

**STUDY OF MATERNAL
DEATHS DUE TO
CORONAVIRUS IN THE
MUNICIPALITY OF
FRANCA**

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Abstract: Infection with the new coronavirus SARS-Cov-2, responsible for causing the disease Covid-19, has become a devastating threat to the health of the world's population and has been declared a global pandemic by the World Health Organization (WHO) on March 11, 2019. 2020. Given this context, it is necessary to understand the real impact of Covid-19 on pregnancy, childbirth and the puerperium and to know whether the pregnancy-puerperal state modifies the natural history of the disease. In view of this, concern for the care of pregnant and puerperal women is essential, mainly because this population has difficulties in accessing quality prenatal care, which has worsened even more during this pandemic period. In this sense, the present work proposes to carry out a survey of maternal deaths due to the Coronavirus in the municipality of Franca in the period from 2020 to 2021, in order to analyze the magnitude and causes of such deaths. It is also intended to contribute to the collection of statistical data in the municipality, in addition to promoting municipal statistics and contributing to local health management, through the proposal of measures to prevent new cases of maternal deaths. In this research, it is possible to highlight some difficulties during the analysis of the medical records, since there was not much information about the symptoms, their onset, as well as their duration and severity. Another point to be highlighted is the difficulty of collecting data, especially for private services. The work data were only from the public service, and only from patients who need hospitalization, either in a ward or intensive care unit bed. When analyzing the death certificates, we noticed that some patients, in particular, those who died, were not residents of the city of Franca, therefore, they were not included in the maternal mortality indicators. Finally, some items deserve to be highlighted and

serve as ways of protocoling the care and care for the pregnant woman from the prenatal consultation, as well as her follow-up. Therefore, health professionals must be aware of the early diagnosis of Covid-19, considering them as a risk group for the development of serious or fatal forms, especially from the 3rd trimester of pregnancy and in the presence of pre-existing diseases.

Keywords: Maternal mortality; Covid-19

INTRODUCTION

Infection with the new coronavirus SARS-Cov-2, responsible for causing the disease Covid-19, has become a devastating threat to the health of the world's population and has been declared a global pandemic by the World Health Organization (WHO) on March 11, 2019. 2020. Starting in China at the end of 2019, it quickly spread to several countries, and the first officially diagnosed case in Brazil occurred on February 26, 2020. Since then, despite the initial measures to slow down the spread of the virus, we are alarmed at the exponential growth in the number of cases (FEMINA, 2020).

Given this context, it is necessary to understand the real impact of Covid-19 on pregnancy, childbirth and the puerperium and to know whether the pregnancy-puerperal state modifies the natural history of the disease. Initial studies in the obstetric population do not suggest a greater susceptibility of pregnant women to the complications of Covid-19 (CHEN, 2020). However, subsequent publications reported cases of pregnant women with severe illness and maternal deaths resulting from Covid-19 (FEMINA, 2020).

Maternal mortality is a sensitive health indicator and, therefore, it is an important management tool for public policies and health institutions. Maternal death is considered the death of a woman during pregnancy or up to

42 days after the end of pregnancy, regardless of the duration or location of the pregnancy. It is caused by any factor related to or aggravated by the pregnancy or the measures taken in connection with it. Maternal death is not considered to be caused by accidental or incidental factors (MINISTÉRIO DA SAÚDE, 2009). The main causes of deaths in pregnant women are hypertension, hemorrhage, postpartum infection and unsafe abortion. (FEBRASGO, 2018).

The Maternal Mortality Ratio is an index that expresses the number of deaths of pregnant women or mothers up to 42 days after childbirth per 100,000 live births. In developed countries, it is around 10 per 100,000 live births.

It must be noted that the physiological changes in the body of pregnant and postpartum women lead to a predisposition to serious infections, including respiratory ones, and anatomical changes reduce their tolerance to hypoxia. Pregnant women at any gestational age (including those who had an abortion or fetal loss) make up the population with conditions and risk factors for possible complications of the flu syndrome (SVS, 2020).

Just as there is a greater risk of pregnant women requiring admission to an intensive care unit (ICU) when compared to non-pregnant women; It is possible that the population of pregnant women has very different characteristics and the presence of comorbidities, especially preeclampsia and obesity, which are very common inflammatory conditions in our population and which are risk factors for complications (SVS, 2020).

In view of this, concern for the care of pregnant and puerperal women is essential, mainly because this population has difficulties in accessing quality prenatal care, which has worsened even more during this pandemic period. Not only prenatal care, but all

health care for women was affected by the pandemic, either because of the fear of some pregnant women to seek health services due to uncertainties and fear of leaving home, increasing the frequency of signs and symptoms of anxiety and depression, or due to serious and very frequent failures in assistance to women in the municipalities, prioritizing assistance with the treatment of COVID-19.

In this sense, the present work proposes to carry out a survey of maternal deaths due to the Coronavirus in the municipality of Franca in the period from 2020 to 2021, in order to analyze the magnitude and causes of such deaths. It is also intended to contribute to the collection of statistical data in the municipality, in addition to promoting municipal statistics and contributing to local health management, through the proposal of measures to prevent new cases of maternal deaths.

GOALS

To study maternal deaths in the municipality of Franca - SP, between the years 2020 and 2021, resulting from Covid-19 and correlate with the following variables:

- Identification: age, marital status, race, education
- Pregnancy information: type of pregnancy (topical/ectopic; single/multiple); parity; prenatal care and number of consultations;
- Resolution of pregnancy: abortion, cesarean or vaginal delivery; gestational age;
- Time of death: during pregnancy, childbirth or puerperium;
- Study maternal deaths in the socio-educational, care and causal context;
- Identify some of the factors that intervene in the occurrence of maternal deaths and neonatal prematurity;
- Propose measures to prevent new cases of maternal deaths;

- Contribute to municipal statistics seeking improvements in health indicators.

THEORETICAL REVIEW

Covid-19 is a disease caused by the coronavirus, called SARS-CoV-2, which has a clinical spectrum ranging from asymptomatic infections to severe cases. According to the World Health Organization, the majority (about 80%) of patients with covid-19 may be asymptomatic or oligosymptomatic (few symptoms), and approximately 20% of detected cases require hospital care due to respiratory difficulties, of which approximately 5% may need ventilatory support (SEI/MS, 2021).

In Brazil, maternal deaths associated with covid-19 occur more frequently in the 3rd trimester or in the puerperium in patients who had associated preexisting comorbidities such as obesity, diabetes mellitus, autoimmune diseases, cardiovascular disease, bronchial asthma and arterial hypertension (SEI/MS, 2021).

The available literature points out that, in relation to maternal and perinatal outcomes, SARS-CoV-2 infection adds a high cesarean rate (70%), and prematurity rates can reach 47%, fetal death at 2.1 %, and perinatal death at 7.1% 18-21. Vertical transmission has been described in case reports, pointing out that it is possible, but it seems to have a low potential for mother-to-child transmission (SVS, 2020).

Thus, there is a global need to combat the pandemic caused by SARS-CoV-2, and especially in the case of pregnant women, due to the greater risk of complications that they and their babies face when infected by the virus, which can be cited as a higher probability of premature birth (WHO, 2020).

In order to guide gynecologists and obstetricians in the care of women in the pregnancy-puerperal cycle during the Covid-19 pandemic, different medical

societies and professional institutions have published guidelines for the care of pregnant patients, covering prenatal screening, pre-delivery care, intrapartum care during different stages of labor in emergency and non-emergency situations, as well as postpartum care and follow-up.

METHODOLOGY

The present study was carried out in the municipality of Franca-SP, based on the analysis of information available in the database of the Fundação Santa Casa de Misericórdia, through the Coordination of Teaching and Research, Epidemiological Surveillance and Medical Records.

Deaths of women in Franca in the period from 2020 to 2021 were included, considering women during pregnancy or up to 42 days after the end of pregnancy, regardless of the duration or location of the pregnancy. Caused by respiratory infection by the Covid-19 virus. On the other hand, those whose cause of death is not due to the coronavirus and/or are pregnant will be excluded from this research.

RESULTS AND DISCUSSIONS

According to the United Nations (UN) together with its partners, including Brazil, they are working to achieve the Sustainable Development Goals (SDGs). Among these objectives, one deserves to be highlighted when analyzing this research, since it addresses Maternal Mortality and the Maternal Mortality Ratio (MMR).

This way, the third goal of the SDGs aims to ensure a healthy life and promote well-being for everyone, at all ages. In more detail, we highlight that by 2030, reduce the global maternal mortality rate, as well as discuss the impact of the Covid-19 pandemic on MRI in Brazil (IPEA, 2022).

In view of this, the Brazilian Obstetric Observatory (OOBr) was implemented in

order to carry out an in-depth analysis to account for all maternal deaths due to Acute Respiratory Syndrome (SARS) by Covid-19, as well as to analyze them according to characteristics of the Brazilian population.

The analysis identified that in 2020, 544 deaths in pregnant and puerperal women were reported in the country, with a weekly average of 12.1 deaths, considering that the pandemic lasted for 45 epidemiological weeks in that year. Until May 26, 2021, after 20 epidemiological weeks, 911 deaths were recorded, with a weekly average of 47.9 deaths, denoting a worrying increase (Sivep-Flu, 2021).

Maternal mortality from Covid-19 shows that the system is failing from case identification to clinical management at different levels of care. Despite the disturbing number of deaths in the obstetric population, immunization for pregnant and postpartum women only started in July 2021, when more of them had already died (PAHO, 2022).

The present study was carried out in the city of Franca-SP, based on the analysis of information from the current period of the pandemic, at Hospital Santa Casa de Misericórdia de Franca, from 2020 to 2021. During this period, information was collected from patients who 12 patients required hospitalization, of which 2 (16.6%) died.

SOCIODEMOGRAPHIC CHARACTERISTICS

Initially, COVID-19 infection was not associated with worse outcomes for pregnant and postpartum women. However, it soon became clear that the risk existed in the Brazilian obstetric population, especially for women with associated health conditions or social vulnerability factors (Andreucci; 2012).

According to the data collected, in October 2022, after combining the 2020, 2021 and 2022 SIVEP-Flu bases, there were 2,119,502 cases of

SARS due to Covid-19, of which 23,455 cases were in pregnant and puerperal women in the territory Brazilian. (UN, 2022).

The geographical distribution of pregnant women hospitalized for SARS and confirmed Covid-19, by region of residence in descending order, is as follows: Southeast (885 cases), Northeast (744 cases), North (312 cases), Midwest (163 cases), and South (152 cases). Deaths were reported in the following regions, in descending order: Northeast (52 deaths), Southeast (49 deaths), North (23 deaths), Midwest (10 deaths) and South (1 death) (OPAS, 2022).

According to PAHO, most deaths from Covid-19 among pregnant women were reported for women between 30 and 39 years of age, followed by the 20-29 age group.

When analyzing only the state of São Paulo, according to OBBR, of the patients who were diagnosed, 65.3% were aged between 20-34 years, followed by 39.5% greater than or equal to 35 years, finally, 5, 1% were under 20 years old. Most of the patients who died, 58.3%, were between 20 and 34 years old. Contrasting, in the current research, Table 1, it is noted that in most cases, five (41.6%) were between 20 and 29 years old. Followed by the age group between 30 and 39 years old with a record of six (50%) of the cases, these two evolved with death.

Analyzing the national OBBR data, among those who were diagnosed with Covid-19 and died, it is noted that about 40% were considered brown, 35% were white, followed by a smaller percentage by black, yellow and indigenous. On the other hand, a study carried out in the United Kingdom with 427 hospitalized patients, 233 were black or from another minority ethnic group.

At the state level, there was little disagreement in relation to the diagnosis, prioritizing white women (56.4%) followed by brown women (23.5%), however, when

analyzing those who evolved to death, white women predominated (55%).

In the municipality analyzed, according to Table 2, it shows that among the hospitalized women, five (41.6%) were considered white, another five (41.6%) were brown, of which two died. Furthermore, the other two (16.6%) data were ignored, going against the state level.

When analyzing the patients' education, according to Serra; 2021, 48% attended high school, followed by 28.2% higher education, 23.7% high school and 1.4% no schooling. On the other hand, the patients in the current study, Table 3, showed similarity between complete secondary and elementary education, 33.3% each, and those who died had completed secondary education. Then Incomplete Higher Education and technical education with 25% and 8.3% simultaneously.

When analyzing the data from Brazil and the State of São Paulo, from OBBR, the data agree with the current research, with the majority of those who attended High School, followed by those who attended Higher Education. Among the patients who died, 25.9% were those who attended high school and, in second place, 9.6% elementary school. In the state of São Paulo, it maintained the same ratio.

According to Table 4, the marital status of the patients stands out, it is noted that eight (66.6%) were in a stable relationship, and one evolved to death. Furthermore, two (16.6%) were single, one was married and, finally, the other death was related to a divorced woman. In addition, according to table 5, of the diagnosed patients, two (16.6%) did not come from the municipality studied. Coincidentally, it was these patients who died.

Age	Death	No death	Total
20 - 29 years	-	5	5 (41,6%)
30 - 39 years	2	4	6 (50%)
40 - 49 years	0	1	1(8,3%)
Total	2(16,6%)	10(66,6%)	12(100%)

Table 1: Age range of patients hospitalized due to Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researcher.

Race/Color	Death	No death	Total
White	-	5	5 (41,6%)
Brown	2	3	5 (41,6%)
Ignored	0	2	2 (16,6%)
Total	2(16,6%)	10(66,6%)	12(100%)

Table 2: Color/race ratio of patients hospitalized due to Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researchers.

Education	Death	No death	Total
Complete Elementary School	-	4	4 (33,3%)
Incomplete High School	-	1	1 (8,3%)
Complete High School	2	1	3 (25%)
Technician Level	-	1	1 (8,3%)
Incomplete University Level	-	3	3 (25%)
Total	2(16,6%)	10(66,6%)	12(100%)

Table 3: Ratio of education of hospitalized patients who died due to the Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researchers.

Marital status	Death	No death	Total
Single	-	2	2
Married	-	1	1
Stable union	1	7	8
Divorced	1	-	1
Total	2(16,6%)	10(66,6%)	12(100%)

Table 4: List of marital status of hospitalized patients who died due to the Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researchers.

City	Death	No death	Total
Franca	-	5	5(41,6%)
Other places	2	5	7(58,3%)
Total	2(16,6%)	10(83,3%)	12(100%)

Table 5: List of origin of hospitalized patients who died due to the Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researcher

OBSTETRIC CHARACTERISTICS

According to the Ministry of Health, it is important to describe the gestational period according to the week of gestation, characterizing the first trimester from zero to 13 weeks, the second from 14 to 26 weeks and the third trimester from 27 to 40 weeks. With this, it was possible to relate the time of death of the 20 cases analyzed, whether during pregnancy, childbirth or in the puerperium (BRAZIL, 2014).

In addition, Zugaib (2016, p. 558) explains that “abortion is characterized by the termination of pregnancy before 20 to 22 weeks or the expulsion of a conceptus weighing less than 500 grams, which can be classified as spontaneous or provoked. It is considered that 10 to 15% of pregnancies end spontaneously in the first trimester or at the beginning of the second”.

During the research with 12 patients, it is necessary to observe Table 7, whose information refers to the gestational age and the moment of diagnosis, as well as the

resolution of the pregnancy. Of the patients who were diagnosed with Covid-19 during pregnancy, 10 (83.3%) stood out, half were in the second and the rest in the third trimester.

Analyzing only the patients, whose gestational age corresponded to the second trimester, two (16.6%) had an outcome at term. Only one evolved with resolution of the extreme preterm pregnancy, between 27 and 28 weeks through cesarean delivery. Another evolved with abortion at 18 weeks and two days, and underwent a uterine curettage process. Finally, in the missing case, there was no information on the resolution of the pregnancy.

Discussing the patients in the third trimester, four (33.3%) had their pregnancies resolved in the preterm period, between 30 and 36 weeks and five days. Of these patients, two died and underwent cesarean delivery. On the other hand, only one resolved the term.

According to Zugaib (2016, p.450) “the puerperium is characterized as the postpartum period, it begins after delivery and extends to six full weeks after delivery. It can be divided into the following periods: Immediate: until the end of the second hour after delivery; Mediate: from the beginning of the third hour to the end of the tenth day after birth; Late: from the beginning of the 11th day until the return of menses, or six to eight weeks in lactating women”.

Exploring the data from the current survey, it was observed that only two patients were diagnosed with Covid-19 during the puerperal period, one immediately and the other late. The first presented a clinical picture of postpartum Eclampsia associated with Hemorrhagic Stroke, the other presented a less complex outcome, late puerperium of a twin pregnancy.

It is observed in the group of pregnant women who develop the Covid-19 infection high rates of preterm birth and cesarean

section (Ellington et al. 2020). Prematurity and cesarean rates range from 30% to 80% (Ellington et al. 2020, Knight et al. 2020)

When analyzing OBBR data, both at national and state level, a prevalence of patients diagnosed in the third trimester was observed, followed by other trimesters and finally puerperal women. Brazil were the patients in the third trimester followed by puerperal women. In the state of São Paulo, the majority were deaths in postpartum women.

Therefore, it was possible to observe that the data from the current survey are in line with the others, since most women were diagnosed with Covid-19 during the third trimester. However, they differ when it comes to deaths, since, in the current municipality, there were no deaths in the puerperium.

Moment of diagnosis	In gestation			Total
	1° Quarter	2° Quarter	3° Quarter	
Resolution Covid				
Abortion	-	1	-	1
Pre-term	-	1	2	3
Term	-	-	-	-
Total	-	2	2	4
Resolution Other causes				
Abortion	-	1	-	-
Pre-term	-	1	1	5
Term	-	-	2	5
Total	-	4	5	9
	2	-	-	-
Immediate (up to 2 hours after)	1	-	-	-
Immediate (3rd to 10th day)	-	-	-	-
Late (11th to 42 days)	1	-	-	-
Total	2	-	-	2

Table 9: Time of diagnosis of hospitalized patients who died due to the Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researcher

PARITY

Considering the obstetric antecedents, it is necessary to conceptualize, according to Zugaib (2016), that parity represents the total number of pregnancies and the discrimination among them of which evolved to childbirth. Montenegro; Rezende Filho (2013) clarifies some terms used, such as: primiparous, being the woman who conceives for the first time, and multiparous, representing the one who carried many pregnancies, which can be used secundi, terci or quartigesta. In relation to childbirth, a primiparous woman is defined as someone who has been pregnant for more than 20 weeks or who has given birth only once, and for those who have had two or more pregnancies per delivery, premature or full-term, the term multiparous is used. Zugaib (2016) adds that the great multipara is the woman who has had more than five pregnancies with more than 20 weeks of evolution.

Based on these concepts and analyzing the history of the 12 patients who were diagnosed with Covid-19 and who required hospitalization. Table 8 shows that nine patients, 75%, were multiparous, of which one died. The others, three, were primiparous, one of which died.

Therefore, it is important to highlight the need to improve care during, not only the pregnancy cycle, but also family planning, in order to reduce morbidity and mortality.

Parity	Death	No death	Total
Primiparous	1	2	3(25%)
Multiparous	1	8	9(75%)
Total	2(16,6%)	10(83,3%)	12(100%)

Table 8: Parity ratio of hospitalized patients who died due to the Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researcher

PLACE OF INTERNATION

The literature has shown unfavorable maternal and neonatal outcomes in the presence of moderate and severe Covid-19. Pregnant women infected with SARS-CoV-2 are more likely to be hospitalized, admitted to an intensive care unit and mechanically ventilated (Ellington et al. 2020). It is possible that pregnancy changes affect the immune response, however it is still not certain.

When describing the data for the Brazilian nation and for the state of São Paulo, we noticed similarity in the information, since most of the patients required hospitalization and died, an average of 96%, and of these more or less 70% were in a unit bed. Intensive Treatment.

Going against these data, it is noted that in the current research, of the 12 patients evaluated, 75% required hospitalization in the intensive care unit, of which the two died. On the other hand, only one was in an infirmary bed.

Place of internation	Death	No death	Total
Infirmary	-	1	1(8,3%)
ICU	2	7	9(75%)
Infirmary/ ICU	-	2	2(16,6%)
Total	2(16,6%)	10(83,3%)	12(100%)

Table 8: List of hospitalized patients who died due to the Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researcher

CHARACTERISTICS OF MORBIMORTALITIES

Epidemiological surveillance in Brazil has reported cases of maternal deaths resulting from cardiopulmonary complications or multiple organ failure related to Covid-19. The main comorbidities associated with mortality were obesity, diabetes and cardiovascular disease, similarly to the general population.

(MINISTRY OF HEALTH, 2020).

Studies carried out in Mexico, according to PAHO, highlight that the most frequent comorbidities identified among deaths were obesity (17.9%), diabetes (10.4%), hypertension (7.6%) and asthma (4.7%).

When we analyzed some of the pathologies that the patients had, we noticed that, according to the OBBr data, nationwide, 6.4% had diabetes, 5.7% had heart disease, 5.6% were obese, 3.2% had asthma, 0.9% immunosuppression and 0.6% pneumopathies. Of those who died, 10% had heart disease and diabetes.

Data from the state of São Paulo do not differ from the previous ones, since, 7.7% diabetic, 6.3% with heart disease, 3.8% with asthma, 0.8% with lung disease, 1.0% with immunosuppression. Of those who died, 12% had heart disease and diabetes. When evaluating the city of Franca, it is noted that the comorbidities that stood out were hypertensive diseases, diabetes mellitus and obesity.

Comorbidities	Death	No Death	Total
Hypertensive Syndrome	1	1	2(16,6%)
Gestational diabetes	-	1	1(8,3%)
Obesity	-	2	2(16,6%)
Without Information	1	6	7(58,3%)
Total	2(16,6%)	10(83,3%)	12(100%)

Table 8: List of comorbidities by hospitalized patients who died due to the Coronavirus in the city of Franca-SP between 2020-2021

Source: Prepared by the researcher

FINAL CONSIDERATIONS

In this research, it is possible to highlight some difficulties during the analysis of the medical records, since there was not much information about the symptoms, their onset, as well as their duration and severity. Another

point to be highlighted is the difficulty of collecting data, especially for private services. The work data were only from the public service, and only from patients who need hospitalization, either in a ward or intensive care unit bed.

When analyzing the death certificates, we noticed that some patients, in particular, those who died, were not residents of the city of Franca, therefore, they were not included in the maternal mortality indicators.

Finally, some items deserve to be highlighted and serve as ways of protocoling the care and care for the pregnant woman from the prenatal consultation, as well as her follow-up. Therefore, health professionals must be aware of the early diagnosis of Covid-19, considering them as a risk group for the development of serious or fatal forms, especially from the 3rd trimester of pregnancy and in the presence of pre-existing diseases.

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