# Description of characteristic of pregnant mother on firmed positive covid-19 at Dr soetomo hospital

LestariSudaryanti[1],* SyllaNurSamsiah[2]

[1] Midwifery Study Programme

Faculty of Medicine University Airlangga, Surabaya, East java, Indonesia

[2] Midwifery Study Programme

Faculty of Medicine University Airlangga, Surabaya, East Java, Indonesia

**Abstract**

Dr Soetomo Hospital Surabaya is a COVID-19 referral hospital in Eastern Indonesia. During 2020, they treated 102 pregnant women with confirmed COVID-19 who were referred from various regions. Pregnant women are more susceptible to COVID-19 infection, this can cause childbirth complications that cause an emergency during childbirth. Research on pregnant women with COVID-19 in Indonesia is still very limited. This study aims to provide an overview of the characteristics of the delivery of pregnant women with the confirmation of Covid 19 at RSUD Dr.Soetomo Surabaya. Retrospective descriptive study with data taken from the medic a records of RSUD Dr.Soetomo based on the characteristics Of pregnant women presented in the form of distribution. 76.5% pregnant women were in the age range of 20 to 35 years, 2.9 immatur, 35.3% premature, 52% aterm, 9.8% postmature, 65.7% multipara with 59.7% history of vaginal delivery and 40.3 history of cesarean delivery, more than half 59.8% of mothers with caesarean section, 26.5% overweight, 54.9% obesity, 77.5% without clinical symptoms. The referrals came from the districts of Gresik, Mojokerto, Madura, Madiun, Kediri, Pasuruan, Bangka an, Tulungagung, Malang, and Banyuwangi. 94.1% of patients performed photos of thorax with the results of 65.6% normal, 29.2% bilateral pneumonia. Indications for 59.8% cesarean delivery were 36.1% Covid-19, 19.7% preeclampsia, 14.8% latitude or sun sang location, 9.8% history of cesarean section, 4.9% postdate pregnancy and suspected placenta accreta,3.4% myomauterine,1.6% premature rupture of membranes, IUFD and CPD.98% of the babies were born live, the APGAR score of 68.6% was normal, 71.6% had a birth weight of 2500 to 4000 grams, 92.2% of the babies had a negative COVID-19 PCR test result. Further, research is needed to understand the mode of transmission, symptoms and clinical outcomes in pregnant women and neonates to reduce the number of COVID-19 infections in the future.

**Keywords:** COVID-19, pregnancy, childbirth, characteristics maternal and neonatal

## Introduction

In December 2019, there were findings of pneumonia cases in the city of Wuhan, the capital of Hubei Province, China. The disease is known to be caused by a new type of beta coronavirus, named SARS-CoV-2duetoitsgenetic similarity to the SARS-CoV virus that causes Severe Acute Respiratory Syndrome (SARS).

The disease it causes is called Coronavirus Disease 2019 (COVID-19) (Jin et al., 2020). SARS-CoV-2, like other coronaviruses, is a single-stranded, spherical, or oblong RNA positive RNA virus with a size of 80-160 nm and enveloped in a lipidbilayer (Docea et al., 2020; Petrosillo et al., 2020). Coronavirus is a zoonotic pathogen discovered in the 1960s only to cause the common cold. In the last 20 years, two pathogenic types of coronaviruses have been reported, namely SARS in 2003 and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in 2012 (Sahin, 2020). The mortality rate for SARS and MERS was much higher than for COVID-19, at 10% for SARS and 37% for MERS. However, the transmission of COVID-19 is wider than the two diseases (Petrosilloetal,2020). COVID-19 has spread very quickly and has become a pandemic throughout the world, including Indonesia. Pregnant women are also susceptible to infection with Severe Acute Respiratory Syndrome Coronavirus 2(SARSCoV2), which can increase the risk of harm to pregnant women (Qiao,2020). The spread of COVID-19 concerns Intrauterine transmission from mother to fetus in pregnant women (Liuetal.,2020; Wangetal.,2020) The COVID-19 disease in pregnant women is important to note because pregnant women are more susceptible to viral in fections and severe pneumonia due to physiological changes in the immune and cardiopulmonary systems during pregnancy, manifestations vary from asymptomatic to very severe (Zaigham&Andersson,2020). Viral pneumonia is one of the leading causes of death in pregnant women worldwide ( Liu et al., 2020). The things that are most often questioned about the spread of COVID-19 in pregnant women are pneumonia symptoms that are felt in pregnant women differently from women who are not pregnant, the possibility of maternal and newborn death, complications of pregnancy or premature birth, and many cases of COVID-19 which are transmitted to the infant (Liuetal.,2020). The development of COVID-19 cases until December 2021 in Indonesia reached 4,261,412 confirmed cases with 3.4% of cases dying and 96.5% of cases recovered (KementrianKesehatanRI,2021). The addition of daily cases of 255 people ranks 15 in Asia while in Southeast Asia, Indonesia is in 4th place under Vietnam, Thailand, and the Philippines (mutia,2021). The Indonesian Obstetrics and Gynecology Association (POGI) in CNN(2021) noted that 20% of maternal deaths were due to mothers infected with COVID-19 and 13.7% of pregnant women were more easily infected with Covid-19 than those who were not pregnant. Pregnant women with COVID-19 have a higher risk of serious illness, morbidity, and mortality compared to the general population (Favre et al., 2020). Case reports of new borns (withinthefirst12hours) with Covid-19 infection prove the possibility of vertical mother-in fant transmission that is intrauterine (transplacental) or extrauterine (transvaginal, transabdominal or through breast milk). This is supported by studies that prove the presence of the SARS-CoV-2 virus in the placenta, amniotic fluid, umbilical cord blood, and breast milk, along with maternal viremia (Dong et al., 2020; Lamouroux et al., 2020; Vivanti et al.,2020).

Currently, there are still a few studies examining the characteristics of COVID-19 in pregnant women and neonates. Several studies have conducted previous research and concluded that the characteristics of COVID-19 in pregnant women have similar characteristics to non-pregnant women in COVID-19 infection (Chenetal.,2020; Guanetal.,2020; Liuetal.,2020). So that this study aims to determine the characteristics of pregnant women and neonates in RSUD Dr. Soetomo, Indonesia.

**Method**

This study used a descriptive observational design to describe the condition of pregnant women who were referred and gave birth at Dr. Soetomo Surabaya Hospital during the pandemic. Data collection from the medical record started from March 2020 to August 2021 at the SMF Obstetrics and Gynecology inpatient installation. During the pandemic, all pregnant women who were treated at the Dr. Soetomo underwent a COVID-19 screening by the provisions of the Ministry of Health of the Republic of Indonesia. Neonates born from mother with confirm of COVID-19 will undergo RTPCR swab at least once in the first 24 hours.

The diagnosis of mothers and neonates infected with COVID-19 was obtained from the results of the RT-PCR examination of the nasopharyngeal swab carried out at the Microbiology Laboratory of Dr. Soetomo Surabaya. The sampling technique used was total sampling. Inclusion criteria were pregnant women at SMF obstetrics and gynecology inpatient installations with positive COVID-19 polymerase chain reactions (PCR) swab test results. The data presented is in the form of distribution based on maternal age, gestational age, parity, past delivery history, type of delivery, maternal nutritional status, symptoms of covid, mother'sdomicile, photo of thorax results, section, and the characteristics of the baby being born.

The age of the mother in question is the age of the mother at delivery, the gestational age in question is the gestational age when the patient is confirmed positive for COVID-19 based on the results of the PCR swab test. Parity data is divided into 2 categories; primigravida and multigravida. The delivery history in question is the history of previous deliveries carried out by mothers with multigravida. The type of delivery describes the delivery carried out by the patient when confirmed COVID-19. Maternal nutritional status data is divided into; normal, overweight, and obese. Clinical symptoms of COVID-19 describe clinical symptoms that occur to mothers when they come to the hospital. The domicile or place of residence of the patient to find out which pregnant women who are confirmed positive for COVID-19 are from. The data from photo of thorax is divided into 3 categories; cor and Pulmo were normal, bilateral pneumonia, pulmonary edema, and cardiomegaly. The indication for a section is the condition of the patient who needs to give birth by cesarean section. The characteristics of neonates born include: baby's condition at birth, gender, APGAR score, baby's weight, and COVID-19 status. This research was approved by the research ethics committee of RSUD Dr. Soetomo (0531/LOE/301.4.2/VII/2021).

## Results and discussion

Hospital Dr. Soetomois the Teaching Hospital of the Faculty of Medicine, Universitas Airlangga, and is one of the largest hospitals in Eastern Indonesia. Hospital Dr. Soetomo is a class A hospital. Dr. Hospital. Soetomo not only serves treatment but also serves as a teaching hospital, research center, and the highest referral center for Eastern Indonesia (Top Referal) so that many people put their trust in the hospital in terms of health matters. During the Covid-19 pandemic that hit Indonesia, Dr.Soetomo General Hospital Surabaya was one of the COVID-19 Teaching Hospitals and Referral Centers in East Java until the time this research was written. Dr. Hospital Soetomo gave birth to 102 pregnant women with confirmed COVID-19 from March 2020 to August 2021. The distribution of cases can be seen in Table1.

This study aims to describe the characteristics of pregnant women infected with COVID-19, including; maternal age, gestational age, parity, history of previous delivery, type of delivery, nutritional status, symptoms of COVID-19, domicile or place of residence of pregnant women confirmed positive for COVID-19, results of photo thorax, indications for cesarean delivery, and neonatal outcomes born alive from mothers infected with COVID-19 either spontaneously vaginally or by cesarean section.

Clinical diagnosis of pregnant women with COVID-19 is carried out through history taking, physical examination, and supporting examinations. Careful history taking is carried out to determine the main complaints of pregnant women and assist health workers in determining the clinical degree of pregnant women. Generally, the complaints of pregnant women are the same as those of patients who are not pregnant. However, it should be noted that symptoms of fever, dyspnea, gastrointestinal symptoms, and fatigue may overlap with changes in physiological adaptation during pregnancy. Physical examination includes the general condition of vital signs, heart-lung examination, and other appropriate indications. Further, investigations such as routine blood, lung imaging, and real-time reverse-transcription polymerase chain reaction (RT-PCR) for SARS-CoV-2 with samples taken via throat swabs. Supportive examination in the form of serology is not recommended by WHO except for research purposes (MacKenzie&Smith, 2020).

Table1. Characteristics of pregnant women confirmed positive for COVID-19.

| Variable | N | % |
|---|---|---|
| Mother's age(years) | | |
| <20 | 2 | 1,9 |
| 20 –35 | 78 | 76,5 |
| >35 | 22 | 21,6 |
| Gestasionalage | | |
| Immatur22-28weeks | 3 | 2,9 |
| Premature28-27weeks | 36 | 35,3 |
| Aterm37 –42weeks | 53 | 52 |
| Posmatur>42weeks | 10 | 9,8 |
| Parity | | |
| Primipara | 35 | 34,3 |
| Multipara | 67 | 65,7 |
| Past birth history | | |
| Pervaginam | 40 | 59,7 |
| Secsio | 27 | 40,3 |
| Type of delivery | | |
| Pervaginam | 41 | 40,2 |
| Secsio | 61 | 59,8 |
| IMT(IndeksMassaTubuh) | | |
| Normal | 19 | 18,6 |
| Overweight | 27 | 26,5 |
| Obesity | 56 | 54,9 |
| Symptoms of Covid | | |
| Asymptomatic | 79 | 77,5 |
| Fever | 10 | 9,8 |
| Shortness of breath | 9 | 8,8 |
| Cough | 4 | 3,9 |

The average age of third-trimester pregnant women who were confirmed positive for COVID-19 who gave birth at Dr.Soetomo's Hospital is 29.87 (±6.5) years old with the youngest being 17 years old and the oldest being 49 years old. Aged between 20-35 years, meaning that most pregnant women who are confirmed positive for COVID-19 have a relatively low risk of childbirth complications and are included in the reproductive age when only seen from the age variable. A good productive age for healthy reproduction is at the age of 20 to 35 years (Crawford & Steiner, 2015).

Age is one of the benchmarks for a mother's readiness to give birth, where the ideal age is 20-35 years old (Crawford & Steiner, 2015). Maternal age also determines maternal health and is closely related to the conditions of pregnancy, childbirth, and the postpartum period as well as the baby. The age of pregnant women who are too young or too old (≤ 20 years and 35 years) is a complicating factor for pregnancy. Women aged less than 20 years usually have immature psychic conditions and financial capabilities that are less supportive, while women over 35 years old will face risks such as congenital abnormalities or complications at the time of delivery due to uterine muscle tissue that is not good enough to accepta pregnancy (Prawiroharjoetal., 2016).

Elderly pregnant women (>35 years) without COVID-19 will be at higher risk of experiencing obstetric complications asaresul to fan increase in heal the problems such as diabetes, hypertension, premature delivery,

placental abruption, placenta previa, and stillbirth which can increase morbidity and mortality rates during pregnancy. Perinata (Watson, 2018). This is by a study conducted by Gram Ika et al., (2017) non-COVID-19 pregnant women who gave birth at the age of over 35 years. The study stated that it was easy for the mother to get sick, and the organs of the womb were aging, and the birth canal was also stiffer, there was a higher chance of getting sick. Most pregnant women have children with disabilities, obstructed labor, and bleeding occurs.

Half of the gestational ages when patients were diagnosed with COVID-19 were term pregnancies, namelyat 37 to 42 weeks of gestation with an average gestational age of 38.2 weeks. These results are in accordance with astudy conducted by Zhu et al, Parag Goyal, Chow et al., (2020) in the United States, China, and Europe in 2020 that the majority of mothers with COVID-19 will give birth at term and the highest cause of termination of pregnancy. Prematurely comes from indications of the fetus and the mother. Pregnant women with SARS or MERS are also at higher risk of miscarriage or giving birth prematurely. This incident can also occur in pregnant women with Covid-19, but there are still very few reports of the incident (Berghella & Hughes, 2021)

Parity shows the number of children ever born. Parity is an important factor that supports the success of pregnancy and childbirth. Based on data obtained from102 pregnant women with positive RT-PCR results for Covid-19, it was found that the majority of pregnant women had experienced childbirth, both birth, and death, namely 67 pregnant women (65.7%), and there maining35 pregnant women (34,3%) were first pregnancies or were primiparous. The first birth usually has a high relative risk for the mother and child, then this risk decreases in the second and third parity, and will increase again in the fourth parity, and so on. Mothers who give birth frequently have a risk of childbirth complications in subsequent pregnancies if they do not pay attention to nutritional needs. At parity of more than four, the uterus is usually weak, which can cause prolonged labor and bleeding during pregnancy (Oxorn&Forte, 2010)

In this study, data were obtained from 67 multiparous pregnant women who were confirmed positive for COVID-19. As many as 40 pregnant women (59.7%) had history of vaginal delivery, and the remaining 27 pregnant women (40.3%) had history of cesarean delivery.

A cesarean section delivery with a vertical incision of the abdomen and uterus make pregnant women vulnerable to tearing in the uterus when the mother pushes duringa normal delivery process, which can potentially lead to bleeding. Therefore, to avoid morbidity and mortality in mothers with history of cesarean section with a vertical incision, cesarean delivery is an option. (Keagetal., 2018)

The method of delivery does not affect the transmission of COVID-19 in neonates (American Academy of Pediatrics., 2020). Research conducted by Kalamdani et al., (2020) reported that more deliveries were made by cesarean section compared to normal deliveries (83.3%). In this study, 59.8% of infants were born by cesarean section, and 40.2% were born vaginally. The cesarean section rate is much lower when compared to that reported by(Kalamdanietal.,2020). At the beginning of the COVID-19 pandemic, there was minimal information regarding the potential for vertical transmission of SARS-CoV-2, resulting in anxiety for pregnant women or obstetricians. In this study, the most common method of delivery was a cesarean section, although no data were showing that cesarean delivery was better than vaginal delivery.

Pregnant women experience physiological and mechanical changes during pregnancy, this can increase the vulnerability of pregnant women to infection. There are changes in the cardiorespiratory system such as an increase in the diaphragm so that the total lung capacity is also reduced. This can encourage respiratory failure in pregnant women. So that the method of giving birth to pregnant women who are confirmed positive for COVID-19 needs to be considered whether it takes place vaginally or by cesarean section.

Pregnant women with a body mass index (BMI) of obesity are associated with pregnancy outcomes such as preeclampsia/eclampsia, induced labor, having a baby with macrosomia, having a cesarean section, and postpartum hemorrhage (Weku et al., 2016). In this study, 56 pregnant women (54.9%) had an obese body mass index (BMI). The study (Marchi et al., 2015) reported several risks for mothers with obesity, namely the risk of developing gestational diabetes, hypertension, cesarean section, having a baby with preterm birth, death, and malformations. Likewise, mothers with underweight BMI are associated with adverse pregnancy outcomes. Research conducted by (Marchietal.,2015) found that the group of underweight mothers often experienced anemia, gave birth prematurely, and had babies with low birth weight. Obesity is one of the co morbidities in pregnant women with COVID-19 which can cause worsening of health for the mother because it has the potential to cause a pulmonary embolism. Com or bid or co morbid diseases can worsen the mother's condition such as obesity, hypertension, asthma, and diabetes mellitus (Turan et al., 2020)

Upon admission to the hospital, a complete assessment of pregnant women with COVID-19 must be carried out including the severity of Covid-19 symptoms and the mother's vital signs (checking temperature, respiration, and oxygen saturation, if available). Based on the clinical picture is divided into three classifications. The classification is based on the severity of infection in the respiratory tract and is divided into mild, moderate, and severe clinical.

This classification helps medical personnel plan action and treatment quickly and appropriately by looking at the severity of COVID-19 in pregnant women through its clinical picture. According to the National Institutes of Health, the clinical symptoms of COVID-19 are divided into asymptomatic, mild, moderate, severe, and critical conditions. Asymptomatic indicates patients who do not show clinical symptoms but from the results of the examination, it is proven that they are infected with the SARS-CoV-2 virus. Mild clinical signs include fever, sore throat, cough, malaise, headache, and muscle aches, without dyspnea, shortness of breath, and abnormal imaging findings. Moderate clinical symptoms in the form of clinical symptoms of lower respiration with clinical examination or imaging and SpO2>90% at room temperature. Severe clinical symptoms include a respiratory rate >30x/min, an SpO2 93% at room temperature, or the ratio of partial pressure of arterial oxygen PaO2 to the fraction of inspired oxygen (FiO2)(PaO2/FiO2 50%(MacKenzie &Smith, 2020).

All pregnant women who are referred for delivery at Dr. Hospital. Soetomo, Surabaya is only based on the results of the real-time polymerase chain reaction (RT-PCR) test positive for COVID-19, which is as many as 77.5% do not complain of any symptoms (asymptomatic). The remaining 23% complained of mild symptoms of COVID-19in the form of 3.9% cough, 9.8% fever, 8.8% complained of moderate complaints in the form of shortness of breath. There were no severe or critical cases and no deaths were found in pregnant women with COVID-19 in this study. This is in line with the research conducted by Wong et al, which compared the case fatality rate between COVID-19, SARS and MERS which were 0%, 18%, and 25% respectively. In SARS and MERS, progressive respiratory failure and severe sepsis are common in pregnant women (Hui & Chan, 2010). ( Liu *et al.*, 2020; Chen *et al.*, 2020) their study also stated that no pregnant patients with COVID-19 infection died. MacKenzie&Smith stated that the clinical symptoms experienced by pregnant women and those who were not pregnant were the same. Wu et al., dan Arentzet al., (2020) proved that pregnant women with asymptomatic COVID-19 generally had a shorter hospital stay when compared to symptomatic pregnant women.

Table2. Distribution of domicile of pregnant women

| Variable | N | % |
|---|---|---|
| Surabaya | 67 | 65,7 |
| Gresik | 11 | 31,4 |
| Mojokerto | 5 | 14,3 |
| Madura | 3 | 8,6 |
| Malang | 3 | 8,6 |
| Bangkalan | 3 | 8,6 |
| Kediri | 2 | 5,7 |
| Pasuruan | 2 | 5,7 |
| Jawatengah | 2 | 5,7 |
| Madiun | 1 | 2,9 |
| Tulungagung | 1 | 2,9 |
| Bojonegoro | 1 | 2,9 |
| Banyuwangi | 1 | 2,9 |

Hospital Dr. Soetomo is one of the Covid-19 referral hospitals in East Java. 65.7% of pregnant women with positive Covid-19 RT-PCR results are native to Surabaya, 31.4% are from Gresik, 14.3% of pregnant women are from Mojokerto,8.6% are from Madura and Malang and Bangka an, mothers pregnant women came from Kediri, Pasuruan, and Central Java Provinces by 5.7%. And 2.9% came from Madiun, Tulungagung, Bojonegoro, and Banyuwangi. There was a sense of concern experienced by mothers and birth attendants, so that at the beginning of the pandemic patients who were confirmed positive for COVID-19 were immediately referred to secondary health facilities that can perform elective CS procedures in negative pressure operating rooms to reduce exposure to health workers who assist in childbirth.

Table3. Distribution of chest radiographs

| Variable | N | % |
|---|---|---|
| Photo of thorax | 96 | 94,1 |
| No thorax photos | 6 | 5,9 |

Table4. Result of thorax photos

| Variable | N | % |
|---|---|---|
| Corandpulmo with in normal limits | 63 | 65,6 |
| Bilateral pneumonia | 28 | 29,2 |
| Pulmonary edema and cardiomegaly | 5 | 5,2 |

A chest CT scan is carried out to detect Covid-19 infection early for mothers who are about to give birth. If there is no thoracic CT scan facility, this method can be replaced with a chest x-ray examination. Currently, CT scan-based artificial intelligence is being developed to improve the accuracy of the Covid-19 diagnosis using chest X-rays. The use of low-dose CT scans and chest X-rays in one examination has a fairly low radiation exposure and is safe for pregnant women (POGI, 2020). Chest radiographs may reveal features such as ground-glass opacification, infiltrates, peribronchial thickening, focal consolidation, pleural effusion, and atelectasis. Chest X-ray is less sensitive than CT scan because about 40% of cases do not find abnormalities on chest X-ray (Arentz et al., 2020; Guan et al., 2020). Berkowitz K. stated that viral pneumonia is one of the main causes of morbidity and mortality in pregnant women who are confirmed positive for Covid-19. In this study, 29.2% of pregnant women were found with bilateral chest radiographs of pneumonia. Pneumonia in pregnant women can cause various clinical outcomes of childbirth, such as premature labor, premature rupture of membranes, low birth weight (LBW) birth, fetal death in the womb (IUFD), and neonatal death (Nurdianto & Suryokusumo, 2020). Turan et al., (2020) reported the number of pregnant women with confirmed COVID-19 was1.6% maternal mortality, 1.4% stillbirth, 1.0% neonatal death, and33.7% prematurity.

**Table5.** Indications for caesarean delivery

| Variable | N | % |
| --- | --- | --- |
| COVID-19 | 22 | 36,1 |
| Preeklampsia | 12 | 19,7 |
| Latitude or sunsang location | 9 | 14,8 |
| Previous section history | 6 | 9,8 |
| Postdate pregnancy>42weeks | 3 | 4,9 |
| Suspect placenta accrete | 3 | 4,9 |
| Myoma uterine | 2 | 3,4 |
| KPP> 12hours | 1 | 1,6 |
| Intrauterine fetal death(IUFD) | 1 | 1,6 |
| Cephalopelvic disproportion(CPD) | 1 | 1,6 |

The choice of delivery method for pregnant women who are confirmed positive for COVID-19 considers the condition of the mother and baby. Prevention of transmission from mother to fetus, and assistant officers during the delivery process must also be considered. In this study, 59.8% of pregnant women underwent cesarean delivery and the rest underwent vaginal delivery. Delivery by caesarean section was performed with the following indications, 19.7% due to preeclampsia, 14.8% due to transverse or breech position, 9.8% due to a history of cesarean delivery, 4.9% due to overdue pregnancy (>42 weeks) , 4.9% due to suspected placenta accreta, 3.4% because the mother suffered from uterine myoma, 1.6% due to premature rupture of membranes (PROM) more than 12 hours, fetal death in the womb (IUFD) and cephalopelvic disproportion (CPD).

36.1% due to indications of COVID-19 itself. The decision to give birth by caesarean section was made because the mother had Covid-19 and had other pregnancy complications. A study by Polónia-Valente et al., (2020) reported that there is no risk of vertical transmission if the baby is born vaginally, so vaginal delivery is not a contraindication. Several other researchers stated that surgical procedures were most often performed to treat cases of COVID-19, taking into account the condition of the mother, the difficulty of mechanical ventilation of the gravid uterus and fetal compromise (Dashraath et al., 2020).

Currently, Indonesia has not found strong clinical evidence regarding recommendations for safe delivery methods for mothers giving birth with Covid 19 (Dashraath et al., 2020). Referral types are determined individually (case by case) (POGI, 2020). Family counseling is needed by considering obstetric indications and the wishes of the family, except for pregnant women with respiratory symptoms who require immediate delivery (Sectio Caesarea). Indications for induction of labor and cesarean section are performed if there are medical or obstetric indications according to the condition of the mother and fetusTable6. Distribution of characteristics of newborns from pregnant women with positive RT-PCR results for COVID-19

| Variable | N | % |
|---|---|---|
| The state of the baby | | |
| Born alive | 100 | 98 |
| Stillborn | 2 | 2 |

| Gender | | |
|---|---|---|
| Woman | 47 | 46,1 |
| Men | 55 | 53,9 |
| APGAR score | | |
| Normal(score7-10) | 70 | 68,6 |
| Low(score4-6) | 32 | 31,4 |
| Newborn's weight | | |
| <2500grams | 26 | 25,5 |
| 2500-4000grams | 73 | 71,6 |
| >4000grams | 3 | 2,9 |

De Bernardo et al., (2020) stated that the manifestation of clinical symptoms and signs of COVID-19 infection in neonates was lighter than in adult patients. The main symptoms that often appear are fever, vomiting, cough, shortness of breath, and no neonates have died from COVID-19. All babies born to mothers who were confirmed positive for COVID-19 were monitored for symptoms and the condition of the babies when they were discharged. During monitoring, there were no special symptoms in infants related to COVID-19, although there

were babies born prematurely and all babies born to mothers who were confirmed positive for COVID-19 could be sent home with the mother or her family.

In this study 98% of infants were born alive, only 2% died due to respiratory failure. These data are consistent with the research of Turan et al., (2020) and De Bernardo et al., (2020) which did not find any deaths of neonates infected with COVID-19. The clinical manifestations of COVID-19 infection in neonates are not well known. In this study, 53.9% of babies were born to mothers with positive RT-PC R results for Covid-19, 46.1% of babies were female. 70% of babies were born with normal APGAR scores and 31.4% low APGAR scores.53.1% of infants had moderate asphyxia and 46.9% moderate to severe asphyxia. The APGAR score was used to assess the clinical status of the newborn at 1 minute of age and to assess the need for immediate intervention to stimulate breathing. The APGAR score measures the number of clinical signs of neonatal depression such as cyanosis or facial pallor, bradycardia, depressed reflexes to tactile stimuli, hypotonia, and apnea or respiratory distress (Weineretal., 2016).

Infant birth weight was found to be 2.9% weighing more than 4000 grams, 25.5% babies weighing less than 2500 grams, there maining 71.6% with normal weight between 2500 to 4000 grams. Epidemiological studies in Turkey and China in 2020 also reported the same thing that the majority of mothers who were confirmed with COVID-19 gave birth to babies with normal birth weight because there was no evidence tha COVID-19 infection would interfere with fetal growth, unless there were other complications such as mothers with diabetes mellitus, preeclampsia, and other intrauterine infections such as HIV-positive mothers (Marim et al., 2020; Chen et al., 2020). The highest cause of early termination of pregnancy comes from fetal and maternal indications (Zhuetal., 2020; ParagGoyal.,2020; Chowetal., 2020)

In this study, 7.8% of newborns with a positive RT-PCR test result for COVID-19. The possibility of COVID-19 infection through vertical transmission is still possible (Dashraath et al., 2020). Sheth, Shah and Bhandari, (2020) reported that of 326 pregnant women who were confirmed positive for COVID 19, 23 newborns (7.05%) we reconfirmed positive and it is estimated that 3% of infections were acquired through vertical transmission.

Maternal immunity can cross the blood-placental barrier which can lead to the formation of passive immunity in the fetus. In the case reported by Dong et al., (2020) there were positive IgM and IgG SARS CoV-2 results in newborns, but the results of the PCR Swab test were negative. Another study conducted by Hosier et al., (2020) found a small number of ACE-2 receptors in the placenta allowing vertical infection through the placenta.

When SARS-CoV-2 binds to theACE-2 receptor, the transmembrane enzyme serine protease 2 (TMPRSS2) is activated, allowing the virus to pass through cells (Deniz & Tezer, 2020). This allows the discovery of the SARS CoV-2 RNA virus in the placenta or amniotic membranes (Penfield et al., 2020). A larger study reported that of 666 newborns to SARS-CoV-2 positive women, 4% of infants were infected with SARS-CoV-2 after birth (Walker et al., 2020). Research to prove vertical or horizontal transmission is still very much needed.

Several studies have shown a suspicion of vertical transmission in neonates with confirmed COVID-19whounderwent RT-PCR swab examination at 48 hours of postpartum care with delivery according to the COVID-19prevention protocol (Sheth et al., 2020).). The American Academic of Pediatrics (AAP) recommends screening neonates born to mothers with confirmed COVID-19 at 24 and 48 hours after birth. Recent data suggest that angiotensin-2 receptor levels are so low in the placenta that vertical transmission is unlikely. Chen et al., (2020) reported that there was no change in the morphological characteristics of the placenta from COVID-19 infected mothers, and no nucleic acid was found. Virological examinations of umbilical cord blood, amniotic fluid, and breast milk in mothers who were positive for COVID-19 were found to be negative (Chen et al., 2020). Nasopharyngeal swab examination of neonates at 24 and 48 hours after birth has become a routine protocol at RSUD Dr. Soetomo, Surabaya

Several scientific publications have recommended strict precautions to avoid horizontal transmission during neonatal resuscitation with mothers with confirmed COVID-19 in the delivery room. The American Academic of Pediatrics (AAP) recommendation for medical personnel to use personal protective equipment during neonatal resuscitation such as gloves, gown, N95 respiratory mask, and eye protection goggles or air filter breathing apparatus (Shethetal., 2020). Tools such as stethoscope sand sphygmomanometers,

The thermometer should be provided specifically for one patient. If it is used for other patients, clean and disinfect with 70% alcohol (world health organizing, 2020).

Implementation of strict infection prevention protocols during the perinatal period can significantly reduce the incidence of horizontal transmission of the COVID-19 virus (Karimi-Zarchi et al., 2020). Transmission by skin-to-skin contact is controversial, so skin-to-skin contact may be permitted if the mother wears a mask and washes her hands.

This research serves as a basis to support further research on this topic, and further research is needed on the effect of COVID-19 on maternal and neonatal outcomes broadly. And further research is needed on knowledge and attitudes regarding the COVID-19 pandemic in pregnant women to reduce the number of COVID-19 infections in the future.

**Conclusion**

Characteristics Pregnant women whoa recon firmed positive for COVID-19 who are referred to Dr.Soetomo Hospital are in the age range of 20-35 years, gestational age at term, multiparous with a history of cesarean delivery, obesity, without clinical symptoms, with mostly normal chest X-ray results. The COVID-19 pandemic is still a global health problem. Pregnant women and neonates are a group that is very vulnerable to COVID-19 transmission. Further research is needed to determine the growth and development conditions of neonates born to mothers with confirmed COVID-19 during pregnancy

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