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# Study of Obstetric Risk Factors, Complications and Outcomes of Pregnancies Complicated by COVID 19 Infection During Pregnancy at a Tertiary Hospital

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**ABSTRACT**
COVID-19 infection may cause increased rates of unfavorable outcomes in the course of the pregnancy. Present study was aimed to study obstetric risk factors, complications and outcomes of pregnancies complicated by COVID 19 infection during pregnancy at a tertiary hospital. Present study was prospective, observational study, conducted in ANC patients came to tertiary health care center history of COVID infection (RTPCR positive report as proof). Maternal and neonatal outcome was analyzed. Out of 60 patients, majority of them belonged to age group 19-25 years (60%), were residing in urban area (70%) and from upper middle class (36.67%). 28 (47%) patients had cough, 21 (35%) patients had fever, 15 (25%) patients had myalgia/malaise, 14 (23%) patients had loss of taste/ smell, 11 (18%) patients had nasal congestion, 8 (13%) patients had sore throat, 5 (8%) patients had dyspnea. 22 (37%) patients were asymptomatic. Majority of the patients were P2 (45%), were in the category of 35-39 weeks (76%). 12 (20 %) patients had vaginal delivery., 48 (80%) patients had undergone caesarean section delivery. Till study period 42 women delivered, no neonatal mortality noted. Majority of the neonates had birth weight ≥ 2500 grams comprising of 36 (85.7%) neonates, followed by 4 (9.5%0 and 2 (4.7%) babies in 1500-2499 and <1500 grams categories, respectively. 8 (19%) neonates required neonatal intensive care unit admission, whereas 34 (81%) did not require it. Our study concludes that majority of Covid-19 positive pregnant women had mild disease with good fetomaternal outcome.

## INTRODUCTION

Corona virus disease 2019 (COVID-19) is a contagious disease caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019[1]. The disease has since spread worldwide, leading to an ongoing pandemic[2]. Symptoms of COVID 19 are variable, but often include fever, cough, headache, fatigue, breathing difficulties, loss of smell and loss of taste[3,4]. COVID-19 has a global CFR of ~6.4% and has caused more deaths than MERS and SARS combined[5]. Understandably, this raises concerns regarding its effects during pregnancy. This is because pregnancy is associated with physiological changes in women which make them more susceptible to respiratory infections and subsequent rapid progression to respiratory failure[6]. COVID-19 infection may cause increased rates of unfavorable outcomes in the course of the pregnancy. Some examples of these could be fetal growth restriction, preterm birth and perinatal mortality, which refers to the fetal death past 22 or 28 completed weeks of pregnancy as well as the death among live-born children up to seven completed days of life[7]. Present study was aimed to study obstetric risk factors, complications and outcomes of pregnancies complicated by COVID 19 infection during pregnancy at a tertiary hospital.

## MATERIALS AND METHODS

Present study was single-center, prospective, observational study, conducted in Department Of Obstetrics And Gynecology Government Medical College, Jalgaon, India. Study duration was of 2 years (July 2020 to June 2022). Study was approved by institutional ethical committee.

**Inclusion Criteria:**

- All ANC patients came to tertiary health care center history of COVID infection (RTPCR positive report as proof) admitted in Obstetrics and Gynecology wards, willing to participate in present study.

**Exclusion Criteria**:

- All women who were shifted to other canter for delivery.

Study was explained to participants in local language and written informed consent was taken. Demographic details along with brief medical history was recorded using a preform designed questionnaire for data collection in this study. All ANC patients came for delivery who are diagnosed at least once throughout the pregnancy as COVID positive with (RTPCR Confirmatory test) were be considered for this study after explaining study procedure in her language and taking her consent. Once enrolled, their data was collected with the help of preformed questionnaire. Also, the NICU or long duration admission of the mother or child was evaluated until discharge. Data is entered in Excel and analyzed in SPSS software version 20. The data was imported into Excel and analyzed with SPSS version 23. Continuous variables with regularly distributed distributions were reported using mean±standard deviation., otherwise, median and inter quartile range were utilized. Numbers and percentages were used to report categorical variables.

## RESULTS AND DISCUSSIONS

Out of 60 patients, majority of them belonged to age group 19-25 years comprising of 36 (60%) patients, followed by 15 (25%) patients in 26-30 years and 9 (15%) patients in 31-35 years age group. Majority of the patients were found to be residing in urban area (70%). Majority of the patients to upper middle class comprising of 22 (36.67%) patients followed by 16 (26.67%) patients in lower middle class. 6 of 60 (10%) patients had travel history, 7 (12%) patients had contact history whereas there was no such history in 47 (78%) of the patients.

**Table 1: General Characteristics**

| Characteristics | No of patients | Percentage (%) |
|---|---|---|
| Age group (in years) | | |
| 19-25 | 36 | 60.00 |
| 26-30 | 15 | 25.00 |
| 31-35 | 9 | 15.00 |
| Residence | | |
| Rural | 18 | 30.00 |
| Urban | 42 | 70.00 |
| Socio-Economic Class | | |
| Upper class | 7 | 11.67 |
| Upper middle | 22 | 36.67 |
| Lower middle | 16 | 26.67 |
| Upper lower | 9 | 15.00 |
| Lower | 6 | 10.00 |
| History | | |
| Travel history | 6 | 10.00 |
| Contact history | 7 | 11.67 |
| Unidentified | 47 | 78.33 |

In the present study 28 (47%) patients had cough, 21 (35%) patients had fever, 15 (25%) patients had myalgia/malaise, 14 (23%) patients had loss of taste/ smell, 11 (18%) patients had nasal congestion, 8 (13%) patients had sore throat, 5 (8%) patients had dyspnea. 22 (37%) patients were asymptomatic.

**Table 2: Symptoms**

| Symptoms | Number of patients | Percentage (%) |
|---|---|---|
| Asymptomatic | 22 | 36.67 |
| Fever | 21 | 35.00 |
| Cough | 28 | 46.67 |
| Sore throat | 8 | 13.33 |
| Dyspnea | 5 | 8.33 |
| Headache | 4 | 6.67 |
| Nasal congestion | 11 | 18.33 |
| Loss of smell/taste | 14 | 23.33 |
| Myalgia/malaise | 15 | 25.00 |
| Diarrhea | 1 | 1.67 |

Majority of the patients were multipara with P2 consisting of 27 (45%) patients followed by 23 (38%) patients being P1 and 10 (16.6%) patients were >P3

Majority of the patients were in the category of 35-39 weeks comprising of 46 (76%) patients followed by 5 (8%), 4 (7%) patients in >40 weeks, 30-34 weeks, respectively. In the present study, 12 (20 %) patients had vaginal delivery, 48 (80%) patients had undergone caesarean section delivery.

**Table 3: Obstetric Characteristics**

| Characteristics | No of patients | Percentage (%) |
|---|---|---|
| Parity | | |
| P1 | 23 | 38.33 |
| P2 | 27 | 45.00 |
| >P3 | 10 | 16.67 |
| Gestational age on admission (weeks) | | |
| <20 | 1 | 1.67 |
| 20-24 | 2 | 3.33 |
| 25-29 | 2 | 3.33 |
| 30-34 | 4 | 6.67 |
| 35-39 | 46 | 76.67 |
| >40 | 5 | 8.33 |
| Obstetric outcomes | | |
| Vaginal delivery | 12 | 20 |
| Caesarean section | 48 | 80 |

On analyzing co-morbidities, 11 (18%) patients had co-morbidities while remaining 49 (82%) patients had no comorbidities. Amongst co-morbidities, anemia was most commonly encountered, affecting 4 (7%) patients, followed by gestational diabetes and hypothyroidism each in 3 (5%) patients and pre -eclampsia in 1 (1.7%) patient.

**Table 4: Comorbidities**

| Comorbidities | Number of patients | Percentage (%) |
|---|---|---|
| Anemia | 4 | 6.67 |
| GDM/DM | 3 | 5.00 |
| Pre-eclampsia | 1 | 1.67 |
| Hypothyroidism | 3 | 5.00 |
| None | 49 | 81.67 |

Till study period 42 women delivered, no neonatal mortality noted. Majority of the neonates had birth weight ≥2500 grams comprising of 36 (85.7%) neonates, followed by 4 (9.5%0 and 2 (4.7%) babies in 1500-2499 and <1500 grams categories, respectively Birth weight according to gestational age was adequate in majority of the neonates comprising of 30 (71%) neonates, followed by 8 (19%) neonates who were small for gestational age and 4 (9.5%) neonates who were large for gestational age. APGAR score at 1 minute was in the range of 7-10 in majority of the neonates (86%), APGAR score at 5 minutes was in the range of 7-10 in majority of the neonates (95%). 8 (19%) neonates required neonatal intensive care unit admission, whereas 34 (81%) did not require it.

**Table 5: Neonatal Outcome**

| Characteristics | Number of neonates | Percentage (%) |
|---|---|---|
| Birth weight [gm] | | |
| < 1500 | 2 | 4.76 |
| 1500-2499 | 4 | 9.52 |
| ≥2500 | 36 | 85.71 |
| Apgar at minute 1 | | |
| 1-3 | 1 | 2.38 |
| 4-6 | 5 | 11.90 |
| 7-10 | 36 | 85.71 |
| Apgar at minute 5 | | |
| 1-3 | 1 | 2.38 |
| 4-6 | 1 | 2.38 |
| 7-10 | 40 | 95.24 |
| Birth weight for gestational age | | |
| LGA (large for gestational age) | 4 | 9.52 |
| AGA (adequate for gestational age) | 30 | 71.43 |
| SGA (small for gestational age) | 8 | 19.05 |
| NICU admission (n=42) | | |
| Yes | 8 | 19.05 |
| No | 34 | 80.95 |

In the present study out of 60 patients, majority of them belonged to age group 19-25 years (60%). Similar findings were recorded in studies done Savasi[8] Majority of the patients were found to be residing in urban area (70%), belong to upper middle class (36.67%). It is exceedingly difficult to maintain social distance when there is a high population density, bad working circumstances and limited dwelling space. Majority of the patients were para 2 (45%) followed by primipara (38%). In a study done by Marsden[9] there were no connections between parity and the incidence or severity of COVID-19 infection. In a study done by Fallach[10] median gestational age at birth was lower in infected (39 weeks., IQR 39-40 weeks) compared to non-infected (40 weeks., 39-40 weeks p<0.001). In the present study 28 (47%) patients had cough, 21 (35%) patients had fever, 15 (25%) patients had myalgia /malaise, 14 (23%) patients had loss of taste/ smell, 11 (18%) patients had nasal congestion, 8 (13%) patients had sore throat, 5 (8%) patients had dyspnea. 22 (37%) patients were asymptomatic. In a review by Ciapponi[11], it was reported that fever (40%), cough (39%) and dyspnea (19%) were the most common symptoms. It also reported that raised C reactive protein levels (49%) and lymphopenia (35%) were the most common laboratory findings. Regarding findings on X-rays or CT, ground glass appearance had a prevalence of 69% and any other abnormalities on CT had a prevalence of 65%. Wang[12] also reported similar findings. On analyzing co-morbidities, 11 (18%) patients had co-morbidities while remaining 49 (82%) patients had no comorbidities. Many elderly patients (>60 years), immunosuppressed and patients with concomitant conditions such diabetes, hypertension and chronic lung disease have been documented to have severe COVID-19. Although the majority of pregnant women are younger than middle age, it is crucial to take into account the possible effects of pre-existing co-morbidities like hypertension, diabetes mellitus on the results of the COVID-19 in pregnant women. de Oliveira[13] noted that the presence of comorbidities in pregnant women diagnosed with covid-19 disease. In the present study, 21 (35%) patients had vaginal delivery, 16 (26.7%) patients were discharged undelivered from the hospital as they were far from term, 15 (25%) patients had undergone caesarean section delivery, 6 (10%) patients had preterm delivery, 2 (3%) patients had abortion. In a review article by de Oliveira[13] in eleven studies, term delivery (31.4%) and seven (20%) preterm births were the results. Twelve studies (34.3%) reported that the frequency of full-term births ranged from 23.1-100%, while the frequency of preterm births ranged from 8.7-100%. These discrepancies were caused by the extreme heterogeneity of the study populations. When categorizing the causes of caesarean deliveries, we found 29 studies. Nine of them (31.0%) cited infection

as the cause of 16-100% of the caesarean sections, although they did not specify how severe the infection was. Other explanations were discovered in seven (24.1%) papers, including symptoms of fetal hypoxemia identified by cardiotocography, transverse presentation, failure to advance, fetal problems unrelated to COVID-19, maternal coagulopathy and one report that cited parturient choice. The gestational outcome in five investigations was abortion and in one of them, the pregnancy was found after a significant aggravation of ulcerative colitis, making it impossible to estimate the gestational age. Abortion was the end result in the other investigations and its incidence ranged from 6.3-50%. All of the pregnant women who underwent abortions had significant COVID-19 infections[13]. Majority of the neonates had birth weight ≥2500 grams comprising of 36 (85.7%) neonates, followed by 4 (9.5%) and 2 (4.7%) babies in 1500-2499 and <1500 grams categories, respectively. The incidence of low birth weight in present study was low as compared to that reported by Villar[14] wherein incidence of low birth weight in covid positive mother was around 20% and 15% in a study done by de Mederios[15]. Majority of the neonates were adequate for gestational age (71%), followed by neonates who were small for gestational age (19%). The percentage of neonates who were small for gestational age was reported to be 14% in a study done by Villar[14] 8 (19%) neonates required neonatal intensive care unit admission, whereas 34 (81%) did not require it. Mederios[15] reported higher incidence of NICU admission in neonates born to covid positive mothers in their study. They reported that 28% of the neonates required NICU admission. It is important to emphasize here that factors determining NICU admission vary from hospital to hospital. The authors had commented that it is possible that most of the NICU admissions might be done only to monitor clinical status of neonates. Given that pregnant women are a particularly susceptible demographic, it is advised that preventative recommendations be strengthened and universal screening programmes be implemented. Health managers should use their understanding of the profile of COVID-19 infection in pregnant women to inform their public health activities and decisions at all levels, targeted at this particular population. Additionally, aide tactics and elaborate care protocols may be created based on this profile to optimize nursing care.

## CONCLUSION

Our study concludes that majority of Covid-19 positive pregnant women had mild disease with good fetomaternal outcome. Extensive and stringent care must be provided during antenatal, intrapartum and postpartum period to ensure transmission-free clinical scenario. Along with maternal and postnatal care, awareness, knowledge and attitude is essential and practice on COVID-19 management in pregnancy should be reiterated among all mothers as well as healthcare workers.

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