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DEATH RISK FACTORS IN PARTURIENTS INFECTED BY SARS-COV-2

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ARTICLE INFO

ABSTRACT

Objective: To investigate the existence of a relationship between the risk of death of newborns and pregnant women infected with SARS-CoV-2. **Material**: Medical records of patients admitted to José Pedro Bezerra Hospital, in the city of Natal-RN, Brazil, from January 2020 to December 2021, totalizing 6,353 deliveries, of which 2725 were vaginal deliveries and 3628 were cesarean deliveries. **Method:** Review of medical records to collect data on gestational age, risk of death in infected parturients with SARS-CoV-2and relationship of severity of infection depending on blood group. **Results**: With regard to the blood groups of the total of 135 pregnant women who had a positive RT-PCR test, 59 are from blood group "O" (43.7%), 49 are blood group "A" (36.3%), 20 from blood group "B" (14.8%) and 7 from blood group "AB" (5.2%), an expected result since this is the incidence of blood groups in our population. Of the 35 pregnant women who went to the ICU, 14 (40%) are blood group "A" and of these,five died together with their NB. With the same prevalence (40%), patients of blood group "O" five went to the ICU, all of them survived and of these three of their NB died. Of the patients of blood group "B", sixwere hospitalized in the ICU and only one of them died together with her NB. In patients with the blood group "AB", only one patient was admitted to the ICU, but she survived as well as her newborn. **Conclusions**: The blood group of infected patients did not influence the severity of the disease; however, their comorbidities were a determining factor for the severe condition they presented.

INTRODUCTION

Since the end of December 2019, the world has faced a new health crisis, following the discovery of a new virus. This virus is a variation of a pre-existing coronavirus, called novel coronavirus (SARS-CoV-2), which causes a disease with predominantly respiratory manifestations. The first study that demonstrated some of the manifestations of this virus on humans was published in January 2020[1,2]. The World Health Organization (WHO) was informed of cases of pneumonia of unknown etiology detected in the city of Wuhan, Hubei province, China. This was subsequently recognized as an infectious disease caused by the new coronavirus (COVID-19)[3]. In Brazil, the first confirmed death was of a 57-year-old woman who was admitted to a municipal hospital in the capital of São Paulo, on

March 12[4]. Coronavirus is a zoonotic virus, an RNA virus of the order Nidovirales, of the Coronaviridae family[5]. This is a family of viruses that cause respiratory infections, which were first isolated in 1937 and described as such in 1965, due to their profile in microscopy resembling a crown[6]. Based on the study of 55,924 confirmed cases, the WHO-China Joint Mission on Coronavirus Disease 2019[7] reported as the most common signs and symptoms: fever (87.9%), dry cough (67.7%), fatigue (38.1%), sputum production (33.4%), dyspnea (18.6%). With regard to chronic symptoms, longitudinal studies conducted in post-COVID-19 cohorts have provided preliminary evidence of a high prevalence of psychiatric symptoms in the "long phase" of the illness, such as anxiety, depression, fatigue and post-traumatic stress disorder (PTSD)[8,9,10,11,12]. However, recent studies indicate that these symptoms tend to decrease in the following months[13]. As periods of social distancing have been imposed in some

parts of the world and the pandemic has evolved, people have begun to report changes in their health/mental status[14]. On January 9, 2020, the World Health Organization (WHO) confirmed the circulation of the new coronavirus. The next day, the first SARS-CoV-2 sequence was published by Chinese researchers. On January 16, the first importation into Japanese territory was notified. On January 21, the United States reported its first imported case. On January 30, the WHO declared the epidemic an international emergency (PHEIC)[15]. In Brazil, on February 7, there were 9 cases under investigation, but with no records of confirmed cases[16]. The speed of propagation of a disease can be assessed by its basic reproduction number (R0), defined as the average number of secondary cases generated per primary case. Initial R0 estimates for SARS-CoV-2 range from 1.6 to 4.1[17,18,19]. Taking as a basis for comparison, the epidemic caused by the Influenza A H1N1 virus in 2009 presented an R0 between 1.3 and 1.8 [20], showing this virus has a much higher speed of propagation than the influenza A virus. SARS-CoV-2, so far, has been mostly associated with elderly patients or with the presence of comorbidities that affect the immune system[21]. The lethality rate for this virus, estimated by the World Health Organization (WHO), is 3.4%[22], being highest in China and lowest in the rest of the world, according to data from the WHO-China joint mission[23], estimated at around 0.5 to 4% worldwide. This fatality rate is similar to that of the Spanish flu (2 to 3%)[24] and much higher than that of influenza A H1N1 (0.02%)[25] or seasonal flu (0.1%)[26.] However, 80.9% of cases of the disease are classified as mild cases[27]. Due to its global scale, the pandemic has transformed the world into a large laboratory in which different processes are being tested, such as new forms of socialization, work, education, use of masks and face shields, and medical treatments.

MATERIAL AND METHOD

Medical records were analyzed to research blood groups, comorbidities, hematological profiles, patients admitted to the ICU, the number of pregnancies, the age of patients, and as an exclusion factor, those who did not present a positive RT-PCR test were removed. The study included patients hospitalized at José Pedro Bezerra Hospital in the city of Natal-RN, Brazil, from January 2020 to December 2021, with 6,353 deliveries, of which 2,725 were vaginal deliveries and 3,628 were cesarean deliveries.

RESULTS

With regard to the blood groups of the total of 135 pregnant women who presented a positive RT-PCR test, 59 had blood group"O" (43.7%), 49 were from blood group "A" (36.3%), 20 were from blood group"B" (14.8%), and 7 were from blood group"AB" (5.2%). This distribution is consistent with the expected incidence of blood groups in our population[28,29]. Of the 35 pregnant women who were admitted to the ICU, 14 (40%) were of the "A" blood group, and of these, five died along with their newborns. Among the patients of blood group "O", five went to the ICU, all survived and of these, three of their newborns died. Of the patients with blood group "B", sixwere hospitalized in the ICU and only one of them died along with her newborn. Among the patients of the "AB" blood group, only one patient was admitted to the ICU, but her newborn also survived. It was not necessary to use blood components, as all patients had hemoglobin levels equal to or greater than 8g%. Of the patients admitted to the ICU with Covid-19, a percentage of them had comorbidities such as gestational diabetes mellitus (GDM), obesity, and pregnancy-specific hypertensive disease (PHD). Consequently, 48 of these patients gave birth to premature babies, making up 35.5% of the total, suggesting that the SARS-CoV-2 infection worsened the general condition of these patients. The age group with the highest incidence of ICU admission was 26 to 34 years old, with 17 cases, representing 12.6%. The next highest incidence was from 35 to 42 years old, with a percentage of 8.9%, followed by 16 to 25 years old, at 5.9%. Comorbidities associated with SARS-CoV-2 infection resulted in a high incidence of premature babies. In total, 11 maternal deaths were recorded, with pregnancy complicated by infection with Covid-19 as the underlying cause. The average age of these pregnant

women was 35 years old, with an age range of 21 to 42 years old. These deaths occurred in the months of May and June 2021, six in May and five in June. To investigate the relationship between blood type and the occurrence of neonatal and maternal death, Pearson's chi-square test was used, with significant values of p<0.05. There was no significant relationship in both cases, as the results were 0.689 for neonatal death and 0.090 for maternal death.

DISCUSSION

The literature has shown that the presence of moderate and severe Covid-19 leads to unfavorable maternal and neonatal outcomes. Pregnant women infected with SARS-CoV-2 are more likely to be hospitalized, admitted to an intensive care unit, and require mechanical ventilation (ELLINGTON et al., 2020). It is possible that changes in pregnancy affect the immune response, but this is not yet certain. Symptomatic pregnant women appear to be at greater risk of severe illness and death when compared to non-pregnant women. The main risk factors during pregnancy are age over 35 years, obesity, and pre-existing diseases, particularly hypertension and diabetes (KARIMI et al., 2021). These conditions, particularly severe hypoxemic respiratory failure, increase the risk of severe illness and death. In addition, pregnant women with Covid-19 may also experience difficulty breathing and decreased oxygen saturation, which may require intubation. In Brazil, the curve had a significant increase between April and July and some stability at levels, still very high, between July and November, as can be seen in charth below.

Source: Brazil..., 2021.
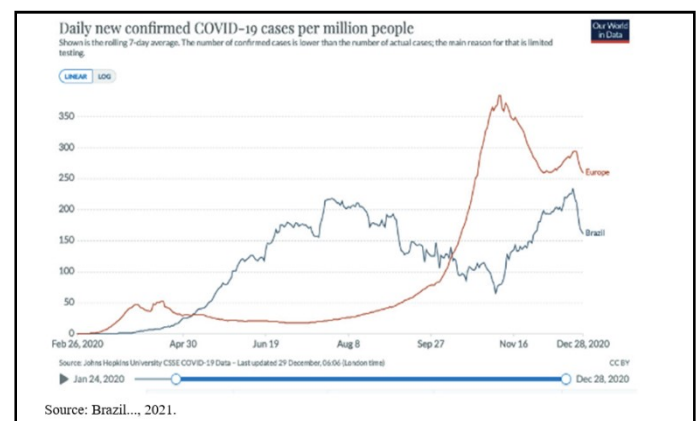
New restriction measures were taken in response to the increase in cases. On November 30, the government of the State of São Paulo, the most populous state in the country, announced new measures for the entire state, such as limiting opening hours and public capacity in bars, restaurants, gyms, shopping malls, and commerce. These strict measures would remain in effect until January 4, 2021[30]. In the wake of the pandemic, health research institutions rushed to produce vaccines. This was also the case with the Coronavirus. Pharmaceutical companies and the scientific community have come together for this purpose. In April, the World Health Organization (WHO) and the Vaccine Alliance (Gavi) launched Covax, with the aim of producing low-cost vaccines[31]. Two months later, the Ministry of Health announced an agreement between Fiocruz and the pharmaceutical company AstraZeneca for the purchase of batches and technology transfer of the Covid-19 vaccine developed jointly with the University of Oxford. Following this, with the release of the Pfizer/BioNTech vaccine and the start of immunization in countries such as the United Kingdom, USA, China, among others, Brazil acquired lots of this vaccine to be part of the National Immunization Program against Covid-19.

CONCLUSIONS

Our study found that blood group was not a significant factor in determining the severity of a patient's ICU admission. The age of the patients and the comorbidities they presented were crucial factors in

the severity of the disease associated with SARS-CoV-2 infection. It is not possible to determine from our study if the effects of SARS-CoV-2 infection would have been milder if these patients had been immunized.

Thanks: The statistics team of the epidemiology service from José Pedro Bezerra Hospital.

Conflict of interest: None.

Annexes

Number of pregnant women with COVID-19 and their relationship with the blood group admitted to the ICU, at HJPB, Natal/RN, in the period from January 2020 to December 2021
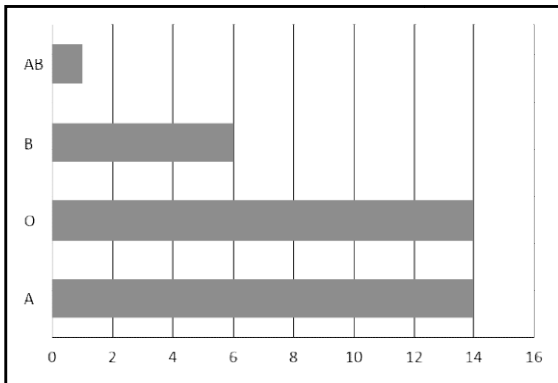
SOURCE: JOSÉ PEDRO BEZERRA HOSPITAL – SISNAC EPIDEMIOLOGY SERVICE – SMS. Number of cases of pregnant women with COVID-19 with evolution to death, in HJPB, Natal/RN, from January 2020 to December 2021
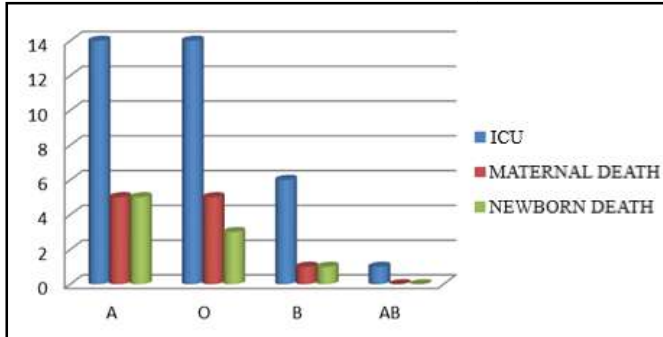

Pearson's chi-square test with significant values of p<0.05.

Blood group	Neonatal death				p
	Yes		No		
	n	%	n	%	
A	5	35,7	9	64,3	0,689
B	0	0,0	1	100	
AB	1	16,7	5	83,3	
O	3	21,4	11	78,6	
Total	9	25,7	26	74,3	

Blood group	Maternal death				p
	Yes		No		
	n	%	n	%	
A	5	35,7	9	64,3	0,090
B	0	0,0	1	100,0	
AB	1	16,7	5	83,3	
O	0	0,0	14	100,0	
Total	6	17,1	29	82,9	

Result: There was no significant relationship in both cases

Number of cases of pregnant women with COVID-19 by age group and place of hospitalization at HJPB, Natal/RN, from January 2020 to December 2021
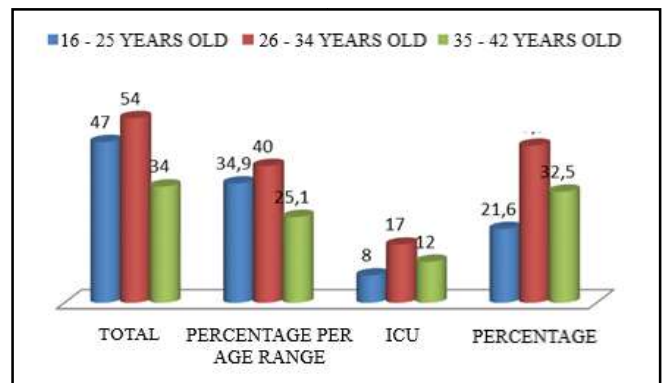
SOURCE: JOSÉ PEDRO BEZERRA HOSPITAL – SISNAC EPIDEMIOLOGY SERVICE– SMS

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