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Case Series

Impact of COVID-19 in Pregnant Women and Vertical Transmission in Newborns; A Case Series

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ABSTRACT

Objective: To assess the impact of COVID-19 in pregnant women and determine the vertical transmission in newborns.
Study Design: Case series.
Place and Duration of Study: Department of Gynecology & Obstetric, Combined Military Hospital, Gujranwala Pakistan, from Jun to Sep 2020.
Methodology: Forty consecutive pregnant women reported as COVID-19-positive cases were included. After taking clinical and demographic details, the maternal outcome was defined regarding shortness of breath, fever, oxygen saturation and ventilator support. The fetal outcome was defined based on APGAR score, birth weight, and Neonatal Intensive Care Unit admission. For vertical transmission, the neonatal nasopharyngeal swab samples were collected after 24 hours of birth.
Result: Forty pregnant women were included in the study with the mean age of 30.05±2.8 years, and mean gestational age of 36.08±0.717 weeks. Of the included women, 67.5% underwent C-sections, and 25.0% underwent SVD. As per fetal outcome, most of the babies 80% were normally delivered, while 5% were IUD. Out of all, three neonates were diagnosed with vertical transmission, but none of them developed any complications.
Conclusion: Vertical transmissions of COVID-19 among neonates were observed. No critical maternal outcome in terms of maternal severe morbidity or mortality was observed. However, further studies are required on this subject.

Keywords: APGAR score, Infant, Newborn, Pregnancy outcome, Infectious disease transmission, Vertical disease transmission, Infectious.

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INTRODUCTION

The COVID-19 pandemic is a global public health crisis considered one of the commonest communicable illnesses.[1] During pregnancy, the women become risky as they may develop co-morbidity like Gestational Diabetes Mellitus, pregnancy-induced hypertension, etc.[2] Similarly, during delivery, women and their fetuses are at higher risk of developing morbidity or mortality due to additional labour stress.[3] In some published studies of COVID-19 happening during pregnancy and due to the chance of vertical transmission from mother to fetus, there is an apprehension that the neonates might be in danger of inborn COVID-19 disease.[4,5] Vertical maternal to fetal transmission is a key problem with SARS-CoV-2 infection.

Antibodies against SARS-CoV-2 can penetrate the placenta during pregnancy, according to popular belief, and various research has looked into this possibility.[6,7] However, restricted information from the case series and case reports recommend no proof of mother-to-fetus transmission when the disease shows in the third trimester of the pregnancy.[8,9] The proof of vertical transmission of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is unknown. No local studies have been found till date. Hence, this study has been conducted to evaluate the impact of COVID-19 in pregnant women and determine the vertical transmission in newborns.

METHODOLOGY

The case series was conducted at the Gynaecology & Obstetric Department, Combined Military Hospital, Gujranwala Pakistan, from June 2020 to September 2020 after approval of the Ethical Review Committee (No 109/administration dated 25th March 2021), The sampling technique used was non-probability consecutive sampling.

Inclusion Criteria: Pregnant women reported as COVID-19-positive cases were included.

Exclusion Criteria: All the females with a diagnosis of congenital fetal disease, pre-term deliveries were excluded.

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After informed consent from each case or their attendants, the complete clinical examination and routine laboratory investigations were done. All the females, were admitted and underwent deliveries by senior gynaecologists with a minimum experience of 10 years. All the deliveries were done in collaboration with physicians and paediatricians per hospital protocol for COVID-19 patients. Hospital Maternal outcome was defined in terms of shortness of breath, fever, oxygen saturation and ventilator support, and fetal outcome was defined in terms of APGAR score, birth weight and admission to Neonatal Intensive Care Unit. For vertical transmission, the neonatal nasopharyngeal swab samples were collected 24 hours after birth; their sample collection, processing, and laboratory testing were done per WHO guidance.

Statistical Package for Social Sciences (SPSS) version 21.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages.

RESULTS

Forty pregnant women were included in the study with the mean age of 30.05+2.8 years, mean gestational age of 36.08+0.717 weeks and haemoglobin level as 10.6+0.84. Of the included women, 67.5% underwent C-sections, and 25.0% underwent SVD. Intrauterine deaths were observed after developing severe oligohydramnios in pregnancies initially going smoothly with adequate liquor volume amount. As per fetal outcome, most of the babies (80%) were normally delivered, while 5% were IUDs, 7.5% were miscarriage, and 7.5% had vertical transmission of COVID-19 (Table).The frequency of vertical transmission of COVID-19 was as 7.5% (Figure).

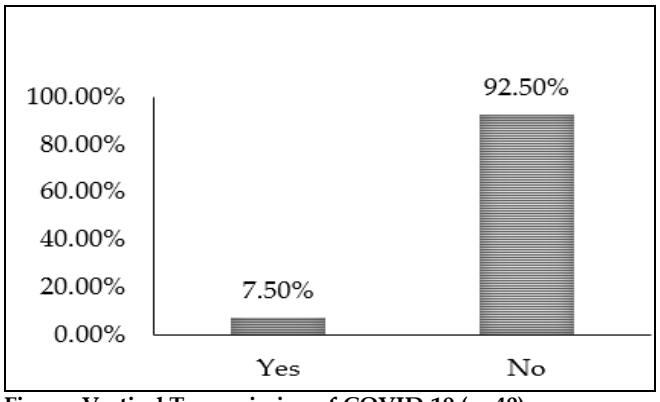

Figure: Vertical Transmission of COVID-19 (n=40)

Table: Cases Distribution as per Mode of Delivery, Neonatal Gender and Blood Group (n=40)

Variables		n(%)
Mode of Delivery	C-section	27(67.5%)
	Spontaneous Vaginal Delivery	10(25%)
	Miscarriage	03(7.5%)
Neonatal Gender	Male	19(47.5%)
	Female	21(52.5%)
Blood Group	A+	07(17.5%)
	AB+	07(17.5%)
	A-	01(2.5%)
	B+	09(22.5%)
	O+	16(40%)
PCR	Positive	24(60%)
	Negative	16(40%)
Pregnancy Outcome	Intra Uterine Death	02(5%)
	Miscarriage	03(7.5%)
	Vertical transmission	03(7.5%)
	Normal baby	32(80%)

DISCUSSION

Vertical transmissions of COVID-19 among neonates were observed. No critical maternal outcome in terms of maternal severe morbidity or mortality was observed. In this study, most of the females underwent C-sections. On the other hand, Tolu *et al*.[9] reported that pre-term births accounted for 1.9 per cent of all births, except for one stillbirth at 20 weeks. Yan *et al*.[10] demonstrated that in their investigation of 99 COVID-19 pregnant women, they discovered an 85.9% caesarean rate, with COVID-19 pneumonia being the most common indication. However, Salvatore *et al*.[11] observed an even lesser rate of c-sections, 44%. In this study, for most of the babies, 80% were normally delivered, while 5% were IUDs and 7.5% were miscarriages.

In this study, no adverse maternal outcome was observed. Similarly, Moreno *et al*.[12] reported that there were no occurrences of maternal ICU hospitalisation, sepsis, postpartum haemorrhage, or maternal death. This study observed the vertical transmission of COVID-19 frequency among 7.5% of neonates. The study of Tolu *et al*. [9] reported that in the five (33.3%) neonates throat swabs, SARS-CoV-2 was seen positive, five fetuses were tested via placental association, cord blood samples and amniotic fluid and out of them, only one sample of the amniotic fluid was seen positive by the RT PCR.

In comparison, five (33.3%) fetuses were seen with raised IgG and IgM but lacked intrauterine tissue tested, and four cases were observed as cases of

COVID-19 *pneumonia* neonates by chest imaging. On the other hand, Yan *et al*.[13] reported that among 116 cases of COVID-19, there were no vertical transmissions observed to the neonates during the third trimester of pregnancy. However, in this study, all the COVID-19-diagnosed cases with no confirmatory test results via rRT-PCR were selected. Di Mascio *et al*.[14] stated in their systematic review and meta-analysis that 41 newborns in China did not show any clinical indications or symptoms of vertical transmission. On the other hand, the study of Abdel Massih *et al*.[15] reported that COVID-19 vertical transmission is improbable as it happened in 2.8% of fetuses, while underlines a significant and thought little hazard, which is the conceivable placental deficiency due to the prothrombotic propensity made by COVID-19.

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CONCLUSION

Vertical transmissions of COVID-19 among neonates were observed to be 7.5%. No critical maternal outcome in terms of maternal severe morbidity or mortality was observed.

Conflict of Interest: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

YF & IB: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

PH & MS: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

LN & MW: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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