

## IMPACT OF COVID-19 PANDEMIC IN HOSPITALIZATIONS OF WOMEN WITH ENDOMETRIOSIS: ECOLOGICAL STUDY

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**Highlights:** (1) The COVID-19 pandemic has impacted care for women with endometriosis. (2) Women with endometriosis have had reduced hospital admissions due to the pandemic. (3) The women most impacted were white, between 40 and 49 years old and from the southeast of the country.

PRE-PROOF

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### ABSTRACT

**Objective:** to analyze the impacts of the covid-19 pandemic on hospitalizations of women with endometriosis in Brazil. **Method:** this is an ecological epidemiological study, retrospective, based on documentary and quantitative approach, which followed the recommendations of STROBE. Data on hospital admissions for endometriosis were collected through the hospital information system based on DATASUS, between 2018 and 2021. **Results:** in 2018 and 2019 there were 12,406 and 11,989 hospitalizations of women with endometriosis. In the years 2020 and 2021 there were 7,202 and 7,759 hospitalizations, showing a decrease of about 40% compared to previous years. The prevailing age group was between 40 and 49 years (42%) and as for race/color, in 2018 and 2019 it was the white race and in 2020 and 2021 the brown race. As for the region of residence, more occurred in the southeastern region (43%), as well as the states of São Paulo (18%) and Minas Gerais (16%). Regarding the character of the service, most was elective. **Conclusion:** it was evidenced that the pandemic impacted on hospital admissions of women with endometriosis, who presented a white color/race profile, aged between 40 and 49 years, living in the southeastern region of the country, mainly in the states of São Paulo and Minas Gerais.

**Keywords:** Endometriosis; Coronavirus; Pandemic; Hospital; Nursing.

### INTRODUCTION

In late 2019, a new severe acute respiratory syndrome virus known as SARS-CoV-2 was first reported in China and subsequently the 2019 coronavirus disease (COVID-19) that spread rapidly to other countries in early 2020. In January of the same year, the World Health Organization (WHO) declared the outbreak an "international public health emergency" and in March it was declared a pandemic. In addition, some public health measures have been applied such as social distancing, quarantine and economic lockdown in several countries to prevent further spread<sup>1</sup>.

Endometriosis is one of the benign gynecological conditions most frequently diagnosed in women of childbearing age, with a worldwide prevalence ranging between 16 and 20%, while in Brazil it varies between 10 and 15%, although the data is still controvers<sup>2-3</sup>. It is a chronic,

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progressive and recurrent inflammatory disease characterized by the presence of endometrial tissue outside the uterine cavity, in which the most recurrent symptoms are dysmenorrhea, chronic pelvic pain, dyspareunia and infertility<sup>4</sup>.

Although this pathology does not have its physiopathology well defined currently, some existing theories seek to explain it, one of the most accepted is that of retrograde menstruation, where it is believed that the appearance of endometrial cells in extrauterine regions occurs due to the normal reflux of menstruation from the uterine cavity to the fallopian tubes and, consequently, the abdominal cavity, however, this theory would not justify the cases of endometriosis in distant places such as lung and brain<sup>5-6</sup>.

Therefore, other possible explanations are still being studied as the lymphatic dissemination, celomic metaplasia and immune deficiency, what leads to believe that these endometriotic implants settle in regions outside the uterine cavity and the immune system are sufficient to remove it<sup>5-6</sup>.

Other etiological factors have been associated with the development of endometriosis, such as immunological alteration, genetic predisposition, environmental factors such as dioxin and polychlorinated biphenyl, and risk factors related to lifestyle, including alcohol and caffeine<sup>7</sup>.

To diagnose this pathology, currently, the emphasis is given to the clinical findings presumptive, based on symptoms, physical examination and image, mainly to start low-risk and cost interventions, such as hormonal contraceptives, being the least invasive, leading to a lower risk and reducing the delay in the treatment of women<sup>8</sup>.

However, the increasing progress in the diagnosis of endometriosis added to the knowledge of women about the risk related to this pathology has caused a greater number of diagnoses, mainly in patients who present with symptoms and who use health services recurrently<sup>9</sup>.

Endometriosis is not a disease with an imminent threat to the life of patients, but it has a significant impact on the quality of life of women diagnosed. The painful and complex

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treatment process implies psychic suffering, negative social reflexes, lack of support and often late diagnoses full of uncertainty and discreditability<sup>10</sup>.

In this context, the covid-19 pandemic has brought major negative impacts to some populations, among them women with endometriosis, which have demonstrated an increase in social and emotional vulnerability causing a huge impact on care worldwide. Several medical centers temporarily needed to stop offering surgical treatment and outpatient consultations, which were canceled or postponed due to the regulations imposed by the adaptations that were necessary in the face of the complications that covid-19 imposed on the population<sup>11</sup>.

As a result, the quality of life of these women with endometriosis was greatly impaired by worsening symptoms such as pain, underfertility, as well as frustration with recurrence of the disease and uncertainty about the available therapeutic options for improvement<sup>12</sup>.

Given the presented context, the study brings as a guiding question: what is the impact of the Covid-19 pandemic in hospitalizations of women with endometriosis? To answer this question, the present study aimed to analyze the impacts of the covid-19 pandemic on hospitalizations of women with endometriosis in Brazil.

### **METHOD**

This is an ecological epidemiological study, retrospective, based on documents and quantitative approach, carried out in June 2023, with data of women hospitalized for endometriosis, from the code of the International Classification of Diseases for Endometriosis - ICD N80 - Endometriosis (female genital tract disorder)<sup>13</sup>, in Brazil from January 2018 to December 2021, through the Hospital Information System (HIS), which covers the Declaration of Hospital Morbidity of the Unified Health System (SUS) and belonging to the Department of Informatics of the UHS (DATASUS) (<http://datasus.gov.br>), which is responsible for recording all hospitalizations in the country.

The variables analyzed were data by place of residence – Region (North, Northeast, South, Southeast and Center-west) and state of the country (UF), Color/Race (white, brown, black, yellow, indigenous and ignored), Age Group (Under 1 year, 1 to 4 years, 5 to 9 years, 10

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to 14 years, 15 to 19 years, 20 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years, 60 to 69 years, 70 to 79 years, 80 years and more, Age ignored) per year of hospitalization.

Data processing was performed using DATASUS Tabwin32 and the analysis of variables were performed through Microsoft Excel 2016 software by Windows®. The descriptive analysis was performed from absolute frequency (n) and percentage (%), and the results were presented in a descriptive way, by means of tables.

It is noteworthy that the present study followed the recommendations of the Items of the Guidelines Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) as a resource for defining methodological stages<sup>14</sup>.

In accordance with Resolution 510/2016 of the National Research Ethics Council, which regulates the use of data for research involving only secondary information in the public domain and, therefore, without the obligation or need for approval by the Research Ethics Committee.

## RESULTS

In the years 2018 to 2021, 39,356 hospitalizations of women due to endometriosis were recorded (ICD N80: Endometriosis - female genital tract disorder), in which about 62% occurred in the years 2018 and 2019. In 2020 the covid-19 pandemic was triggered and social living restrictions were instituted, a fact that limited access to health services, as well as excessive care of covid-19 cases, overburdened all health system. In the first two years of the pandemic, there was a 24% drop in hospital admissions due to endometriosis, reflecting the difficulty women had during this period to be able to receive care in times of pandemic.

Regarding the character of the care of women with endometriosis, most were elective. However, in the years 2020 and 2021 it was possible to observe an increase in the frequency of urgent care in about 31% of hospital visits (**Table 1**).

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**Table 1** – Frequency of care provided to women with endometriosis from 2018 to 2021.  
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Service characteristic	2018		2019		2020		2021	
	n	%	n	%	n	%	n	%
<b>Elective</b>	9352	75.4	9335	77.9	4959	68.9	5281	68.1
<b>Urgency</b>	3054	24.6	2654	22.1	2243	31.1	2478	31.9
<b>Total</b>	12406	100.0	11989	100.0	7202	100.0	7759	100.0

Source: OLIVEIRA HGS, et al., 2022. Data extracted from DATASUS.

Although the percentage of hospitalization cases before and during the pandemic were important, when it was analyzed the percentages by age group, it was observed that they remained constant in the 40 to 49 years old age group. Some cases occurred among children under the age of nine, ten cases between 2018 and 2021, and a smaller number among young people and adolescents (less than 1%) (**Table 2**).

Regarding the self-reported race/color of women hospitalized for endometriosis, the most prevalent among the years 2018 and 2019 was white color/race with 38.9% and 38.2%, however, in the years 2020 and 2021 there was a higher prevalence in brown race/color with 38.5% and 41.6% (**Table 2**).

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**Table 2** – Profile of women hospitalized for endometriosis, according to age group and race/color from 2018 to 2021. Brazil, 2023.

Variable	2018		2019		2020		2021	
	n	%	n	%	n	%	n	%
<b>Age group (years)</b>								
Below 1 year	2	0.0	-		3	0.0	1	0.0
1 - 4 years	-	0.0	1	0.0	-	0.0	1	0.0
5 - 9 years	-	0.0	2	0.0	-	0.0	-	0.0
10 - 14 years	15	0.1	16	0.1	12	0.2	8	0.1
15 - 19 years	114	0.9	81	0.7	67	0.9	66	0.9
20 - 29 years	900	7.3	886	7.4	566	7.9	581	7.5
30 - 39 years	3065	24.7	3071	25.6	1925	26.7	1918	24.7
40 - 49 years	5214	42.0	4964	41.4	3018	41.9	3337	43.0
50 - 59 years	1843	14.9	1734	14.5	980	13.6	1082	13.9
60 - 69 years	851	6.9	862	7.2	434	6.0	527	6.8
70 - 79 years	352	2.8	315	2.6	173	2.4	201	2.6
80 years or more	50	0.4	57	0.5	24	0.3	37	0.5
<b>Color/race</b>								
White	4823	38.9	4574	38.2	2601	36.1	2638	34.0
Black	442	3.6	494	4.1	321	4.5	311	4.0
Brown	4191	33.8	4248	35.4	2776	38.5	3227	41.6
Yellow	360	2.9	352	2.9	250	3.5	141	1.8
Indigenous	5	0.0	7	0.1	3	0.0	8	0.1
Not informed	2585	20.8	2314	19.3	1251	17.4	1434	18.5
<b>Total</b>	<b>12406</b>	<b>100.0</b>	<b>11989</b>	<b>100.0</b>	<b>7202</b>	<b>100.0</b>	<b>7759</b>	<b>100.0</b>

Source: OLIVEIRA HGS, et al., 2023. Data extracted from DATASUS.

Regarding the region of the country, the southeast region led the number of hospitalizations with an average of 43%, presenting the highest rate of hospitalizations of women with endometriosis, followed by the northeast region, with an average of 26% (**Table 3**).

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**Table 3** – Frequency of hospitalizations of women due to endometriosis according to region of the country, from 2018 to 2021. Brazil, 2023.

Region	2018		2019		2020		2021	
	n	%	n	%	n	%	n	%
North	737	5.9	713	5.9	456	6.3	533	6.9
Northeast	3104	25.0	3039	25.3	1939	26.9	2205	28.4
Southeast	5581	45.0	5227	43.6	2994	41.6	3211	41.4
South	2144	17.3	2142	17.9	1236	17.2	1202	15.5
Mid-West	840	6.8	868	7.2	577	8.0	608	7.8
<b>Total</b>	12406	100.0	11989	100.0	7202	100.0	7759	100.0

Fonte: OLIVEIRA HGS, et al., 2023. Data extracted from DATASUS.

Regarding the state of the federation, the highest rate of hospitalizations occurred in Minas Gerais and São Paulo, which led with an average of 16% and 18% from 2018 to 2021, while the states with the lowest hospitalizations were Acre, Amapá and Roraima with less than 1% in all years (**Table 4**).



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**Table 4** – Frequency of hospitalizations of women due to endometriosis according to region of the country, from 2018 to 2021. Brazil, 2023.

State (FU)	2018		2019		2020		2021	
	n	%	n	%	n	%	n	%
Acre	66	0.5	65	0.5	77	1.1	57	0.7
Alagoas	205	1.7	181	1.5	93	1.3	87	1.1
Amapá	32	0.3	71	0.6	39	0.5	48	0.6
Amazonas	135	1.1	129	1.1	80	1.1	130	1.7
Bahia	633	5.1	614	5.1	413	5.7	364	4.7
Ceará	658	5.3	664	5.5	511	7.1	444	5.7
Distrito Federal	71	0.6	81	0.7	80	1.1	81	1.0
Espírito Santo	227	1.8	205	1.7	110	1.5	187	2.4
Goías	431	3.5	444	3.7	274	3.8	262	3.4
Maranhão	525	4.2	406	3.4	309	4.3	465	6.0
Mato Grosso	199	1.6	207	1.7	168	2.3	206	2.7
Mato Grosso do Sul	139	1.1	136	1.1	55	0.8	59	0.8
Minas Gerais	2338	18.8	1996	16.6	1158	16.1	1086	14.0
Pará	277	2.2	224	1.9	153	2.1	189	2.4
Paraíba	248	2.0	236	2.0	150	2.1	227	2.9
Paraná	943	7.6	939	7.8	463	6.4	437	5.6
Pernambuco	338	2.7	403	3.4	179	2.5	164	2.1
Piauí	176	1.4	186	1.6	134	1.9	275	3.5
Rio de Janeiro	712	5.7	778	6.5	385	5.3	504	6.5
Rio Grande do Norte	261	2.1	309	2.6	128	1.8	137	1.8
Rio Grande do Sul	710	5.7	560	4.7	451	6.3	491	6.3
Rondônia	122	1.0	122	1.0	46	0.6	57	0.7
Roraima	17	0.1	20	0.2	8	0.1	8	0.1
Santa Catarina	491	4.0	643	5.4	322	4.5	274	3.5
São Paulo	2304	18.6	2248	18.8	1341	18.6	1434	18.5
Sergipe	60	0.5	40	0.3	22	0.3	42	0.5
Tocantins	88	0.7	82	0.7	53	0.7	44	0.6
<b>Total</b>	<b>12406</b>	<b>100.0</b>	<b>11989</b>	<b>100.0</b>	<b>7202</b>	<b>100.0</b>	<b>7759</b>	<b>100.0</b>

Source: OLIVEIRA HGS, et al., 2023. Data extracted from DATASUS.

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### DISCUSSION

This study showed that there was a reduction in hospitalizations due to endometriosis in Brazil and in practically all regions during the pandemic period caused by covid-19 in the years 2020 and 2021. A study on endometriosis and covid-19 found that almost half of women reported decreased access to medical care and medication<sup>15</sup>.

It was possible to observe that in the years 2020 and 2021 the frequency of hospitalizations with urgency was higher than in the years 2018 and 2019, an increase between 2019 and 2020. Due to the restrictions of the covid-19 pandemic, in order to preserve the capacity to care for patients infected with the SARS-CoV-2 virus, regular outpatient contacts of the endometriosis centers were directed to attend to severe or emergency cases, as well as the limited use of elective surgeries for women with severe symptoms<sup>10</sup>.

There are reports of women with endometriosis about the concern to seek medical help due to the fear of being infected by SARS-CoV-2 in medical centers, which corroborates the data presented in this study. This may have aggravated symptoms such as dysmenorrhea, dyspareunia, pelvic pain, colic and other gastrointestinal symptoms, in addition to depression, anxiety, stress and fatigue<sup>16-17</sup>.

A study on the hospitalization of women with endometriosis in Brazil showed a rate of seven admissions per 100,000 inhabitants in the last 10 years. In addition, an Israeli cohort found a prevalence of 10.8 cases per 1,000 people, with an average annual incidence rate of 7.2 per 10,000 inhabitants<sup>3,17</sup>.

Concerning the epidemiological profile of women hospitalized for endometriosis in Brazil, most of them were between 40 and 49 years old, which corroborates the studies<sup>3</sup> referring to a historical series of 10 years, showed that the young women who presented lower prevalence among age groups in the national scenario, as well as from 40 years old hospitalizations represented more than half of the total.

In Spain, a study conducted by Marfil<sup>18</sup> estimated the overall incidence of endometriosis in 16.1 per 10,000 women and the mean age of patients followed in the study was  $36.8 \pm 5.4$

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years. In Australia, the prevalence of clinically confirmed endometriosis was 6 per 100 women when aged 40-44 years, increasing to 11 per 100 women when considered for diagnoses of clinically suspected endometriosis. Age-specific incidence estimates among Australians reached a peak of 6 per 1000 person-years at the age of 30-34 years<sup>19</sup>.

Regarding the women's age, it is known that the diagnosis of endometriosis occurs mainly during the period, and that, moreover, the diagnosis tends to increase the incidence as the age, where the first symptoms tend to appear at the beginning of adolescence. This happens due to possible ignorance of menstrual cycles, the idea that menstrual periods are painful and "normal", in addition to the difficulty in performing gynecological examinations in younger women, as well as the high cost of the exams, which generates less information collected for a possible diagnostic suspicion<sup>20</sup>.

Regarding the analysis of self-reported race/color of women with endometriosis, there was a higher prevalence of white and brown women of color/race. Corroborating this data, a study<sup>21</sup> showed similarity, where in the years from 2017 to 2021 in the state of Maranhão, the highest prevalence occurred in women of brown color/race, as well as the study<sup>22</sup> carried out in the Amazon region also brought the same data.

The highest concentration of hospitalizations due to endometriosis occurred mainly in the Southeast region of the country, occurring mainly in the states of São Paulo and Minas Gerais, which are regions with greater industrialization process, corroborating the study by Guedes<sup>3</sup>. It is important to note that the exposure of women to chemicals with potential endocrine disruptors, mainly organophosphates, bisphenol type A and polychlorinated biphenyls increase the risk of developing endometriosis throughout life, since most of the industries are concentrated in the Southeast region of the country<sup>23</sup>.

A study<sup>20</sup> between the years of 2015 and 2019, showed that the region with more hospitalizations was the Southeast, followed by the Northeast. The states of São Paulo and Minas Gerais were the ones that had more hospitalizations in total, and both states together represented 1/3 of the national cases, corroborating with the data presented in this study.

The population index of these two states may help the indices found in women with endometriosis, since according to the Brazilian Institute of Geography and Statistics (IBGE)<sup>24</sup>,

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the Southeast corresponds to approximately less than half of the national population and the two together add up to approximately 1/3 of the Brazilian population. In addition, this region concentrates many specialists in gynecology, which may explain a greater amount of care in this region, while the northern region has the lowest concentration, explaining the lower number of care<sup>25</sup>.

Finally, it is necessary to highlight that the analysis of the epidemiological profile of women with endometriosis presented the limitation regarding the data exposed in the HIS/DATASUS platform, which does not have more variables to support a better analysis. Nevertheless, even with the limitations, the DATASUS database remains of utmost importance for the dissemination of freely accessible data in the public domain to the population and scientific community, which can be used to produce new scientific information.

### **CONCLUSION**

This study showed that the pandemic impacted on hospital admissions of women with endometriosis, who presented a white color/race profile, aged between 40 and 49 years old, living in the southeastern region of the country mainly in the states of São Paulo and Minas Gerais. More studies should be carried out on this same theme, since it is a very current subject and interferes with the quality of life of so many women. In addition, the impacts that occurred during the pandemic can be remedied and women who had their late diagnoses can be followed and treated without further loss of time, because endometriosis is a chronic disease with several repercussions in multiple spheres of women's lives.

### **ACKNOWLEDGEMENTS**

We would like to thank all the collaborators of this study, to the women who live with endometriosis in Brazil and in the world, a disease so sensitive, loaded with uncertainties, that it increasingly needs to be seen by the community of professionals who provide care for these women, the managers of the women's health care network and all the hospital environments that have opened their doors and cared for these women over all these years. In addition, early

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diagnosis can help to better manage pain and other complaints of women that interfere negatively in their lives, and thus reduce the number of hospitalizations, medications, surgical procedures and diagnoses of other endometriosis-related problems.

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