Maternal mortality in Brazil during the Covid-19 pandemic and post-pandemic period

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ABSTRACT

Maternal death occurs in the pregnancy-puerperal period due to causes directly linked to gestational conditions or by indirect causes resulting from pre-existing maternal conditions that worsen as a result of pregnancy. The coronavirus pandemic has posed a challenge for health care. The consequence of this was a considerable increase in the Maternal Mortality Ratio, reaching alarming values in the peak period of the pandemic. This study aims to identify the main causes of maternal death, which Brazilian regions obtained the highest values of deaths, and what is the period of the pregnancy-puerperal cycle in which these deaths occurred. This is an ecological, descriptive and quantitative analytical study built using data from the DataSus Information System in the period from 2019 to 2022. MMR increased significantly during the pandemic, especially in 2021. The Southeast and Northeast regions recorded the highest numbers of maternal deaths. Maternal mortality causes were divided into direct (complications of pregnancy, childbirth, or puerperium) and indirect (pre-existing conditions aggravated by pregnancy), with a notable increase in indirect causes during the pandemic. Maternal mortality rates were highest among women aged 20 to 39 years, highlighting a significant vulnerability in this age group. Regional and socioeconomic inequalities were critical factors, with black women having the highest mortality rates. The lack of access to adequate health care during the pandemic exacerbated the situation, preventing prenatal, childbirth and postpartum care, which is essential for maternal health.

Keywords: Brazil, COVID-19, Maternal death, Pandemic.

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INTRODUCTION

In 2020, the World Health Organization (WHO) declared an outbreak of the new coronavirus and declared a state of pandemic due to the high transmission power of the disease. COVID-19 is caused by the Sars-CoV-2 virus, which, despite having been classified as having a low lethality potential, had a high potential for geographic transmission and morbidity, in addition, it is worth mentioning the lack of preparation of services, the lack of inputs and specific pharmacological methods. According to the Coronavirus Monitoring Panel, Brazil has recorded 712,571 deaths and more than 30 million cases, these numbers demonstrate the Brazilian situation during the pandemic (Souza; Amorim, 2021).

Maternal mortality is defined as the death of the woman during the pregnancy-puerperal period. It can happen during pregnancy, labor, delivery and up to 42 days after the end of pregnancy, not depending on the duration or location of the pregnancy. It is classified as obstetric causes as direct, when it is related to the physiology of pregnancy, obstetric complications resulting from inadequate treatments, omissions or unnecessary interventions, and indirect, when resulting from pre-existing pathologies, but which were aggravated by the dynamics of pregnancy (Brasil, 2022).

To analyze the evolution of maternal deaths and indicate measures for maternal and child health, the Maternal Mortality Ratio (MMR) is calculated, obtained through the number of maternal deaths divided by the number of live births and multiplied by 100,000. It is an important indicator, also known as the mortality rate, and represents, when high, low socioeconomic conditions and difficulties in obtaining quality of care, and is used to guide health actions (Brasil, 2018).

The numbers of maternal deaths have always been the focus of attention. Before the pandemic period, the MMR was around 50 per 100,000 live births, and with the advent of the covid-19 pandemic, this situation worsened significantly, reaching 7.2% in this period. During the gestational period, a woman's body undergoes several anatomical and physiological changes, contributing to the development of the most severe forms of the disease, in addition to requiring intensive care beds, the use of respiratory ventilation, and operating rooms due to the greater likelihood of babies being born prematurely (Castro, 2021).

In this scenario, the high rates of maternal mortality are notorious, allied to this situation are the absence of family planning, the lack of prenatal care, with few prenatal consultations, both due to the fear of becoming infected and the difficulty of access to services, as well as postnatal care, thus contributing to the increase in deaths (Guimarães; Moreira, 2024).

The United Nations (UN) has established, as part of the Millennium Development Goals, the commitment to reduce maternal mortality by the year 2015. However, some countries, including Brazil, have not met this goal. In 2015, the 2030 Agenda was launched, with the objective of resuming the goal of reducing maternal death rates to less than 70 deaths per 100 thousand live births

according to Sustainable Development Goal (SDG) 3.1. Brazil was more ambitious and proposed to reduce mortality to 30 deaths per 100,000 live births. However, Maternal Mortality must be analyzed through regional discrepancies and it must be understood that it is influenced by the economic status of the population and the national context (Motta; Costa, 2021).

Therefore, it is necessary to research the causes of maternal mortality in the pandemic period and after the covid 19 pandemic, in the most prevalent regions and what is the socioeconomic profile of these women.

METHODOLOGY

A descriptive and quantitative analytical ecological study of maternal mortality in Brazil was carried out, built using secondary statistical data extracted from the tabnet of the DATASUS informatics department in the period from 2019 to 2022. The data collected were on maternal deaths in the Brazilian regions and the federal district in the period from 2019 to 2022 in the Mortality Information System (SIM) and in the Live Birth Information System (Sinasc).

In Sinasc, the number of live births in the Brazilian regions was researched and the data were obtained as follows: Searched in the field line by region; in the column field the year and in content maternal deaths. Next, the region of occurrence was searched in the row field, in the year column field and in the content births by mother's residence.

Maternal death was searched in the Mortality Information System by analyzing the number of maternal deaths, obstetric causes of death, and socioeconomic profile, and separated by major regions of Brazil and year of occurrence, from 2019 to 2022. The research was carried out in three stages, as follows: in the Line field year of death; in the field column region and in Content: maternal deaths to obtain deaths by region. After that, in the field Line type of obstetric cause; in the Field column year of death; Content: maternal deaths to identify the most prevalent causes of death. Subsequently, in the Age group line field; Column year of death; Contents Maternal deaths. Then, it modified the pregnancy/puerperium death line in the field to analyze the period of highest occurrence of deaths.

To specify and evaluate the causes of maternal mortality, chapter XV (pregnancy, childbirth and puerperium) of ICD 10 (International Statistical Classification of Diseases and Related Health Problems) was used. The tabulation of the data and the creation of the graphs were done in the Microsoft Excel program and the tables and analysis of the study were developed in Microsoft Word.

As these are aggregated data in Information Systems available on the Internet and in the public domain, the approval of the Research Ethics Committee is waived.

RESULTS

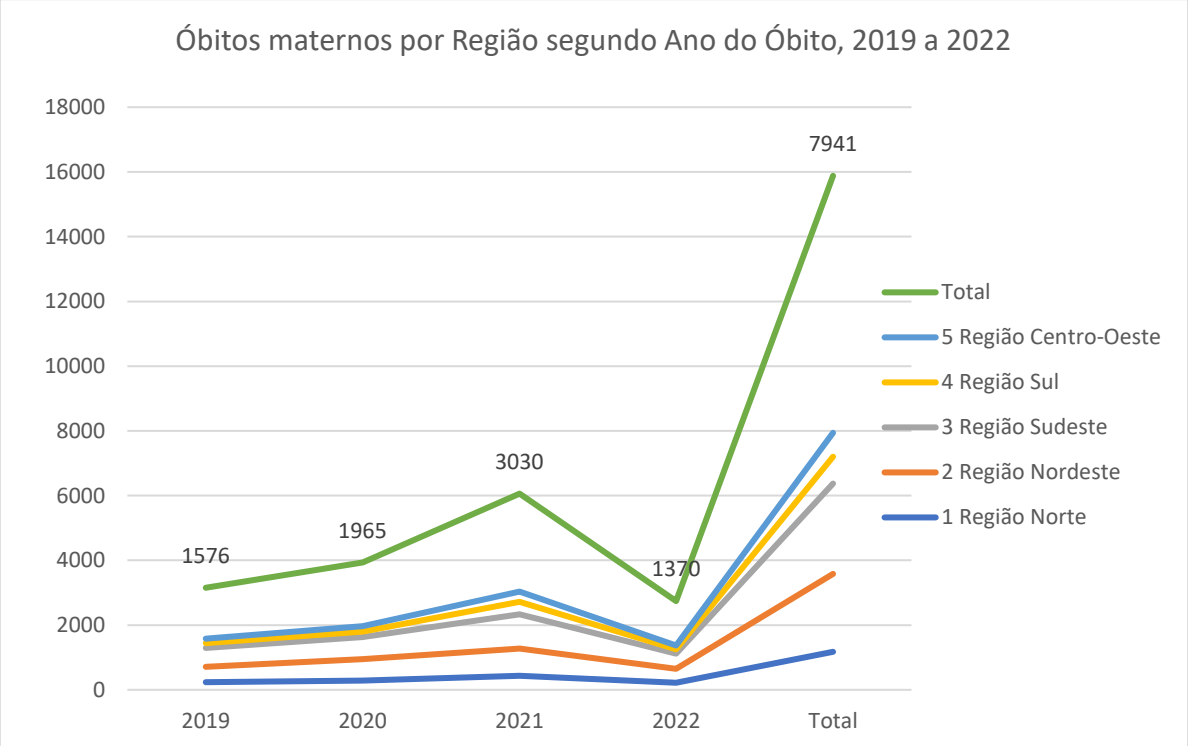
In Brazil, during the Covid 19 pandemic, the number of deaths increased considerably, reaching 619,056 deaths during 2021 and totaling 38,840,012 cases by 2024. The Southeast region, followed by the Northeast region, has the highest numbers of maternal deaths during the 2021 year of the Covid-19 pandemic.

Table 1. Maternal deaths by region according to year of death, 2019 to 2022.

Year of death	North	Northeast	Southeast	South	Midwest	Total
2019	233	478	582	147	136	1576
2020	285	662	685	162	171	1965
2021	438	838	1055	385	314	3030
2022	218	430	469	135	118	1370
Total	1174	2408	2791	829	739	7941

Source: Mortality Information System (SIM).

Figure 1. Maternal deaths by region according to year of death, 2019 to 2022.



Source: Mortality Information System (SIM).

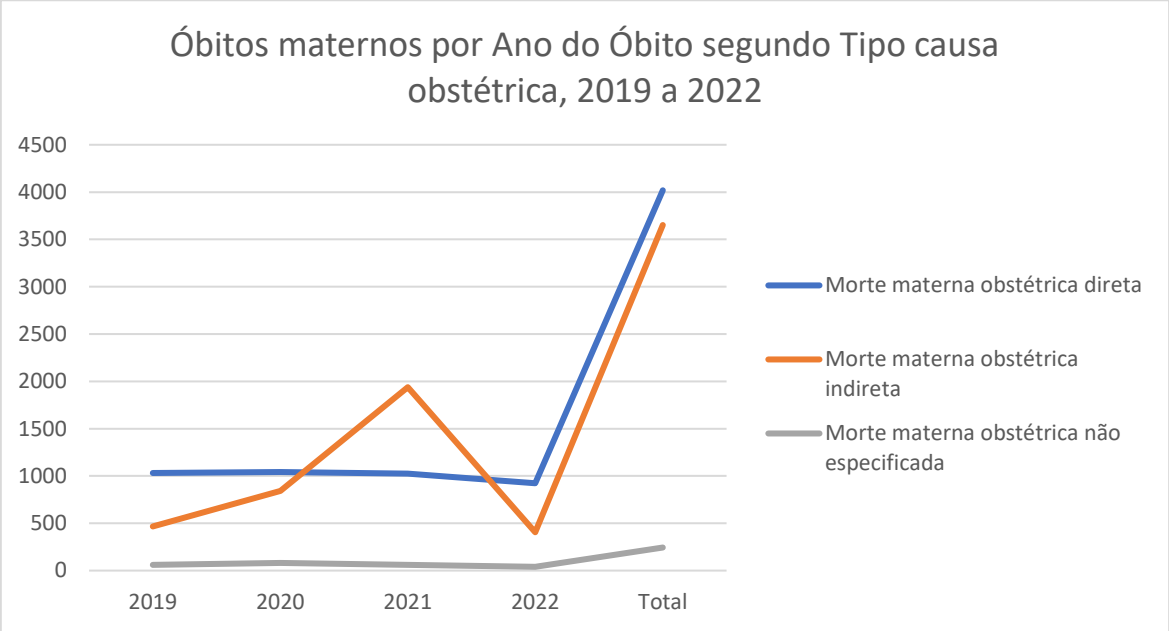
Considering the direct causes (associated with complications in pregnancy, childbirth or puerperium); indirect (associated with pre-existing conditions of pregnancy, childbirth and puerperium) and late (period longer than 42 days). Direct obstetric causes accounted for 50.8% during the study period and indirect causes 46.1%, and indirect obstetric causes in 2021 increased considerably in relation to direct causes.

Table 2. Maternal deaths by year according to the type of obstetric cause, 2019 to 2022.

Obstetric cause	2019	2020	2021	2022	Total
Direct obstetric causes	1032	1040	1028	923	4019
Indirect obstetric causes	466	843	1939	495	3652
Not specified	62	81	61	40	244
Total	1560	1964	3023	1368	7915

Source: Mortality Information System (SIM).

Figure 2. Maternal deaths by year by age group, 2019 to 2021.



Source: Mortality Information System (SIM).

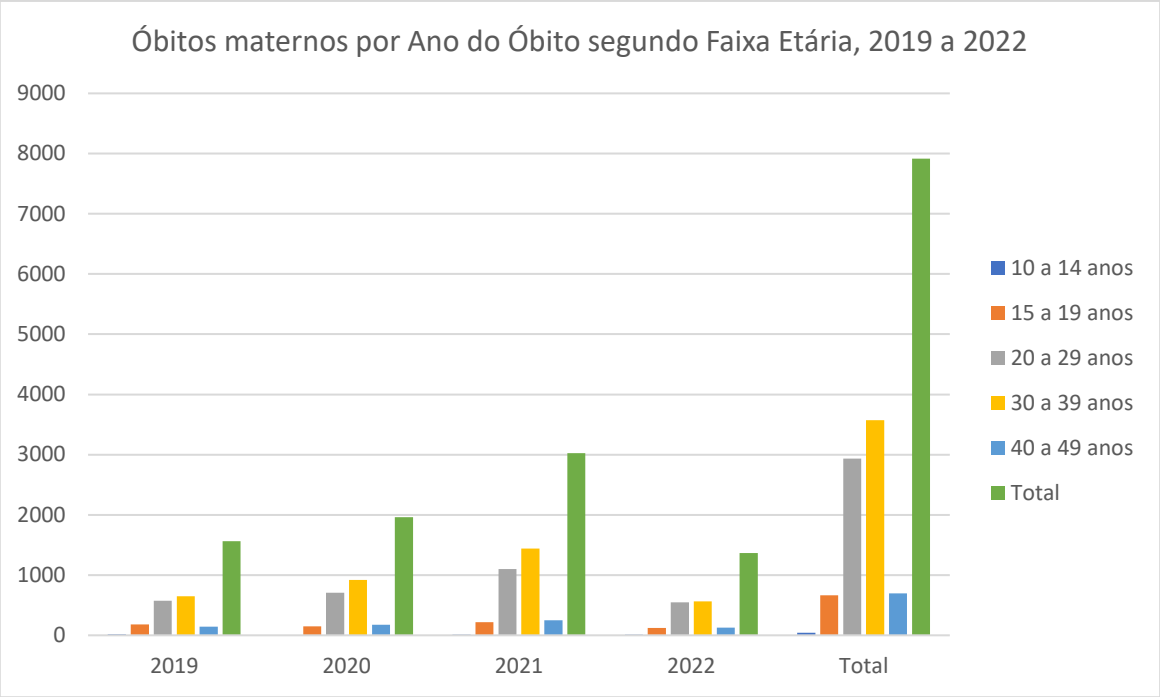
Maternal mortality during childbearing age (age group between 10 and 49 years according to the Ministry of Health) increased, especially between the ages of 20 to 29 years and 30 and 39 years, 1103 and 1441 respectively, during the year 2021.

Table 3. Maternal deaths by year by age group, 2019 to 2021.

Age group	2019	2020	2021	2022	Total
10 to 14 years old	14	7	11	12	44
15 to 19 years old	181	148	218	120	667
20 to 29 years old	574	709	1103	548	2934
30 to 39 years old	649	922	1441	561	3573
40 to 49 years old	143	178	251	127	699
Total	1561	1964	3024	1368	7917

Source: Mortality Information System (SIM).

Figure 3. Maternal deaths by year by age group, 2019 to 2021.



Source: Mortality Information System (SIM).

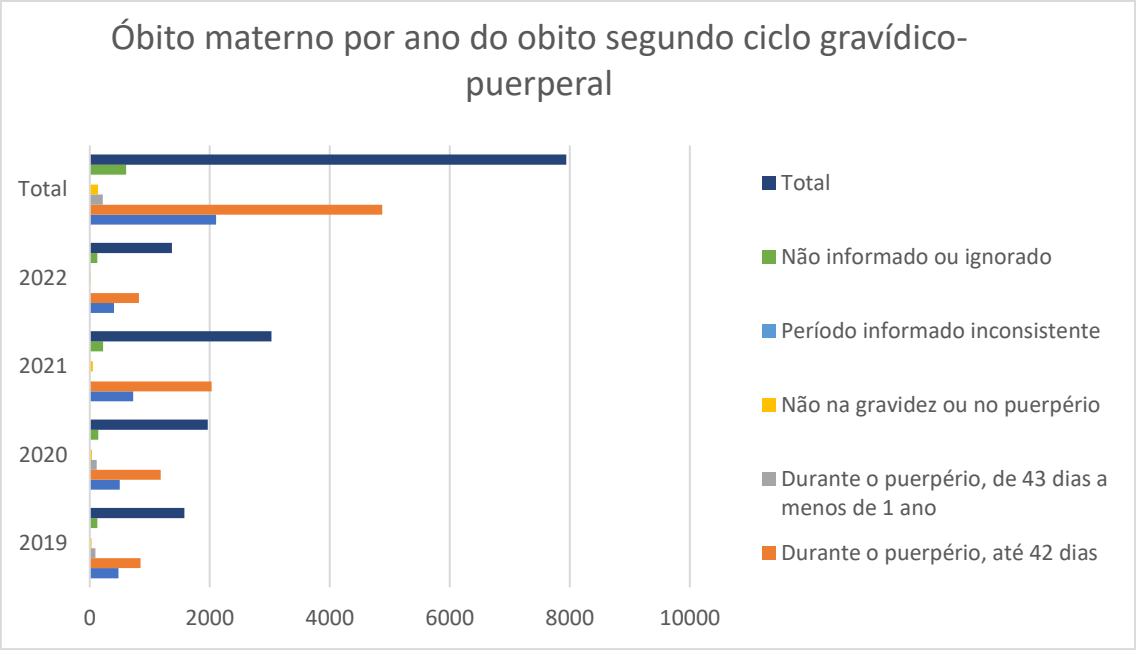
Considering the pregnancy period (labor, delivery and abortion) and the immediate puerperium up to 42 days and mediate (over 42 days up to one year). Maternal deaths were high during the puerperal period, reaching values of 1180 and 2029, in 2020 and 2021, respectively.

Table 4. Maternal deaths by Year of Death according to Death pregnancy/puerperium, 2019 to 2022.

Maternal deaths by Year of Death according to Death pregnancy/puerperium, 2019 to 2022					
Death pregnancy/puerperium	2019	2020	2021	2022	Total
During pregnancy, childbirth, or miscarriage	480	499	722	405	2106
During the puerperium, up to 42 days	847	1180	2029	817	4873
During the puerperium, from 43 days to less than 1 year	92	113	9	-	214
Not in pregnancy or in the postpartum period	30	34	50	21	135
Inconsistent reporting period	2	-	1	2	5
Not informed or ignored	125	139	219	125	608
Total	1576	1965	3030	1370	7941

Source: Mortality Information System (SIM).

Figure 4. Maternal deaths by year of death during pregnancy/puerperium cycle, 2019 to 2022.



Source: Mortality Information System (SIM).

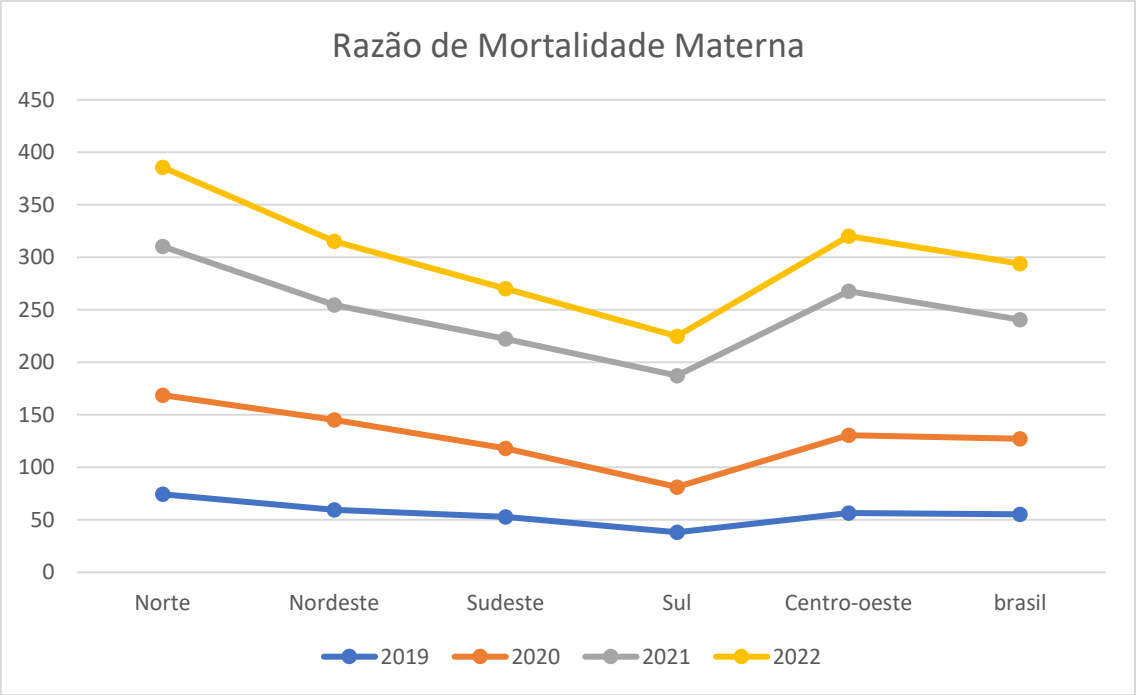
The maternal mortality ratio is a predictor of the mortality rate and operates by crossing data from SIM with Sinasc. The MMR during the pandemic period showed accentuated values, compared to 2019 and 2020, with greater emphasis on the North and Midwest regions.

Table 5. Maternal mortality ratio per 100,000 live births. Brazil and Regions. 2019 to 2022.

Region of residence	2019	2020	2021	2022
North	74,3	94,5	141,6	75,4
Northeast	59,4	85,9	109,4	60,7
Southeast	52,8	65,1	104,5	47,9
On	38,1	43,2	106,1	37,5
Central-West	56,4	74,2	137,1	52,6
Total	55,3	72,0	113,2	53,5

Source: Mortality Information System (SIM).

Figure 5. Maternal mortality ratio per 100,000 live births. Brazil and Regions. 2019 to 2022.



Source: Mortality Information System (SIM).

DISCUSSION

By analyzing the information collected in the study, a high number of maternal deaths during the covid-19 pandemic was observed, especially in 2021 compared to the previous years of 2019 and 2020, probably as a result of the pandemic. The Brazilian regions with the highest maternal deaths were the southeast and northeast regions of the country, with 1,055 and 838, respectively (Table 1).

The MMR showed significant increases with rates above 100.0, revealing an unfavorable scenario aggravated by the pandemic period. The northern region followed by the central-west region were the ones with the highest mortality rates, 94.5 and 74.2 in 2020; 141.6 and 137.1 in 2021 in the North and Central-West regions, respectively (Table 5**).** According to figure 5, the MMR was above the target set for Brazil, which is 30.0 deaths per 100,000 live births by 2030, established in the Sustainable Development Goals (SDGs).

Until 2019, direct obstetric causes had high values, but during the pandemic, indirect obstetric causes were higher, especially in 2021, which shows a probable relationship with the covid pandemic influencing maternal morbidity and mortality (Figure 2). From 2022 onwards, the values of indirect causes began to decrease, signaling a possible adherence to protective measures such as vaccination for Sars-CoV-2 (Brasil, 2024). The period of highest occurrence of maternal deaths occurred during the puerperium (up to 42 days after the end of pregnancy), reaching 1,180 and 2,029 deaths in 2020 and 2021, respectively.

During the pandemic period, women were unable to access health services to carry out prenatal, childbirth, and postpartum care, which are vital for adequate care and assistance

(Guimarães; Moreira, 2024). In addition to the difficulties in accessing services, racial differences, lack of supplies, obstetric violence, and high morbidity of covid in women, especially those with pre-existing comorbidities, evidence the unfavorable scenario aggravated as a result of the pandemic (Souza; Amorim, 2021).

In addition to the temporal context of the pandemic, the difficulty of access and functioning and structure of the Unified Health System, intrinsic, biological and immunological factors contribute to the involvement of these women by covid (Guimarães; Moreira, 2024). It is also important to note that direct obstetric causes, which are related to interventions, omissions, incorrect treatments, thus constituting preventable causes through quality care, during the period before the pandemic and after 2021 were on the rise, totaling 4,019 during the period from 2019 to 2022 compared to 3,652 indirect causes in the same year (Table 2) (Brazil, 2023).

It is important to note that regional and social inequalities have a significant impact on these numbers. The social determinants of health have a great influence on environmental behavior and interfere in population situations. Analyzing the socioeconomic status, it is inferred that the most impacted age group was 20 to 39 years, mainly 30 to 39 years, representing women of childbearing age. It is worth mentioning studies that address the influence of racial discrepancies on the maternal mortality ratio in Brazil. Black women had high MMR compared to brown and black women in all Brazilian regions, in addition to having higher probabilities of hospital admissions and progression to death (Silva et al. 2024).

It is essential to adopt public policies aimed at maternal and child well-being, which guarantee the quality of care in all areas of health. In the current context, the consequences of the pandemic on care are visible, delays in scheduling, lower adherence to prenatal care, lack of reproductive planning, lower vaccination coverage and reduction of postnatal care, which impacts the pregnancy-puerperal period and all women's health care, as it was a period of extreme instability and certainty, thus increasing mental health problems such as anxiety and depression (Souza; Amorim, 2021).

FINAL CONSIDERATIONS

The study highlighted the impact of the Covid-19 pandemic on maternal mortality in Brazil, highlighting the increase in maternal death rates, especially in the Southeast and Northeast regions. Indirect obstetric causes, related to pre-existing conditions and aggravated by pregnancy, were particularly high during the pandemic period, suggesting a direct influence of covid-19 on maternal morbidity and mortality.

Limitations in access to health services during the pandemic contributed to inadequate prenatal, delivery, and postpartum care, critical factors for the prevention of maternal complications.

Socioeconomic and regional inequalities, as well as racial differences, were determining factors in the disparity in maternal mortality rates, with black women presenting higher risks of serious complications and mortality.

The study reinforces the need for public policies aimed at reducing maternal mortality, focusing on improving access to and quality of maternal health care, and eliminating regional and racial inequalities. Adherence to protective measures, such as vaccination, is crucial for the protection of pregnant and postpartum women against Covid-19 and other associated complications.

Maternal mortality is a sensitive indicator of the health conditions and social well-being of the population. Therefore, continuous monitoring and evaluation of interventions are essential to achieve the targets set out in the Sustainable Development Goals and ensure the health and lives of women of reproductive age.

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