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Original Article

Situational Descriptive Analysis of COVID-19 in Pregnant Women and Perinatal Outcomes at the Lircay Hospital, Huancavelica-Peru, from May 2020 to April 2021

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Abstract *- This situational descriptive study of COVID-19 in pregnant women aims to identify the perinatal outcomes of pregnant women who suffered from COVID-19 treated at the Lircay hospital from May 2020 to April 2021. Methodology: observational, retrospective, cross-sectional research developed on 124 pregnant women diagnosed with COVID-19. Results: Of 124 pregnant women with COVID-19, 65% are between 20 and 34 years old, 82% are of rural origin, and 95% are housewives. 100% presented mild COVID-19. The births were preterm in 6%, term in 91%, and post-term in 3%. The births were vaginal in 85% and cesarean section in 15%. Hypertensive disorders of pregnancy were the most frequent pathology (19%). The most frequent complications observed in the fetus were hypoxia 19%, oligohydramnios (6%), and IUGR (6%); the amniotic fluid at birth was fluid green (10%) and meconium (5%). The Apgar at minute was 7 to 10 minutes in 93%, 4 to 6 in 6%, and 1% had less than 4, and at 5 minutes, 99% had an Apgar of 7 to 10. Newborn tested positive for COVID-19. Conclusion: The perinatal pregnant women with mild COVID-19 presented fetal hypoxia, fluid green amniotic fluid and meconium, a situation that suggests a compromise of fetal oxygenation and a newborn was positive for the test.*

Keywords *- COVID-19, Perinatal, Pregnant women, Fetal hypoxia, Asphyxia.*

1. Introduction

COVID-19 is an infection, which is why it requires knowledge in all areas, and we must be at the forefront of the effects that SARS-CoV2 causes in the mother, in the perinatal period and the following offspring.

In this context, it is essential to provide pregnant women with clear and accurate information regarding the risks associated with the pandemic and the preventive measures that hospitals and pregnant women should take. However, due to the pathophysiology of the infection, it is possible that it compromises the newborn's fetal well-being.

The pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) has been growing at an accelerated rate, in this sense, the World Health Organization (WHO) provides daily updates on the figures of confirmed cases and deaths from COVID-19, with a total of 67,009,600 confirmed cases in the American continent as of the first quarter of 2021, of which Peru has 1,965,432 accumulated confirmed cases [1]. On the other hand, the Pan American Health Organization on January 15th, 2021, reported that Peru is the first country in Latin America with the most pregnant women diagnosed with COVID-19, being Lima the region with the most cases, followed by Piura, La Libertad and Cajamarca [2].

The main way this virus is transmitted is through contact with respiratory droplets produced by an infected person, where its clinical manifestations range from asymptomatic cases and mild infection of the upper respiratory tract to severe and fatal cases with pneumonia and acute respiratory failure [3]. That is why public health measures were taken to control and prevent infection, such as compliance with universal precautions, quarantine, and timely diagnosis.

On the other hand, it is known that physiological and anatomical changes occur during pregnancy; therefore, any

change in the body of a pregnant woman will affect the growth and development of the fetus. Pregnant women are particularly vulnerable to respiratory pathogens and severe pneumonia due to changes in their bodies, such as altered T cells, increased oxygen consumption, decreased functional residual capacity, and decreased chest compliance [4]. Thus, Chen[5], in his research, reports that pregnant women with pneumonia have a significantly higher risk of cesarean and premature births, small-for-gestational-age newborns, low Apgar scores, and a higher frequency of preeclampsia/eclampsia at comparison with uninfected pregnant women.

Previous studies have shown that SARS during pregnancy is associated with a high incidence of adverse maternal and neonatal complications, such as spontaneous abortion, preterm birth, intrauterine growth restriction, application of endotracheal intubation, admission to the intensive care unit, renal failure and Disseminated Intravascular Coagulation (DIC) [6].

However, COVID-19 infection causes lung injury in pregnant women, which will accelerate the onset of respiratory distress and lead to maternal hypoxemia, leading to inadequate blood and oxygen supply to the placenta, thus having adverse outcomes. On the other hand, a report from the Center for Disease Control noted that pregnant women were more likely to receive intensive care compared to non-pregnant patients [7, 8].

The influence of SARS-CoV2 infection in pregnant women is still under investigation through clinical observations and data collection, considering that SARS-CoV2 shares the same infection pathway and receptor as SARS-CoV and is more infectious than SARS-CoV. Likewise, it was found in 2 systematic reviews of 252 and 538 pregnant women with COVID-19 that 15% - 20% had premature births and 70% - 85% were cesarean births [9], [10]. Therefore, the influence of COVID-19 on pregnant women and their fetuses should not be ignored, as it may indirectly affect pregnancy outcomes.

The main gap is that pregnant women are particularly vulnerable to respiratory pathogens and severe pneumonia due to physiological and immunological changes. It is known that SARS-CoV-2, SARS-CoV and MERS-CoV are all β-coronaviruses, and their genomes, pathogenesis and clinical symptoms have certain similarities; in this sense, the present research work is conducted with the aim of predicting the impact of SARS-CoV-2 on pregnant women and fetuses. This study aims to analyze the perinatal outcomes of pregnant women with mild COVID-19 treated at Lircay Hospital during a specific period. The research seeks to identify complications and the status of newborns affected by the disease.

On the other hand, from a practical point of view, this research will provide us with the necessary information to care for newborns in the era of the SARS-CoV-2 pandemic since it is necessary for health personnel to anticipate the possible results of the newborns of mothers with COVID-19, to take timely measures. However, the results will allow obstetricians and neonatologists to establish a reasonable monitoring program as soon as possible to reduce the incidence of adverse pregnancy outcomes and neonatal complications.

Thorough knowledge of the effects of infection on the maternal perinatal binomial will help us anticipate preserving health and provide adequate clinical care. Based on this, we make available the results of this investigation.

2. Literature Review

Few studies are observed on the subject; it requires a further review that leads us to know the effects to guide our attention in its prevention since the COVID-19 disease will accompany us for a few more years.

Liu et al. [8] the concern of COVID-19 mothers was aimed at investigating the clinical characteristics of newborns of mothers infected with SARS-CoV-2 and increasing current knowledge about the perinatal consequences of COVID-19; its population was made up of 19 newborns of mothers diagnosed with COVID-19. Among the results, they found no fetal distress, the gestational age of the newborns was 38.6 ± 1.5 weeks, and the average weight at birth was 3293 ± 425 g. Regarding the RT-PCR of SARS-CoV-2 in throat swabs, urine and feces of all newborns were negative; likewise, the RT-PCR of SARS-CoV-2 in breast milk and amniotic fluid was also negative. They concluded that no vertical transmission of SARS-CoV-2 or perinatal complications were found in the third trimester.

Oncel et al. [9] on vertical transmission of COVID19 was aimed to evaluate the epidemiological and clinical characteristics of newborns of women infected with COVID-19. In this multicenter cohort study, its population consisted of 125 pregnant women with a positive RT-PCR test and their newborns. They found that the rates of caesarean section, prematurity, and low birth weight infants were 71.2%, 26.4%, and 12.8%, respectively. On the other hand, 6.4% of pregnant women were admitted to an intensive care unit for mechanical ventilation, of whom 4.8% died. Likewise, 3.3% of newborns had a positive result in the RT-PCR test. They concluded that COVID-19 in pregnant women has important impacts on perinatal and neonatal outcomes.

Yan, et al. [10]. It aimed to evaluate the clinical characteristics and outcomes in pregnancy and the potential for vertical transmission of severe acute respiratory syndrome coronavirus 2 infection. In this retrospective study, its sample consisted of 116 pregnant women with COVID-19. They found that the median gestational age at admission was 38 +0 (interquartile range, 36 +0 -39 +1) weeks, and of the 116 cases, there were 8 cases (6.9%) of severe pneumonia but no maternal deaths. They also found that 1 of 8 patients presenting in the first and early second trimesters had a miscarriage. They also

found that the rate of spontaneous preterm birth before 37 weeks of gestation was 6.1% (6/99). On the other hand, 86 of the 100 newborns tested for COVID-19 had negative results. They concluded that COVID-19 does not increase abortion/preterm delivery or vertical transmission.

As in the previous case, Zhu et al. [11]. It aimed to identify the clinical characteristics and outcomes of 10 newborns (including 2 twins) born to 9 mothers with confirmed infection by 2019-nCoV in 5 hospitals from January 20th to February 5th, 2020, a retrospective study. They found that the initial symptoms were fever and cough; they also found that there were some prenatal complications that included prematurity (5 to 7 hours before the onset of true labor), intrauterine distress (n = 6), abnormal amniotic fluid (n = 2), ruptured membranes (n = 3), abnormal umbilical cord (n = 2), and abnormal placenta (previous placenta) (n = 1). They also found that among these 10 newborns, only four were term babies; the other six were premature babies; one was a large-for-gestational-age (LGA) baby, while two were small-for-gestational-age (SGA). Likewise, they found that the symptoms of the newborns were difficulty breathing (n = 6), digestive tract symptoms (n = 4), fever (n = 2), abnormal liver enzymes accompanied by thrombocytopenia (n = 2), neonatal respiratory distress syndrome (NRDS) (n = 2), increased heart rate (n = 1), and vomiting (n = 1). On the other hand, they collected throat swab samples from 1 to 9 days after birth from nine of the 10 newborns, none of whom were positive for SARS-CoV-2.

In Perú, Lizana, et al [12]. Its objective was to describe the prenatal clinical characteristics and postnatal of newborns born to mothers with COVID-19 and follow up to 14 days post-discharge. In this observational study, its population consisted of 206 newborns. They found that 4 neonates had positive nasopharyngeal PCR and 202 negatives; they also found that most were born abdominally (65.53%), gestational age was 38.06 ± 1.85 weeks, and 12.14% were premature, of which none of the neonates with positive nasopharyngeal PCR, on the other hand, 90.29% had adequate birth weight.

Likewise, 99.51% of neonates were discharged in the first week of life. As for the newborns with positive PCR, breastfeeding was mixed, while in the group with negative nasopharyngeal PCR, 95.58% received mixed breastfeeding, 2.76% artificial feeding and 1.66% breastfeeding. They concluded that the newborns of COVID-19-positive mothers have a low risk of infection. Prenatal/postnatal development is unaffected.

3. Conceptual Basics

The origin of this new virus occurred in December 2019 in the city of Wuhan, Hubei province, China [13]. The WHO officially named this virus as the new COVID-19, while the International Committee on Taxonomy of Viruses (ICTV) named it SARS-Cov-2 [14], [15], being declared a public health emergency on January 30, 2020 [16].

In Peru, through Supreme Decree N° 0044-2020-PCM, a state of national emergency was decreed on March 15th, 2020 [17].

3.1. Coronavirus Classification

Coronaviruses belong to the genus Coronavirus in the family Coronaviridae, with the largest group of viruses belonging to the order Nidovirales, which includes the families Coronaviridae, Arteriviridae, Mesoniviridae, and Roniviridae. CoVs are genotypically and serologically divided into four subfamilies: α, β, γ, and δ-CoVs, of which SARS coronavirus (SARS-CoV) and MERS coronavirus (MERS-CoV) are members of the β- CoV [18, 19].

3.2. Variants

In the United Kingdom (UK), a variant called B.1.1.7 has appeared; this variant spreads more easily and quickly than the other variants. It was first detected in September 2020 and is now highly prevalent in London and Southeast England. Since then, it has been detected in many countries around the world, including Peru [20].

Likewise, another variant called 1351 has appeared in South Africa, independently of the variant detected in the UK. This variant, originally detected in early October, shares some mutations with the variant detected in the UK. Cases caused by this variant have been reported outside of South Africa [20].

On the other hand, a variant called P.1 appeared in Brazil. This variant contains a series of additional mutations that could affect its ability to be recognized by antibodies, and it is currently found in Peru [21].

3.3. Pathophysiology

Once the virus has entered the body, its specific mission is to replicate within the respiratory tract, specifically in the alveoli, reproducing and damaging their cells. To do this, It finds the angiotensin-converting enzyme 2 (ACE-2) receptor, which is present on the surface of type 2 pneumocytes in the respiratory tract. Once bound, the virus begins to reproduce and damage the cells of the alveoli. The virus enters the cytoplasm, and the genomic RNA replicates, using ORFs 1a and 1b to produce polyproteins. These are cleaved into the virus replicase, which uses genomic RNA as a template to create a complete complementary molecule. It then uses it to synthesize genome copies for the virus's progeny. This process leads to the virus replicating and spreading throughout the body. COVID-19 symptoms result from immune system activation, causing inflammation, fever, and cough. [19].

3.4. Source of Infection

The main source of infection is droplets from the respiratory tract of COVID-19 patients, causing five different outcomes: asymptomatically infected people, mild to medium cases, severe cases, critical cases, and death [22], with a mean incubation period of 5.2 days. COVID-19 is transmitted through droplets generated

during coughs and sneezes by symptomatic patients. However, it also occurs in asymptomatic people [23].

Reports indicate that COVID-19 can be detected in the urine and feces of confirmed patients by the laboratory, implying a risk of fecal-oral transmission [18]. On the other hand, there is currently no evidence of vertical transmission in pregnant women who develop COVID-19 at the end of pregnancy [24]. Among the most common symptoms of COVID-19 are a dry cough, fever, myalgia, or fatigue, while the less common ones are diarrhea, headache, and loss of sense of smell or taste. Likewise, serious symptoms include difficulty breathing or a feeling of shortness of breath and pain or pressure in the chest [25], [26].

3.5. Diagnosis

Specific diagnosis is by molecular testing on respiratory specimens (throat swab / nasopharyngeal swab/sputum / endotracheal aspirates and bronchoalveolar lavage) [27].

3.5.1. Nucleic Acid Test

Nucleic acid detection kits have been developed, the main concern with these tests being false negatives [18].

3.5.2. Serological Diagnosis

Patients with SARS-CoV-2 infection have been shown to have acute serological responses [18].

3.5.3. Imaging Technology

Chest radiography or CT is an important tool for diagnosing COVID-19 in clinical practice, where the main characteristic of patients with COVID-19 is the bilateral distribution of irregular shadows and ground glass opacity [28].

On the other hand, for the diagnosis of COVID-19, the case definitions are based on the current information available.

3.5.4. Suspected Case (A, B or C)

A: is any person who meets the clinical criteria (sudden appearance of three or more signs and symptoms: fever, cough, fatigue, headache, myalgia, sore throat, nasal cold, dyspnea, anorexia, nausea, vomiting, diarrhea and mental status altered) and epidemiological criteria (having lived or worked in an environment at high risk of transmission of the virus, in an area where there is community transmission or having traveled to it; and finally, having worked in a health care setting).

B: Patient with severe acute respiratory disease (with a history of fever and cough starting in the last 10 days and requiring hospitalization).

C: Asymptomatic individual who does not meet the epidemiological criteria and has tested positive in a rapid antigen detection test for SARS-CoV-2 [29].

3.5.5. Probable Case (A, B, C or D)

A: Patient who meets the clinical criteria mentioned above and is a contact of a probable or confirmed case.

B: Suspected case with signs indicative of COVID-19 in diagnostic images of the chest.

C: Person with anosmia or ageusia of recent onset in the absence of another identified cause.

D: Death, with no other known cause, in an adult who presented respiratory distress before death and was in contact with a probable or confirmed case [29].

3.5.6. Confirmed Case (A, B or C)

A: Individual who has tested positive in a SARS-CoV-2 nucleic acid amplification test.

B: Individual who has tested positive in a rapid antigen detection test for SARS-CoV-2 and who meets option A or option B of the probable case definition or the suspected case definition.

C: Asymptomatic individual who has tested positive in a rapid antigen detection test for SARS-CoV-2 and is a contact of a probable or confirmed case [29].

3.6. Treatment

Standard care comprises isolation and prevention measures, supportive care for symptoms and complications, and advanced organ support in patients with severe disease [26].

Supportive care includes oxygen therapy, conservative fluid administration, management of complications according to what each patient develops, empiric antimicrobial drugs, antipyretics/analgesics, and mechanical ventilation [30].

On the other hand, empirical antibiotics should be administered based on local epidemiology common pathogens and discontinued after laboratory testing, and antipyretics/analgesics should be prescribed as needed for pain and fever and should not be administered routinely [30].

In our country, the specific treatment for COVID-19 consists of: Chloroquine, Hydroxychloroquine, Azithromycin, Lopinavir/ritonavir, among others, according to the following scheme:

- Chloroquine phosphate 500 mg every 12 hours for 7-10 days, orally.
- Hydroxychloroquine 200 mg every 8 hours for 7-10 days, orally.
- Hydroxychloroquine 200 mg every 8 hours for 7-10 days, orally + Azithromycin 500 mg the first day, then 250 mg every 24 hours for 5 days, orally [31].

The administration of antibiotics is indicated in the event of a concomitant bacterial infection; according to the patterns of resistance and microbial susceptibility administered, antivirals are administered if an influenza

infection is suspected, and to avoid using non-steroidal anti-inflammatory drugs are used. On the other hand, the routine use of corticosteroids is not recommended [31].

3.7. Vaccine

The first mass vaccination program was launched in early 2020, and as of February 15th, 2021, 175.3 million doses have already been administered. COVID-19 vaccines use different methods to teach the immune system to block the virus. These include inactivated/attenuated viruses, protein-based, viral vectors, and RNA/DNA vaccines. All generate a safe immune response by mimicking the virus or producing coronavirus proteins without causing disease. [32].

3.8. Prevention

The WHO and other organizations have established the following general guidelines: maintain physical distance, wear masks, ventilate rooms well, avoid crowds, wash hands, cover mouth and nose when coughing, and frequently clean and disinfect surfaces. Likewise, it gives us recommendations on how to reinforce the security of our environment, avoiding the 3 "C" (closed, congested spaces and close contacts) [29].

At the national level, preventive measures were taken, such as the closure of borders, the inviolability of the home, freedom of movement, freedom of work, business, commerce, and industry, as well as the exercise of the right of assembly [17].

On the other hand, the Ministry of Health indicates the following prevention measures in the community: social distancing, frequent hand washing with soap and water or an alcohol-based lotion, practicing respiratory hygiene and cough etiquette, the mandatory use of a mask to circulate on public roads (the use of N95 respirator or equivalent is not recommended for the community, only for health personnel), pneumococcal and influenza vaccination in the population with risk factors [33].

3.9. Covid-19 and Pregnancy Physiological Susceptibility

3.9.1. Cardiorespiratory System

Pregnancy increases infection risk and may delay diagnosis. Rhinitis in late pregnancy can mask COVID-19 symptoms, leading to transmission. Physiologic dyspnea must be distinguished from pathologic dyspnea. [34]. However, lung volumes are altered: functional residual capacity, end-expiratory volumes, and residual volumes decrease steadily from early pregnancy due to splinting of the diaphragm by the gravid uterus [45], resulting in a reduced total lung capacity at term and an inability to clear pulmonary secretions effectively [35].

This is pertinent as COVID-19 pneumonia progresses rapidly from focal to diffuse bilateral consolidation of the lung parenchyma, which, in the context of the pulmonary changes described above, would more readily predispose to hypoxemic respiratory failure during pregnancy [36].

3.10. Immune System

Cytokines produced by T-helper (Th) lymphocytes regulate immunity and inflammation. Th1-type cytokines are microbicidal and proinflammatory and include interferon-γ (IFN-γ), interleukin (IL)-1α, IL-1β, IL-6, and IL-12. In contrast, Th2-type cytokines are anti-inflammatory and include IL-4, IL-10, IL-13, and transforming growth factor-β (TGF-β) [37]. In pregnancy, attenuation of cell-mediated immunity by Th1 cells due to the physiological shift to a Th 2-dominant environment contributes to overall infectious morbidity by increasing maternal susceptibility to intracellular pathogens such as viruses.

COVID-19 patients demonstrated activation of Th1 and Th2 immunity during similar periods in the course of the disease, culminating in the presence of IFN-γ and IL-1β in addition to IL-4 and IL-10. Furthermore, elevated levels of IL-6 (a predominantly Th1 response) are associated with a significantly increased risk of mortality in COVID-19 patients [24], [38].

Influenza-related pathology is increased during pregnancy through increased pulmonary expression of IL-6, IL-1α, and Granulocyte Colony-Stimulating Factor (G-CSF) and increased lung physiological stress influenced by changes in prostaglandin and progesterone levels. However, in COVID-19, various immune responses have been described, and early adaptive immune responses may predict milder disease severity [38], [39].

3.11. Complications

So far, the results of COVID-19 for the mother look more promising compared to those of SARS and MERS. Pooled data reveal a case fatality rate of 0%, 18%, and 25% for COVID-19, SARS, and MERS, respectively [40], within the fetal complications of COVID-19 include miscarriage, intrauterine growth restriction in some cases and premature birth; on the other hand, cohort studies in patients with other infections have not shown an increased risk of congenital anomalies due to maternal pyrexia in the first trimester [41]. On the other hand, there have been no confirmed cases of vertical transmission.

Newborns are usually not affected by maternal COVID-19. Few infected have mild symptoms. Prevention of infection requires understanding that transmission and breastfeeding benefits outweigh the risks, and direct breastfeeding is important for the newborn microbiome. Alternative feeding is not always necessary [43].

4. Materials and Methods

The research type was observational, descriptive, and prospective; since the information was collected from May 2020 to April 2021, it is longitudinal because the data was taken in a certain period of time [44], [48]. As is typical of this level, we refer only to observing how the event unfolded, in this case, the situational analysis of pregnant women during the COVID-19 pandemic [42] and the respective perinatal results.

Table 1. Operationalization of variable

Conceptual Definition	Conceptual Definition	Dimensions	Indicators	Item	Type of Variable
These are the features and complications that we can see at the fetal level and in the newborn whose mothers suffered from COVID-19.	Characteristics of the perinatal, whose mothers suffered from COVID-19 during pregnancy, refer to the development and health of the fetus, state at birth and characteristics of the newborn.	Sociodemographic characteristics	Age	Age in years	Numerical
			Place of origin	Rural-urban	Categorical nominal
			Occupation	a.- Housewife b.- Independent c.- Unemployed d.- Public employee f.- Student g.- Others	Categorical nominal
		Diagnosis of COVID-19	Grade of COVID-19	Mild, Moderate, Severe	Categorical Ordinal
			Ventilation	To the environment. With oxygen	Categorical nominal
			Gestational Age	Gestational age in weeks at which COVID-19 was diagnosed	Numerical
		Obstetric characteristics	Main pathologies that presented during pregnancy	Diabetes hypertensive disorders Respiratory diseases Heart diseases Kidney diseases HIV/AIDS Pregestational obesity Others:	Categorical nominal
			End of pregnancy	Gestational age in weeks in which the pregnancy ended	Numerical
			Type of term	Abortion, preterm birth birth at term, Post-term birth	Categorical nominal
			Birth Route	Caesarean section Vaginal	Categorical nominal
		Fetal characteristics	Diagnosed fetal pathologies	Fetal hypoxia (SFA or CFS) IUGR Oligohydramnios Indeterminate or ominous (pathological) biophysical profile Pathologic, nonreactive NST CST positive, suspicious IPM category II, III.	Categorical nominal
		Characteristics of the newborn	State at birth	Apgar per minute…… Apgar at five minutes……	Numerical
			Amniotic fluid	Clear, Meconium Green, Fluid Green, Bloody	

Table 2. Sociodemographic characteristics of pregnant women who suffered from COVID-19 served at lircay hospital from may 2020 to april 2021

Sociodemographic Characteristics	Pregnant Women	
	N=124	%
Year		
20 – 34	81	65
15 – 19	22	18
35 – 47	21	17
Origin		
Rural	102	82
Urban	22	18
Occupation		
Housewife	118	95
Student	2	2
Public Employee	2	2
Independent	2	2

The research is observational and retrospective cross-sectional because we refer to observing the variable without any intervention, using secondary sources, and taking it at a single moment. The level of research is descriptive. It was a simple descriptive design [44].

The design responds to the following scheme: M O
Where:

M = sample; made up of pregnant women diagnosed with COVID-19

O = Observation; perinatal outcomes.

The population consisted of all pregnant women with COVID-19 and their newborns, treated at the Lircay hospital from May 2020 to April 2021. Our sampling was carried out using census sampling. The document review and analysis form was used as an instrument for data collection, and the technique used was documentary review.

Microsoft Office Excel 2010 spreadsheet was used for data processing and analysis. Descriptive statistics were used.

In Table 2, a greater number of pregnant women is observed in the group of 20 to 34 years old, 65%, followed by adolescents at 18% and between 35 to 47 years old at 17%; most of them come from rural areas 82%, 95% are housewives.

Table 3. Grade of COVID-19 suffered by pregnant women served at lircay hospital-may 2020 to april 2021

Grade of COVID-19	Pregnant Women	
	N	%
Grade		
Mild	124	100
Moderate	0	0
Severe	0	0
Total	**124**	**100**

Table 3 shows that 100% of the cases in pregnant women were mild.

Table 4. Obstetric characteristics of pregnant women who suffered from COVID-19 served at lircay hospital-may 2020 to april 2021

Obstetric Characteristics	Pregnant Women	
	N=124	%
Term of pregnancy		
Term birth	113	91
Preterm birth	7	6
Post-term birth	4	3
Birth Route		
Vaginal	106	85
Caesarean section	18	15
Main pathologies		
None	85	69
Hypertensive disorders	23	19
Others	16	13

In Table 4, the majority ended in term birth 91%, preterm birth 6% and 3% post-term birth. The birth route was vaginal in 85% and cesarean section in 15%; hypertensive disorders were found in 19% and other pathologies in 13%.

Table 5. Fetal characteristics of pregnant women who suffered from COVID-19 served at lircay hospital from may 2020 to april 2021

Fetal Characteristics	Pregnant Women	
	N=124	%
Fetal pathologies		
None	82	66
Fetal hypoxia	24	19
Oligohydramnios	8	6
IUGR	7	6
Positive CST	2	2
Nonreactive NST	1	1
Characteristics of amniotic fluid		
Clear	106	85
Fluid Green	12	10
Meconium green	6	5

Table 5 shows that 19% of the fetuses presented hypoxia, oligohydramnios was observed in 6%, and IUGR in 6%; in electronic fetal monitoring, 2% presented placental insufficiency, and 1% showed not reactive. 10% had green fluid, and 5% had meconium amniotic fluid.

Table 6. Characteristics of newborns of mothers who suffered from COVID-19 served at lircay hospital from may 2020 to april 2021

Fetal Characteristics	Pregnant Women	
	N=124	%
Apgar at minute		
From 7 to 10	115	93
From 4 to 6	8	6
From 1 to 3	1	1
Apgar at 5 minutes		
From 7 to 10	123	99
From 4 to 6	0	0
From 1 to 3	1	1
Diagnosis of the newborn		
Healthy	122	98
Positive to COVID-19	1	1
Other pathologies	1	1

In Table 6, the Apgar at minutes 7 to 10 can be seen in 93%, 6% from 4 to 6 and 1 to 3 only present in 1%. While at 5 minutes, 99% presented an Apgar from 7 to 10, only 1% remained from 1 to 4.

5. Discussion and Conclusion

SARS-CoV2 is a virus that causes COVID-19, whose behavior continues to be studied to date, which is why we research the results in the perinatal period in this study. (From 22 weeks of gestation to the first seven neonatal days). Few studies have been found, and those that exist are still controversial.

The study was on 124 pregnant women diagnosed with COVID-19, mostly between 20 and 34 years old, of rural origin, and housewives. All presented mild disease; however, Oncel et al. [9], in Turkey, report that 6.4% of pregnant women were admitted to intensive care for mechanical ventilation; Yan et al. (10) report that 6.9% presented severe pneumonia.

Within the obstetric characteristics, the majority was attenuated 91%, 3% post-term and 6% preterm; the latter was like that reported by Yan et al. (10), who indicated 6.1%, while Lizana et al. (12) reported double 12.14% and Oncel et al. (9) find four times higher (26.4%), this points out that there are still gaps in knowledge on the subject, which requires further review on the subject.

The cesarean section rate was 15%, a conservative figure that is within the proportions recommended by the WHO; however, Oncel et al. [9] and Lizama et al. [12] found 71.2%, 65.53% respectively, as we can see quite high compared to our study. COVID-19, in its serious state and some moderate cases, the term by cesarean section is justified. In our study, all the cases were mild, which is

why cesarean birth remains at similar rates outside of the pandemic.

One of the complications observed in this group was hypertensive disorders of pregnancy, which occurred in 19%; there are findings that report that SARS-CoV2 infection in pregnant women with preeclampsia aggravates the condition, exposing them to a greater probability of requiring intensive care unit and even higher risk of maternal mortality [46].

The main fetal pathologies were fetal hypoxia in 19%, oligohydramnios in 6%, and intrauterine growth retardation in 6%. In addition, at birth, 10% presented fluid green amniotic fluid and 5% meconium. On the other hand, Cárdenas-Pineda et al. conducted a study to assess fetal well-being in pregnant women with mild COVID-19 through electronic fetal monitoring, a slight tendency to loss of fetal well-being was identified in more than 25%; becoming necessary, antepartum and intrapartum monitoring in pregnant women with COVID-19.

Of the three pathologies identified with this disease, fetal hypoxia is related to the pathophysiology of the infection; as we know, it blocks adequate oxygenation of the mother and therefore decreases the supply of oxygen in adequate amounts to the fetus, and inflammatory reactions, could alter this process, leading the fetus to intrauterine growth retardation, due to chronic hypoxemia, which is related to fluid green amniotic fluid.

Within the characteristics of the newborn, we had 6% with a low Apgar from 4 to 6 at the minute and 1% with less than 4, improving at five minutes in which only 1% had an Apgar below 5. Newborn tested positive for COVID-19, while Oncel et al. [9] reported 3.3%, Liu et al. [8], Yan et al. [10], Lizama et al. [12] and Zhu et al. [15] reported not having identified any newborn with a positive test for SARS-CoV2. Evidence that removes the possibility that there may be a risk of vertical transmission.

Among the conclusions of this study, it can be mentioned that the pregnant women who suffered from COVID-19 are mostly between 20 and 34 years old, are of rural origin and housewives.

100% of the pregnant women presented COVID-19 of a mild degree. The most outstanding obstetric characteristics were 6% of preterm birth, although the majority were given at term (91%), 15% were by cesarean section, 19% of hypertensive disorder and 13% of other pathologies were found. Among the fetal characteristics, hypoxia was found in 19%, polyhydramnios and IUGR in 6%, fluid green liquid in 10% and meconium in 5%. COVID-19 affects adequate oxygenation of the fetus during pregnancy. The Apgar at minute was decreased by 6%, improving at 5 minutes; in general terms, the state at birth was adequate in 99%; one newborn tested positive for SARS-CoV2.3.

In future work, this perspective opens the door to a deeper understanding of the effects of COVID-19 on pregnant women and their infants, which is critical for improving medical care and implementing preventive measures targeting this vulnerable population. Future research focused on more quantitative analysis will provide more accurate and rigorous data to support informed perinatal health decision-making during the pandemic.

Further research and collection of updated data is essential, which will enrich knowledge and provide new insights to address maternal and child health challenges [47] in the context of COVID-19. In this way, more effective strategies adapted to the evolving epidemiological situation can be designed, thus ensuring optimal care and adequate protection for pregnant women and their infants.

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