

# Maternal and neonatal outcome in pregnant women with COVID 19 - a prospective study in a tertiary care centre

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## ABSTRACT

**Objectives:** The study was undertaken (i) to observe and analyse the different clinical characteristics of pregnant women with covid 19 disease and also (ii) to evaluate the outcome among them (iii) to evaluate the neonatal outcome. **Methodology:** This was a prospective observational study done in a tertiary care centre, Jorhat Medical College and Hospital, Jorhat between 1<sup>st</sup> July 2020 to 1<sup>st</sup> July 2021. A total of 188 covid positive pregnant women were included in the study. Cases like ectopic pregnancy, molar pregnancy, abortions were excluded from the study. Symptoms related to SARS COV 2 infection (eg. fever, cough, difficulty in breathing etc.) were observed along with obstetrical signs and symptoms. Babies of covid positive mothers were categorized into two groups (covid positive and covid negative baby based on the nasopharyngeal swab test result for covid19). Any untoward outcome (eg. IUGR, stillborn, TTNB etc.) were noted in both categories. **Results:** This study showed that 68.62% of the study population were in the age group of 20 <30 years. Only 4.26% of the patients had symptoms of COVID 19. Majority of the patients were delivered by lower segment caesarean section and the indications were mainly obstetrical. Among the study population only 13(6.91%) patients had developed respiratory distress and among them 11 (5.85%) patients needed ICU care. There was no significant co-relation between presence of co-morbid condition and development of respiratory distress among the covid positive patients. There was one maternal death due to covid 19. Only 9(4.79%) babies tested positive for covid 19 disease. Out of the 188 babies delivered 26 babies (13.8%) were admitted to NICU for several reasons. **Conclusion:** The study showed that (i) there was no significant co-relation between infection with SARS COV2 and development of severe pneumonia among pregnant women, (ii) SARS COV2 infection of the mother does not affect the neonatal outcome.

**Keywords:** SARS COV2 (Severe Acute Respiratory Syndrome Coronavirus 2), COVID 19, MODS (Multiple Organ Dysfunction Syndrome), TTNB (Transient tachypnoea of newborn baby), respiratory distress.

The coronavirus disease 2019 (covid-19) caused by severe acute respiratory syndrome corona virus 2 (SARS-COV2), was declared a pandemic by WHO on 11<sup>th</sup> March 2020. The first case of COVID -19 pneumonia was reported in Wuhan, Hubei Province, China, in December 2019 and since then the infection spread to the rest of China and beyond.<sup>1 - 3</sup> According to current evidence, SARS-COV 2 virus is primarily transmitted between people through respiratory droplets and contact routes<sup>4-9</sup>.

Pregnant women is a unique population with significant physiologic and immunologic alterations to support and protect the developing fetus. These changes might increase the risk of infection with respiratory viruses for pregnant women and their fetuses. Several studies have been done till date to show that viral infections during pregnancy can cause more morbidity and mortality as compared to non-pregnant counterparts and also the general population<sup>10 - 22</sup>. SARS COV - 2 virus causing COVID 19 is totally a new experience

Received: 10<sup>th</sup> June 2022, Peer review completed: 10<sup>th</sup> May 2023, Accepted: 17<sup>th</sup> May 2023.

Pegu B, Doley R, Sharma HK, Baranwal SK. Maternal and neonatal outcome in pregnant women with COVID 19 - a prospective study in a tertiary care centre. The New Indian Journal of OBGYN. 2024; 11(1): 174 - 79.

worldwide both in terms of clinical course and management.

With this background, a prospective observational study was planned out in the Department of Obstetrics and Gynaecology, Jorhat Medical College and Hospital, Jorhat.

**Materials and methods**

The study was conducted in the Department of Obstetrics and Gynaecology, JMCH, Jorhat from 01/07/2020 to 01/07/2021 after approval from the Jorhat Medical College Ethical committee. A total of 188 covid 19 positive antenatal women were included in the study after obtaining informed consent by convenience sampling.

Pregnant women of any of the three trimesters with SARS COV 2 infection (laboratory confirmed) were

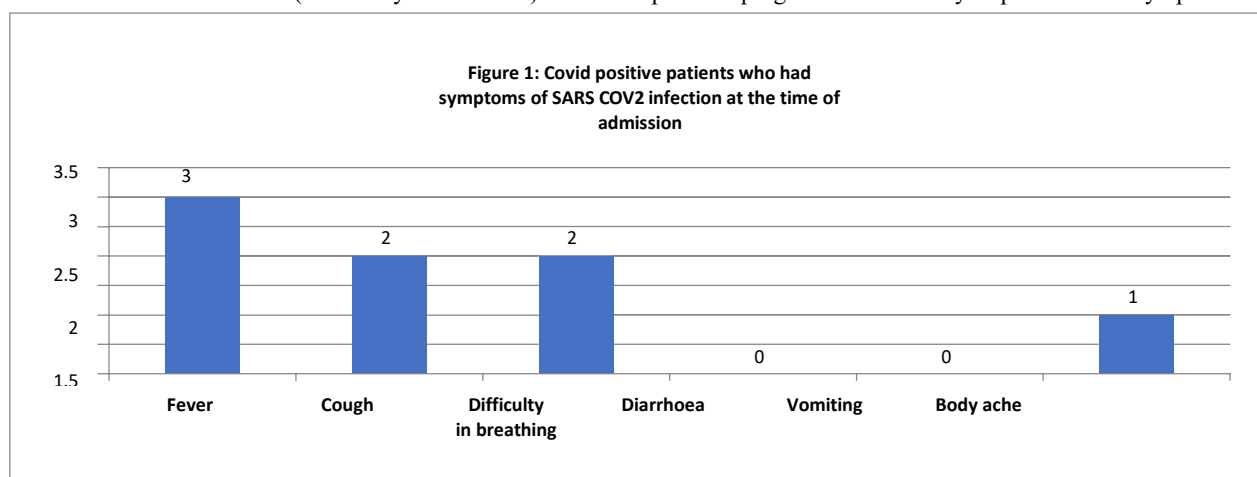
untoward outcome (eg. IUGR, stillborn, TTNB etc.) were noted in both categories.

All covid positive pregnant women, covid positive newborn baby and symptomatic covid negative babies were subjected to routine and necessary laboratory investigations.

Statistical analysis: Chi-square test was applied for statistical analysis where applicable. A p-value of <0.05 was considered significant statistically.

**Results**

The study population consisted of total 188 covid positive pregnant women. More than 50% of the patients were in the age group of 20 <30 years. Among 188 covid positive pregnant women only 8 patients had symptoms of



recruited for the study keeping in mind that the expected date of delivery was on or before 31<sup>st</sup> March 2021. Cases like ectopic pregnancy, molar pregnancy, abortions were excluded from the study.

The pregnant women were inquired about the presenting obstetrical symptoms. Signs and symptoms related to SARS COV 2 infection (eg. fever, cough, difficulty in breathing etc.) were observed. Any associated co-morbid condition was noted. Outcome of pregnancy were determined in terms of preterm delivery or term delivery. Post delivery complication if any was observed and noted.

Women who developed respiratory distress were treated with drugs like remdesivir, low molecular weight heparin, dexamethasone and supportive high flow oxygen. Women who needed ICU admission and care were provided with the same.

Babies of covid positive mothers were categorized into two groups (covid positive and covid negative baby based on the nasopharyngeal swab test result for covid 19). Any

covid 19 disease which accounts for 4.26% of the study population (figure 1). Most of the patients had term pregnancy at the time of admission (96.80%).

**Table 1: Age, gestational age at the time of admission and co-morbid conditions of the covid positive pregnant women**

Age	Number	%
<20	19	10.11
20- <30	129	68.62
30- <40	39	20.74
40- <50	1	0.53
Total	188	100
Gestational age		
≥28 - <37weeks	6	3.19
≥37 Weeks	182	96.80
Total	188	100
Co-morbid conditions		
Diabetes	3	1.59
Hypertension	17	9.04
Hypothyroidism	1	0.53
Anaemia	43	22.87
Thrombocytopenia	1	0.53
Ictc reactive	1	0.53
None	122	64.89
Total	188	100

common co - morbid conditions among the study population were anaemia (22.87%) and hypertension (9.04%) (table 1).

Majority of the patients were delivered by LSCS (61.70%) (table 2). Only 26 patients had post delivery complications

**Table 2: Outcome of the Covid positive pregnant women**

Outcomes	Vaginal delivery	LSCS	%
Preterm delivery	3	3	3.19
Term delivery	69	113	96.81

Chi square=0.359, p-value=0.54

and among these, respiratory distress accounted for 6.91% among them (table 3). There was no significant relation

**Table 3: Indications of LSCS**

Indications	Number	%
Fetal distress	35	30.17
Prolonged labour	23	19.83
Post-caesarean	41	35.34
Others	17	14.66
Total	116	

between respiratory distress with the existence of co-morbid condition (table 5). Among 13 patients who developed respiratory distress, 11 needed ICU (intensive care unit) care.

**Table 4: Post delivery complications**

Complications	Number	%
Atonic postpartum haemorrhage	11	5.85
Respiratory distress	13	6.91
MODS	0	0
Others	2	1.06
None	162	86.17
Total	188	100

There was one maternal death. Out of the total 188 babies delivered, only 9 babies tested to be covid positive. No significant correlation was found between covid positive

**Table 5: Relation between co-morbid conditions and complications**

Parameters	Total	With co-morbid condition	Without co-morbid condition
Atonic postpartum haemorrhage	11	9	2
Respiratory distress	13	5	8

Chi square = 4.608, p - value = 0.0318\*

**Table 6: Neonatal outcomes in relation to covid positive or negative status**

Outcomes	Covid positive	Covid negative	%
Low birth weight	0	15	7.98
Poor Apgar score	1	20	11.17
Transient tachypnoea of the newborn baby (TTNB)	1	11	6.38
Neonatal jaundice	0	8	4.26
Meconium aspiration syndrome	1	18	10.11
Neonatal death	0	3	1.6
None	5	104	57.98
Total	9	179	

Chi square = 1.726, p - value= 0.9431

**Table 7: Indications for admission to NICU**

Indications	Number	%
Severe meconium aspiration syndrome	11	42.30
Poor Apgar score	3	11.54
Low birth weight	12	46.15
Total	26	

status of the newborn and their outcomes (table 6). The rate of neonatal admission into NICU in our study was 13.83%.

Low birth weight (LBW) and severe meconium aspiration were the most common reasons for admission into NICU. There were three neonatal deaths. One death was due to breast milk aspiration and the other two deaths were due to severe meconium aspiration.

### Discussion

The covid 19 disease is a completely new disease and studies are being carried out in different parts of the world on different aspects related to the novel virus and the disease. Hence this study was carried out in Jorhat Medical College and Hospital, Jorhat in the department of Obstetrics and Gynaecology, to observe the different clinical presentations of the disease among pregnant women and to evaluate the outcomes among the women and the neonates.

In our study, majority of the patients (68.62%) were in the age group of 20 - <30 years. Similar observation was made in a study by Arun Harischandra Nayek et al where majority of the patients were in the age group of 21- 25 years<sup>23</sup>. In a retrospective study by Bachani et al also, the mean age was 26 years (26.71 ± 4.54 years)<sup>24</sup>. However in another study by Amal Ayed et al, the median age of the study population was 31 years<sup>25</sup> and in a report submitted by Yan Jie et al the mean age of the patients were 30.8y ears<sup>26</sup>.

In our study, among 188 covid positive patients, only 8(4.26%) had symptoms of COVID 19 disease which means asymptomatic patients were in majority (95.74%). This is again similar to studies done by Arun Haris Chandra Nayek et al and Amal Ayed et al where asymptomatic cases were 97% and 88.6% respectively. However asymptomatic patients were lower in studies done by Renu Arora et al (14.3%)<sup>27</sup>, Bachani et al (17.4%) and Yan Jie et al (23.3%).

The majority of the women in our study attended the health institution at term pregnancy. Similar observation was made by Yan Jie et al where the median gestational age on admission was 38+ weeks. There may be several reasons for this finding - 1. Strict restrictions on movement due to government orders. 2. Most of them were asymptomatic and hence did not attend hospital unless they had some obstetrical complaints like pain abdomen, leaking per vaginum etc.

Viral infections during pregnancy can induce an abnormal response to an opportunistic infection that might lead to preterm labour and delivery<sup>28</sup>. The rate of preterm delivery in our study was only 3.19% as compared to a study

done by Ipek Gurol - Urganci et al, where the rate of preterm delivery was 12.1 %<sup>29</sup>. A systematic review and meta-analysis by Francesca et al found a higher prevalence of preterm delivery (26%) among the covid positive patients; it was unclear however, whether covid -19 might be the direct cause of preterm delivery<sup>30</sup>. Also in a collaborative study by E. Mullins et al preterm delivery occurred in a higher proportion of women with SARS-COV2 infection as compared to contemporaneous and historical national data from uninfected women in the UK and USA<sup>31</sup>. Vinayak Smith et al also found a high prevalence rate of 63.8% of preterm deliveries among the covid positive patients<sup>32</sup>.

The most common co-morbid conditions among the study population were anaemia and hypertension which are very common in this part of the country. This is similar to the study by Arun Harischandra Nayek et al where the common co-morbidities were anaemia, pregnancy induced hypertension and eclampsia. According to a systematic review and meta analysis on clinical manifestations, risk factors and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy by John Allotey et al, pre existing co-morbidities are risk factors for severe COVID 19 in pregnancy<sup>33</sup>. But in our study, we did not find any significant relation between presence of co-morbidities and development of COVID 19 disease complications like respiratory distress which was the most common complication in our study.

The total number of patients who developed respiratory distress were 13(6.91%) of which 11(5.85%) needed ICU care. Among the 11 patients, except one all of them recovered. Similarly in a study by Vinayak Smith et al, it was found that the mortality rate was 0% and only one patient required ICU care. But Bachani et al found the ICU admission rate to be 8.7%. In an earlier study on intensive care unit admissions for pregnant and non-pregnant women with coronavirus disease 2019 by Matthew et al, pregnant women were not at an increased risk for ICU admission compared to non-pregnant women<sup>34</sup>. But according to WHO updated on 12 March 2021 based on new research finding report by John Allotey et al, is of the opinion that pregnant women with COVID 19 are less likely than non-pregnant women with COVID19 to have symptoms but more likely to need intensive care if critically ill.

The rate of caesarean section in our study was 61.70% and the indications were mainly obstetrical which is similar to the findings by Arun Harischandra Nayek et al (50%). In another study done by Amal Ayed et al 47.8% patients were

delivered by caesarean section. But in a retrospective study by Chen et al<sup>35</sup> and in a study done by Vinayak Smith et al the rate of caesarean sections were 100% and 88% respectively.

Out of 188 babies delivered, only 9 babies tested positive for COVID19 (4.79%). This is much less than the findings of Bachani et al and Josevillar et al where the percentage of covid positive babies were 8.9% and 12.1% respectively. The intercovid multinational cohort study by Jose Villar et al<sup>36</sup> found that there was increased risk of severe neonatal complications (in terms of NICU stay for 7 days or longer, morbidities like bronchopulmonary dysplasia, hypoxic ischaemic encephalopathy, sepsis etc.) among women with covid 19. Such complications were not observed among the babies of our study population. Also, in our study though 13.8% of the babies needed NICU care, eventually all of them recovered and could be discharged without any symptom. Neonatal complications were more commonly observed in covid negative neonates. Among the covid positive babies, only one had developed features of covid pneumonia but later on recovered after being treated with antibiotics and oxygen support. In another study done by Dani Dumitriu et al in New York City, 19 neonates out of 141 were admitted into NICU (13.47%) which was similar to our study<sup>37</sup>.

Limitations - Since majority of the patients attended our hospital at term pregnancy (mainly for obstetrical reasons) and were asymptomatic it was difficult to evaluate the clinical characteristics of the disease during pregnancy.

#### **Conclusion**

SARS COV2 infection is associated with severe acute respiratory distress syndrome. It was thought that pregnant women are more susceptible to respiratory pathogens and severe pneumonia but our study could not establish such significant co-relation. Covid19 disease was not associated with increased risk of preterm delivery. There was one maternal mortality. Majority of the babies were covid negative and though the rate of NICU admission was high, all of them could be discharged without any morbidity. Hence we can conclude from our study that SARS COV2 infection of mother does not affect the neonatal outcome in covid positive pregnant women. But at the same time follow up of these neonates may be done to know any long term complication if any.

**Conflict of interest:** None. **Disclaimer:** Nil.

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