associated with the year 2020 is the pandemic that further reduced the access of mastectomized patients to the right to reconstructive surgery due to the restriction of beds for elective surgeries^{17,18}. It is also worth highlighting that the infrastructure and health service model and the degree of impact of the pandemic predict how each country can overcome delays and the increase in the queue of patients requiring late reconstructions^{12,17-19}.

Another point analyzed in the study concerns the contrast between the number of municipalities per residence and the small number of municipalities per breast surgery hospitalization. This difference is justified, among other factors, by the reduced number of reference services in cancer treatment and the consequent lack of infrastructure to increase the demand for care^{3,11,20-23}.

The disparity is even more significant when analyzing plastic breast reconstruction surgeries, where the number of municipalities of hospitalization is more restricted in the states of the Northern Region – only 9% of municipalities have notifications of reconstructive surgery. This discrepancy is related to the lack of reference services with adequate infrastructure and logistics, which, consequently, overcrowded the queue and increased the delay in guaranteeing access to the right to reconstructive surgery^{11,20-22}.

Another factor refers to the low number of trained surgeons with the capacity to perform oncoplasty, considering the country's demand and the reduced salaries in public services compared to private ones, which reduces the permanence of these professionals in this sector^{11,12,20-24}. According to the Medical Demography of Brazil, from 2020, there are 6152 plastic surgeons and 2302 active mastologists²⁵.

Furthermore, these specialist surgeons are heterogeneously distributed between regions, mainly in the South-Southeast axis, aggravated by geographic disparities^{3,11,19-23}. Given these conditions, the flow of patients is limited to a restricted number of municipalities responsible for receiving a large demand for cancer patients^{11,19-23}.

The territorial magnitude of Brazil and its diversity in epidemiological profile translate into differences in accessibility to healthcare^{22,24}. The great contrast between the notification by municipalities that exists between the states of the Northern Region allows us to identify barriers in the availability and accessibility of patients diagnosed with breast cancer in reference services and, therefore, the need to expand infrastructure and health care for this population group.

The main limitation of the present work is the possibility of underreporting, in which a smaller number of the procedures mentioned have been analyzed when compared to the numerical reality of reference centers. Another limitation is the possible erroneous classifications related to the choice of procedure codes in DATASUS, both by professionals when filling out the AIHs and by the departments responsible for notifying the platform. Furthermore, it should be noted that the database does not differentiate by different codes the different types of reconstruction using myocutaneous flaps that exist in oncology, grouping them all into a single code, therefore limiting their use in the present research.

CONCLUSION

The growing number of breast cancer surgeries in the North corresponds, for the most part, to radical approaches, in contrast to the still low number of breast reconstruction surgeries. Finally, the existing heterogeneity between notification municipalities in the North of the country was demonstrated, which reveals the need to reorganize and establish new oncology reference centers to guarantee access to individualized and early diagnosis and treatment, increasing chances of conservative treatment and guaranteeing the right to reconstruction after radical treatment.

COLLABORATIONS

- NRCA** Analysis and/or data interpretation, Conception and design study, Data Curation, Methodology, Writing - Original Draft Preparation, Writing - Review & Editing.
- LGBB** Data Curation, Supervision, Writing - Review & Editing.
- RSL** Conception and design study, Supervision, Writing - Review & Editing.
- VMMA** Analysis and/or data interpretation, Data Curation.
- MRNF** Analysis and/or data interpretation, Data Curation.
- JPB** Analysis and/or data interpretation, Data Curation.
- DRS** Conception and design study, Final manuscript approval, Supervision, Writing - Review & Editing.
- LFLB** Final manuscript approval, Supervision.

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