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Spectrum Of Pregnancy With Covid-19 And Its Feto-Maternal Outcome At Tertiary Level Care Center

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Abstract

BACKGROUND : This study intends to analyze about the varying spectrum of COVID-19 disease in pregnant women and its effect on feto-maternal outcome**.**

MATERIAL AND METHODS : Prospective analysis of 100 COVID-19 positive pregnant women at a tertiary care center in North India.

RESULTS : The mean maternal age was 26.69 years. Main symptoms included tiredness (100%), fever (65%), cough (50%), dyspnea (50%). 72% of USG findings were normal but incidence of oligohydramnios, IUFD and absent diastolic flow were 16%, 8%, 4% respectively. Co-existing medical illness like hypertension, hypothyroidism, deranged LFT were prevalent in 45% of patients. Most of the deliveries were preterm (44%) and most common mode of delivery was LSCS (57%). Among them 72.4% were alive, 13.26% IUFD and 4.08% still births. Neonatal complication occurred in 11.1% but neonatal mortality was only 3.3% and 2 neonates came positive within 24 hours of delivery. 50% patients needed assisted ventilation .Maternal mortality rate was 4%.

CONCLUSION: The present study shows that Pregnancy is a high risk state and additional stress of viral illness makes it more vulnerable to both mother and fetus leading to maternal and fetal co morbidities. As covid 19 itself is a mystery and whole world is coping to control it by using preventive measures and vaccination, pregnancy even when not associated with co morbidities requires proper and timely intervention and correct decision making according to gestational age to improve neonatal and maternal survival rates**.**

Keywords: COVID,PREGNANCY,PRETERM

Introduction

Corona virus disease has spread worldwide and is caused by mutated beta corona virus which was first reported in Wuhan, China in December 2019. In India first case of covid was detected on 30th January 2020. WHO declared it as pandemic on 11thMarch 2020(1).

Various studies across the world stated that covid 19 is a potential threat to the people at any stage and of any ethnicity and its severity is proportionally related to age and associated medical illnesses. Pregnant women constitute an important section of population which need special attention during this pandemic.

Data on covid-19 in pregnancy so far has been very sparse and the biggest challenge in front of obstetricians all over the world is how to manage covid infection during pregnancy and what are the effects of this infection on mother and fetus, optimum timing of delivery and safe route of delivery in such cases. Thus a novel attempt is made to evaluate 100 covid positive pregnant women and their feto-maternal outcome and this study aims to draw awareness in healthcare professionals to initiate optimal and timely interventions, therapeutic decisions and management by multidisciplinary approach to provide best fetal and maternal care.

Materials And Methods

This is a single centered prospective study of 100 randomly selected covid 19 positive pregnant women admitted in dedicated covid center of SMS Medical

College, Jaipur during second wave from March 2021 to June 2021.

Nasopharyngeal swab for RT-PCR was taken in all symptomatic pregnant women to confirm covid 19 status.

Inclusion criteria: covid19 positive pregnant women, admitted in maternity ward and willing to participate in the study.

Parallel evaluation was done with regards to age, socioeconomic status, literacy, residential area and religion. These women were monitored closely for the course of disease.

Clinical presentation, laboratory findings, USG findings, gestational age at the time of infection and delivery, mode of termination, associated co-morbidities, maternal and neonatal outcome were evaluated.

Aim of this study is to assess fetal and maternal outcome in covid-19 positive pregnant women.

All pregnant women positive for RT-PCR were admitted and after taking proper history and blood investigations, were started on higher antibiotic, steroids and anticoagulants and were managed according to National Protocol Guidelines.[(2)]

All covid positive pregnant women requiring oxygen support or having fetal indication of termination of pregnancy were delivered according to bishop's score assessment and maternal and fetal status.

The patient with severe respiratory distress were terminated irrespective of gestational age to improve maternal prognosis.

All patients requiring BIPAP and higher modes of support were kept in ICU and monitored carefully and those who maintained oxygen levels on room air were home quarantined after proper antibiotic coverage.

All delivered neonates were admitted for observation and nasopharyngeal swab for RTPCR was taken with in 24 hours of delivery. All neonates were assessed for their birth weight, APGAR score, NICU admission and covid status.

All the participants were counseled about the study and informed consent was taken. Study was reviewed by institutional ethical committee.

Statistical Analysis

Data were coded and recorded in MS Excel spreadsheet program. SPSS v23 (IBM Corp.) was used for data analysis. Descriptive statistics were elaborated in the form of means/standard deviations and medians/IQRs for categorical variables. Data were presented in a graphical manner wherever appropriate for data visualization using histograms/box-and-whisker plots/column charts for continuous data and bar charts/pie charts for categorical data. Group comparisons for continuously distributed data were made using independent sample 't' test when comparing two groups. If data were found to be non-normally distributed, appropriate non parametric test in form of Wilcoxon test were used. Chi-squared test was used for group comparisons for categorical data. In case the expected frequency in the contingency tables was found to be <5 for >25% of the cells, Fisher's Exact test was used instead. Linear correlation between two continuous variables was explored using Pearson's correlation (if the data were normally distributed) and Spearman's correlation (for non-normally distributed data). Statistical significance was kept at $p<0.05$.

Results

A total of 100 covid positive pregnant women were included in study.

Socio-demographic factors are shown in Table-1. Most of the women belonged to age group of 20-30 years and mean age of study group was 26.69 years. Maximum women were Hindu (86%), almost half of women were hailing from lower middle class group (56%), maximum women (70%) were literate 52% women belonged to urban area and 47% were primigravida.

Symptoms, signs and co-existing medical conditions are analysed in Table-2. Among covid positive pregnant women 45% had co existing medical illness as compared to 65% women who did not have any associated illness.

The prevalence of hypertension, hypothyroidism, deranged LFT were 14%, 4% and 20% respectively, other co morbidities were heart disease, gout,

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wegners granulomatosis, severe anemia and asthma in ratio of 1%, 1%, 1%, 3%, 1% respectively.

Most common symptoms evident were tiredness seen in almost all cases (100%) followed by fever (65%) cough (50%) and breathlessness (50%) as shown in bar diagram in Figure-1.

In most women leucocyte count was within normal limits and leukocytosis was 10%, leucopenia in 3%, transaminase levels were deranged in 20%, and D-dimer, serum ferritin and IL-6 were elevated in 32%, 20% and 11% respectively ,CRP levels were elevated in most of the patients.

USG findings were normal in majority of women (72%) followed by oligohydramnios, IUFD, absent diastolic flow in 16%, 8%, 4% cases respectively.

Pregnancy and perinatal outcomes are shown in Table-3. Around 49.4% cases experienced preterm delivery, followed by term and post term pregnancies in 46.1% and 4.5% respectively. Fetal distress was seen in 20% in cases.

Lower Segment Caesarean Section was done in 57% followed by induced vaginal delivery, spontaneous vaginal delivery in 21%, 10% respectively.

Among delivered women live births were in 72.4% cases followed by 13.26% and 4.08% IUFD and still births.

Oxygen supplementation was required in 50% of study population, most common mode being face mask and high flow mask in 15% in each category followed by BIPAP, NIV and mechanical ventilation in 3%, 12%, 5% respectively as depicted in pie chart in Figure-2.

3% patients developed cardiac complications like sinus bradycardia and first degree heart block.

3% of patients developed barotrauma due to artificial ventilation.

4% patient expired due to covid infection.

Neonatal complication rate was 11.1% and neonatal mortality was 3.% and covid infection was seen in 2% neonates.

Figure-1 : Prevelance of Symptoms in Cases

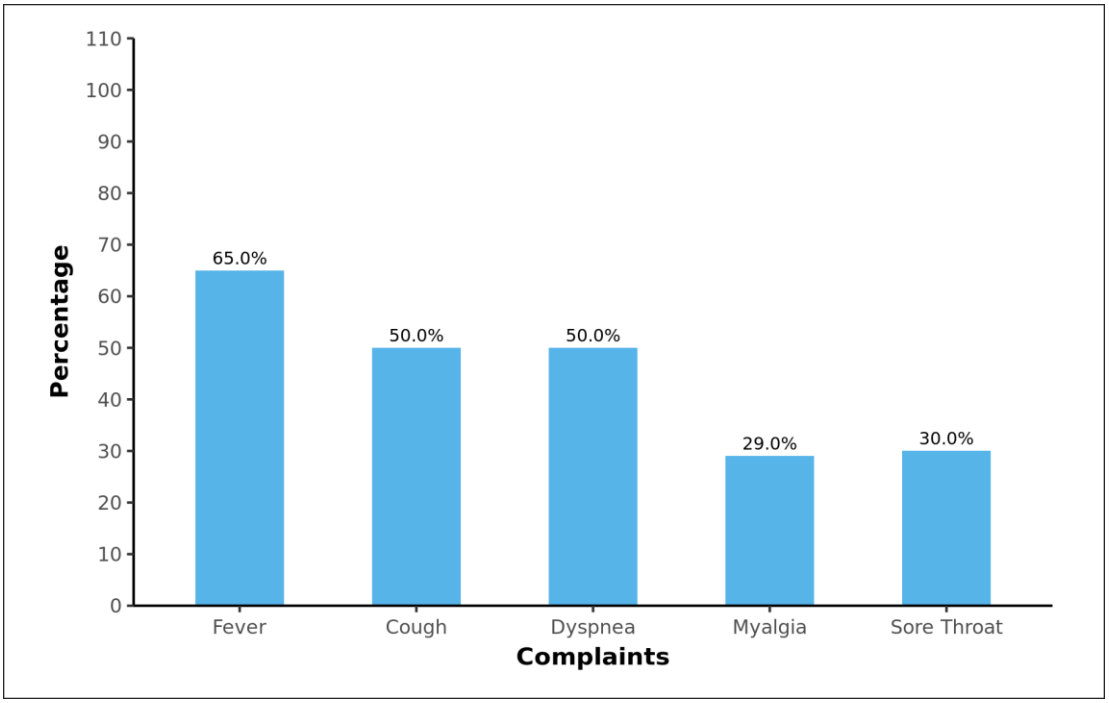

Figure-2 : Distribution of Assisted Ventilation Type

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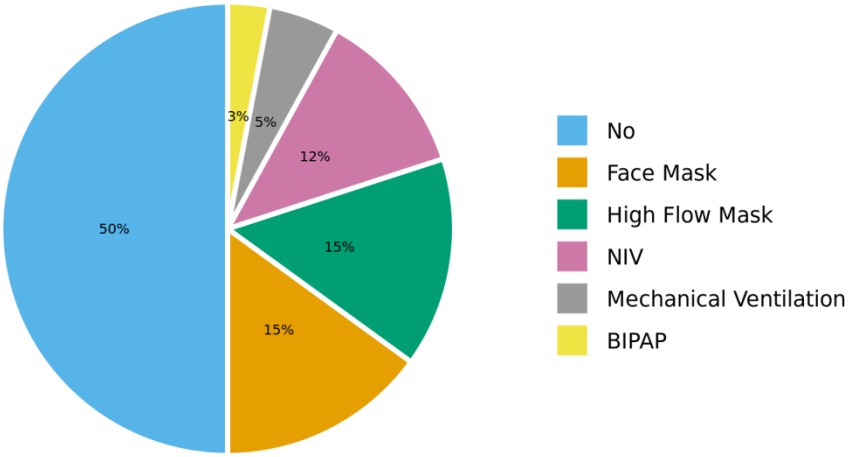

Table-1

Socio-demographic Factors and Maternal Characteristics

Age	
≤20 Years	7 (7.0%)
21-30 Years	73 (73.0%)
31-40 Years	19 (19.0%)
41-50 Years	1 (1.0%)
Religion	
Hindu	86 (86.0%)
Muslim	14 (14.0%)
Socioeconomic Status	
Upper Middle	4 (4.0%)
Middle	40 (40.0%)
Lower Middle	56 (56.0%)
Education	
Illiterate	30 (30.0%)
Literate	70 (70.0%)
Residence	
Rural	48 (48.0%)
Urban	52 (52.0%)
Parity	
P0	47 (47.0%)
P1	37 (37.0%)

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≥P2	16 (16.0%)

Table-2

Symptoms, Signs & Co-existing Medical Illness

SYMPTOMS	
Tiredness	100 (100.0%)
Fever	65 (65.0%)
Cough	50 (50.0%)
Dyspnea	50 (50.0%)
Myalgia	29 (29.0%)
Sore Throat	30 (30.0%)
Associated co-morbidities	
Deranged LFT	20(20.0%)
HDP	14 (14.0%)
Hypothyroidism	4 (4.0%)
Others	7 (7.0%)
None	65 (65.0%)
USG Findings	
Normal	72(72.0%)
Oligohydramnios	16 (16.0%)
IUFD	8 (8.0%)
Absent Diastolic Flow	4 (4.0%)
Lab findings	
Leucocytosis	10 (10.0%)
Deranged LFT	20 (20.0%)
Positive D –Dimer	32 (32.0%)
IL-6	11 (11.0%)
Serum Ferritin	20 (20.0%)
Leucopenia	3 (3.0%)

Table-3

Maternal and Fetal Outcome

Gestational age at the time of delivery	

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Preterm	44 (44%)
Term	52(52%)
Post-Term	4 (4%)
Fetal distress	20.0%
No distress	80.0%
Fetal Outcome	
Alive	81(81%)
IUFD	13 (13%)
Stillborn	4 (4%)
Mode of Termination	
LSCS	57 (57.0%)
Induced VD	21 (21.0%)
Spontaneous VD	20 (22.0%)

Table-4

Maternal & Neonatal Morbidity and Mortality

Maternal Outcome	
No oxygen requirement	50 (50.0%)
Face Mask	15 (15.0%)
High Flow Mask	15 (15.0%)
NIV	12 (12.0%)
Mechanical Ventilation	5 (5.0%)
BIPAP	3 (3.0%)
Morbidity	45 (45.0%)
Mortality	4 (4.0%)
Neonatal Outcome	
Birth weight (Mean)	2.24 kg
APGAR score (Mean at 1 and 5 min)	6, 7
NICU admission	100 (100.0%)
Covid status	2 (2.0%)
Mortality	3 (3.0%)

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Discussion

Most of the patients (80%) belonged to younger age group(<30yrs) due to the concept of early marriage and conception in India. As viral infections are contagious, sociodemographic factors played important role in the spread of the infection. Half of the women in the study group belonged to lower middle class ,owing to spread of communicable disease to such a mass level due to poor sanitation, overcrowding and non compliance. Around 70% patients were literate as educated people were more aware of covid symptoms. As our center is a tertiary level hospital, it is a referral centre from all private hospitals of city as well rural areas nearby so number of patients from rural and urban areas were comparable.

In our study common symptoms were tiredness, fever, cough and breathlessness in 100%, 65%, 50% and 50% cases respectively, and in a study done by Chen N et al the proportions were 100%, 83%, 82%, 31% respectively.[3] According to Gao YJ et al incidence of fever, cough and positive CT findings were less in pregnant women than in normal population with covid 19.[4] Similarly symptoms are less severe in our study, may be due to younger average age compared to general population as well as decreased incidence of chronic co existing medical conditions indicating milder form of disease in our study as we have taken only pregnant women instead of general population and also this result was in line with another study by Liu et al. that compared pregnant and non –pregnant covid-19 patients, where pregnant patients were classified as mild.[5]

All cases taken in study were assessed for the presence of baseline co-existing illness like hypertension, hypothyroidism, severe anemia etc. Incidence of co-existing medical illnesses in our study is 45% which is significantly more than what is observed in covid negative pregnant women (20-25%) because pregnancy associated with co morbidities is more susceptible to any infection than any other normal pregnancy.

Among these 45% women 35.5% had fetal distress, 40% needed assisted ventilation. Morbidity is more in this group because of increased severity of disease in cases with associated co existing medical conditions.

USG findings were normal in majority of cases (72%) but oligohydramnios, IUFD and abnormal doppler finding were present in 16%, 8% and 4% cases. Ultrasonographic examination was done 7-8 days after development of fever. Around 69.2% of patient who delivered IUFD had history of fever which is statistically significant. Around 50% of patient whose liquor was very less (oligohydramnios) or nil had a history of fever. Moreover, around 53.8% in women who delivered IUFD and 50% in women with oligohydramnios required assisted ventilation. These findings show that covid has some adverse effect on ongoing pregnancy and that may be due to microthrombi formation in maternal and placental vascular malperfusion which is a hallmark of covid infection.This is in accordance with studies conducted by Prabhu et al[6] who proved the evidence of vascular malperfusion by conducting placental histopathology showing evidence of thrombosis in fetal circulation.

Laboratory parameters show different trend in covid positive pregnant women as compared to covid infected general population. Incidence of leukocytosis, deranged LFT, positive D-DIMER, raised serum ferritin, elevated IL-6, was 10%, 20%, 32%, 20%, 11% respectively. In our study leucopenia (TLC less than 4000) was seen in only 3% cases which is very unlikely of covid infection. This finding can be explained by the fact that pregnancy is a state of leucocytosis due to increased level of corticosteroid and estrogen. This leucocytosis of pregnancy may compensate leucopenia of covid infection. That is why leucopenia is less evident in our study.

In our study, rate of fetal distress was 20% which is significantly higher when compared to non infected pregnant population (9%) and this may be attributed to covid related oxygen deficiency and placental changes. Our finding is consistent with Chen et al, which showed in their study that covid 19 can result in fetal distress but does not affect neonates.[7]

Di Mascio et al showed higher rate of preterm delivery (41.1%) LSCS and perinatal complications.[8] Almost similar rate (44%) was

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observed in our study. Rate of preterm delivery in general population is 11%, which is significantly lower than our study. Being an obstetrician our primary aim is to save life of mother that is why we terminated pregnancy prematurely in sick mother and this may be the cause of such a high rate of preterm delivery in our study group.

Most common mode of delivery was LSCS and it is due to unfavorable bishop score which is more common when pregnancy is terminated remote from term.

Among 100 cases 72.4% had live births followed by 13.26% and 4.08% had IUFD and still births. In 10% women pregnancy was not terminated either because of milder disease or good response to the treatment. Mean birth weight of neonates in study population was 2.24 kg, this is lower than the normal population and it is due to more preterm delivery and covid related placental changes. Average APGAR score at 1 and 5 min was 6,7 which is considered normal. All 100% neonates were admitted in NICU .Only 2.% neonates were tested positive within 24 hours of delivery, which was confirmed by RT-PCR. Although it is not possible to get COVID infection within 24 hours of birth due to close contact with mother. RT PCR positive status of neonate may be because of vertical transmission but more extensive research is needed to establish this fact. This finding is in relevance with those of Dong et al showing postpartum elevation of IgM levels in neonates.[(9)]

Neonatal mortality rate was 3% as consistent with findings of Chen et al.

Almost 50% patients were on oxygen support, most common reason being our setup as a tertiary care center and has referral from periphery.

3% patient developed cardiac complications like sinus bradycardia and first degree heart block, increasing the suspicion of viral myocarditis like features. Arentz M et al gave evidence of development of viral myocarditis and cardiomyopathy in 33% critically ill non pregnant[(10)] cases so an extensive research and long term follow up is yet to be done to establish such conclusions in pregnant women with covid positive status.

Moreover use of assisted ventilation lead to barotrauma causing subcutaneous emphysema, and thus increasing morbidity of the patient due to ICD insertion and its related complications.

Maternal mortality rate was 4% in our study.All were hindus and were very sick and over period developed severe form of respiratory disease and expired.

Conclusions

Due to covid infection the rate of iatrogenic premature deliveries has increased leading to increased morbidity and mortality of both neonate and mother. Also, as covid 19 is an evolving disease along with all preventive measures of hand hygiene, mask wearing, proper sanitization etc, standard protocols are to be developed more elaborately to prevent termination of pregnancy prematurely and there is a dire need to train healthcare workers even at low resource settings to succumb such diseases in future at a small level only. Approval of vaccination in pregnant and lactating women by FOGSI, may further help in preventing the disease as risk of getting COVID-19 in pregnancy and resulting morbidity is much more than the theoretical risks from the vaccine.[(11)] Since data on effect of vaccination in pregnancy is under research, so vaccination in pregnancy should be done only after informed risk and benefit ratio.

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