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Prospective Study of Maternal and Fetal Outcome in Covid Positive Pregnant Women

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ABSTRACT
SARS-CoV-2 is the strain of corona virus which causes COVID-19. It was first identified in Wuhan City, China, towards the end of 2019. And subsequently spread rapidly to affect rest of the world over a period of 3-4 months, one of the fastest spreading infectious diseases recorded in the history of mankind
Pregnant women appear more or less likely to contract coronavirus than the general population. There is growing evidence that pregnant women and neonates may be at increased risk of severe illness than non-pregnant women. Therefore, this study aimed to determine the maternal and fetal outcome in COVID-19 positive pregnancies.
This is a prospective study conducted in obgy department of MP shah medical college Jamnagar over a period of 1 year. All cases of pregnancy with COVID-19 infection admitted in COVID hospital & patient who visited labour room with complaints were recruited for study after taking consent from the participants. It included patients in first and second wave of the pandemic.
Most of the pregnant women were asymptomatic (51%), who were mostly multigravida (70%) with mean age group of 18-25 years (45%) with travel history to COVID affected areas in only 5% of the cases and mostly were near term (75%). The percentage of caeseran section was 55% and vaginal delivery was 45%. Out of 100 patients 13% patients were admitted in HDU, 8%in ICU and 79% were in isolation ward. Out of 86 live births 14 newborns were admitted in NICU. None of the newborns were COVID 19 positive. Maternal mortality due to COVID 19 infection with underlying comorbidities were 13% and the rest were discharged after effective COVID 19 treatment.
Majority of the mothers were discharged without any complications but severe maternal and perinatal morbidity & mortality due to COVID-19 were reported. Vertical transmission of COVID 19 cannot be ruled out. Proper monitoring of pregnancies with COVID-19 & measured to prevent neonatal infection are to be followed.
Keywords: *coronavirus, COVID-19, neonatal mortality, maternal mortality, SARSCOV 2*

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I. INTRODUCTION

Corona virus is a positive-stranded ribonucleic acid (RNA) enveloped virus belonging to the coronaviridae family that causes respiratory and gastrointestinal infections ranging from mild, self- limiting conditions to more serious disorders such as viral pneumonia with systemic complications.

Women who are pregnant or planning to become pregnant are regarded to be at high risk due to concerns regarding the effects of COVID-19 on them during and after pregnancy, as well as on their fetus. Pregnant women are more sensitive to becoming victims of pathogens than non-pregnant women because of physiological changes in the cardiovascular, respiratory, and immunological systems that occur during pregnancy. This is particularly true in case of outbreaks like the COVID-19 infection. The first trimester bears a major risk for miscarriage and fetal developmental abnormalities. The late second and third trimesters carry an increased likelihood for the development of maternal conditions such as gestational diabetes and hypertensive disorders which contribute to maternal morbidity and premature birth.

Cells at the maternal –fetal interface play crucial roles in development and regulation of the maternal immune response. Viral infections can interfere with the function of these cells and ultimately impair placental function.

II. AIMS AND OBJECTIVES

The aim of this study is to know:

1) Effect of COVID19 infection on pregnancy and its outcome
2) Clinical management of maternal disease severity and mode of delivery (Indication of caesarean section)
3) Neonatal outcome, risk of perinatal complications.

III. MATERIALS AND METHODS

This is a prospective study conducted in Department of Obstetrics and Gynecology over a period of 1 year. All necessary antenatal investigations and COVID-19-specific investigations, including complete blood count (CBC), C-reactive protein (CRP), liver function test (LFT), kidney function test (KFT), D-dimer, and chest X-ray posteroanterior (PA) view with abdominal shield were done on admission. COVID-19 reverse transcriptase-polymerase chain reaction (RT- PCR) test was performed on swabs obtained from the nasopharynx for all newborns on the day of delivery and repeated on the seventh day of life. All newborns were allowed to breastfeed following preventive measures for COVID-19. Neonates were kept separately and given to mothers only during breastfeeding. Instructions were given to mothers regarding wearing a face mask to cover their nose and mouth during breastfeeding and hand hygiene (hand wash/sanitization) every time before breastfeeding. COVID-19-infected pregnant women were managed according to the Government of India guidelines. On the 10th day of admission, the SARS-CoV-2 RT-PCR test was performed on a swab from the nasopharynx of women again. Detection of COVID-19 was done by RT-PCR from a center authorized by the Government of India and state governments. We followed these pregnant women after discharge from the hospital till delivery and their maternal and fetal outcomes were noted.

INCLUSION CRITERIA

1. Confirmed RTPCR/RAT positive patients during pregnancy.
2. Symptomatic pregnant female with complaints of cough, fever, breathlessness with low saturation (clinically considered as covid patients) even without RTPCR, RAT reports/ negative reports.

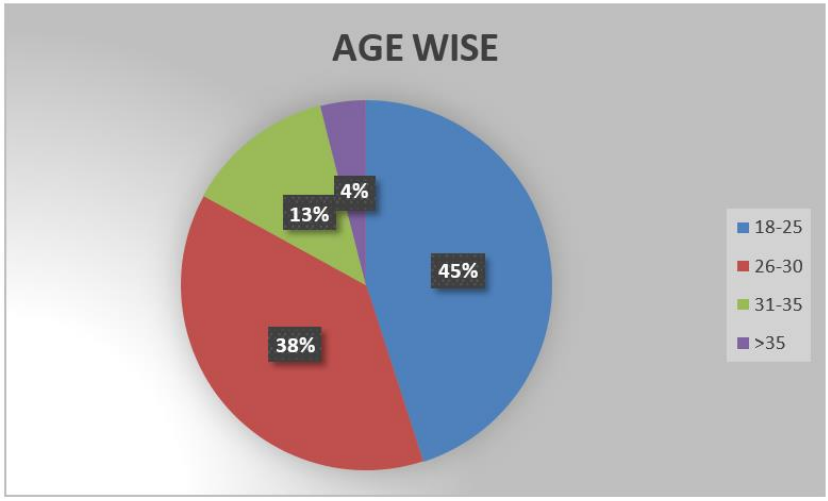
EXCLUSION CRITERIA

1. Patients who tested positive after 14 days of delivery.
2. Pregnant females with confirmed antenatal scan of oligohydromnios, IUGR, congenital anamolies prior to COVID19 infection.
3. Pregnant females with chronic respiratory disease, chronic hypertension, k/c/O DM.
4. Pregnant women who are covid negative and asymptomatic.
5. Positive non pregnant women are excluded from the study.

IV. RESULTS

TABLE NO 1: AGE DISTRIBUTION TABLE AGE WISE

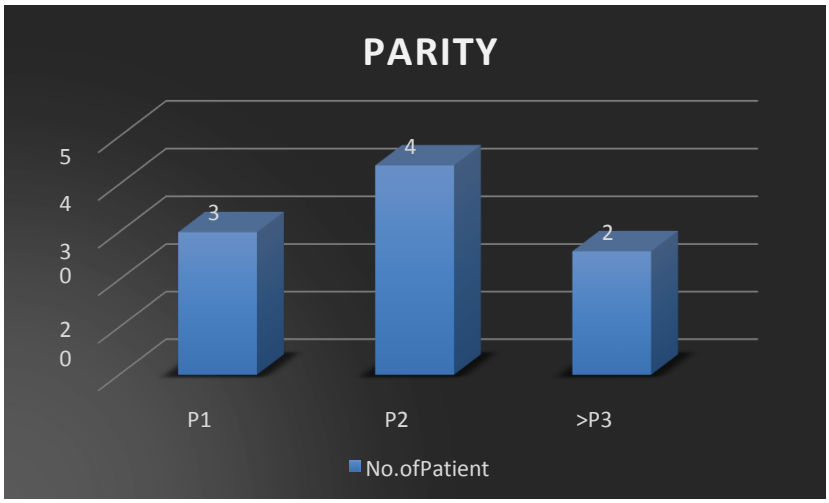
Age Group	No. of Patients	Percentage
18-25	45	45%
26-30	38	38%
31-35	13	13%
>35	4	4%
TOTAL	100	100%



Out of total 100 women,45% were in 18 to 25yr age group,38% were in 26 to 30 yr. age group,13% were in 31 to 35 yrs age group,4 % were in >35yrs age group which is comparable to Shree et al (67.1%) and Chavan et al (46.1%).

TABLE NO 2 : DISTRIBUTION ACCORDING TO PARITY

Parity	No. of Patients	Percentage
P1	30	30%
P2	44	44%
>P3	26	26%
	100	100



In this study population, 30% were primigravida, 70% were multigravida which is again comparable to Shree et al(59.5%) and Chavan et al studies(63.9%)

TABLE NO 3: HISTORY

HISTORY	No of patients	Percentage
TRAVEL HISTORY	5	5
CONTACT HISTORY	20	20
UNIDENTIFIED	75	75

Out of 100 patients only 5 patients (5%) gave history of recent out of state travel while 20 patients (20%) gave history of contact with covid19 positive patients. In the rest of the 75 patients (75%) the source of infection could not be identified and may be due to community transmission.

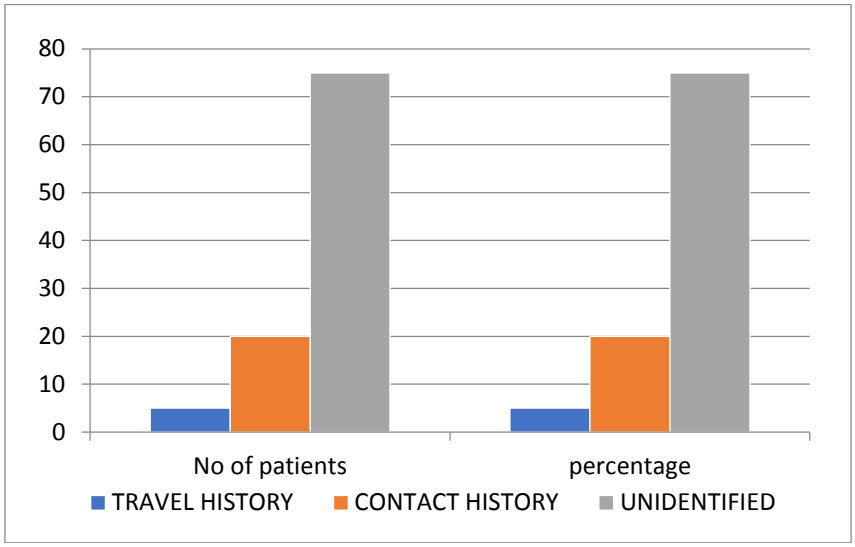


TABLE NO 4: GESTATIONAL AGE ON ADMISSION

GESTATIONAL AGE (WEEKS)	NO. OF PATIENTS	PERCENTAGE
<20	1	1%
20-24	3	3%
25-29	3	3%
30-34	8	8%
35-39	74	74%
³40	11	11%
	100	100%

Out of total 100 women, 11% women were in gestational age of more than or equal to 40weeks group followed by 74% were in gestational age of 35 to 39weeks , 8% between 30 to 34 weeks group,3% were between 20 to 29weeks group and 1 % were in less than 20weeks group. It is nearly similar to the data's mentioned in shree et al and chavan et al studies.

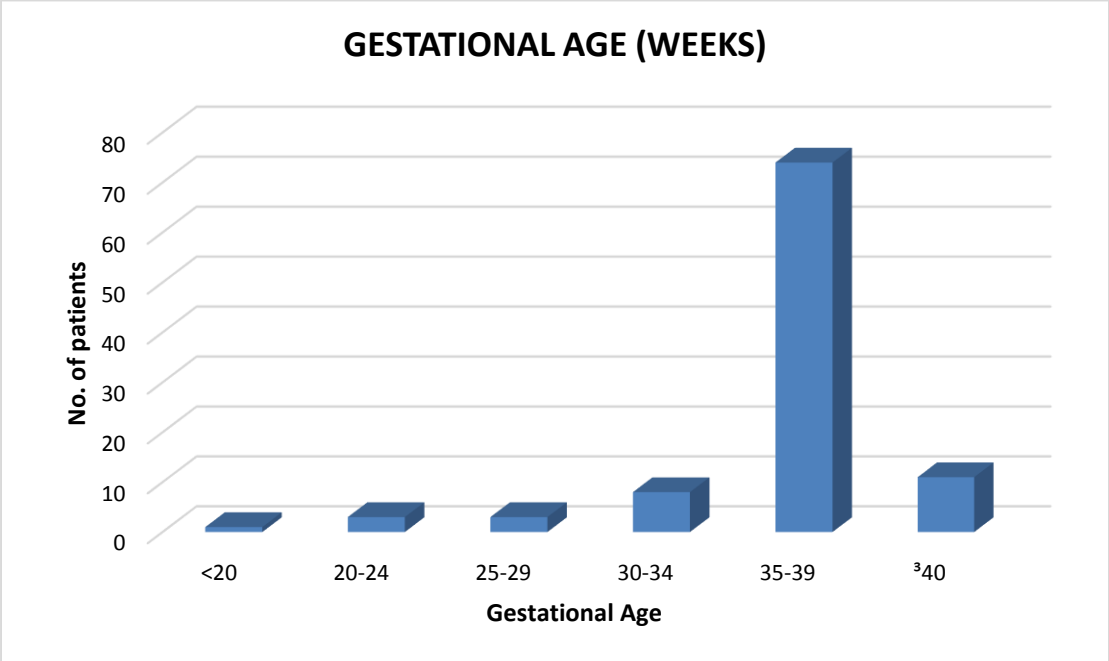


TABLE NO 5 : SYMPTOMS

SYMPTOMS	NO. OF PATIENTS	PERCENTAGE
ASYMPTOMATIC	51	51%
MYALGIA	11	11%
COUGH	13	13%
NASAL CONGESTION	2	2%
DYSPNOEA	2	2%
HEADACHE	3	3%
LOST OF TASTE	4	4%
FEVER	12	12%
SORE THROAT	2	2%
	100	100%

COVID-19-positive pregnant patients were mostly asymptomatic (51%). The most common presenting symptom was cough (13%), followed by fever (12%) and myalgia(11%). Less common symptoms were loss of taste and smell, nasal congestion, sore throat, dyspnoea, and headache in these patients.

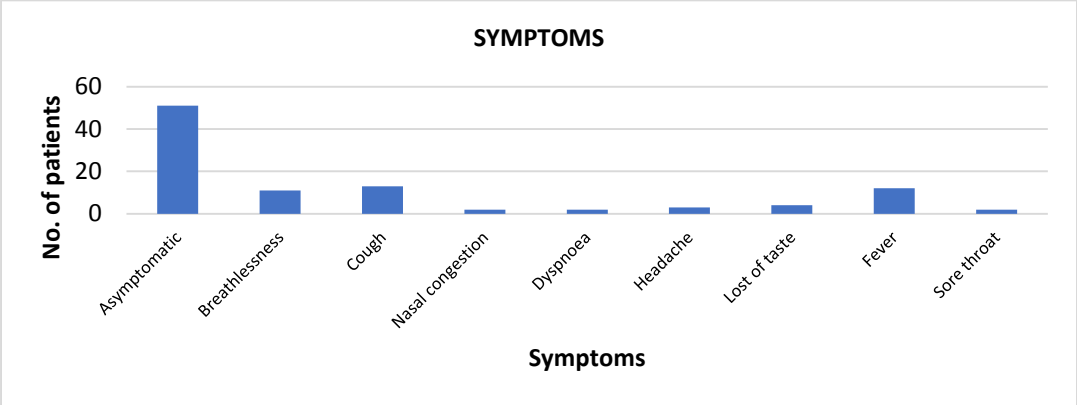


TABLE NO 6 : COMORBIDITIES

COMORBIDITIES	NO. OF PATIENTS	PERCENTAGE
PRE-ECLAMPSIA	8	8%
GDM	3	3%
ANEMIA	5	5%
HYPOTHYROIDISM	4	4%
NONE	80	80%
TOTAL	100	100%

The majority (80%) of COVID-19 mothers did not have any comorbidities, while eight had preeclampsia (8%), five (5%) had anemia four had hypothyroidism(4%) and three women (3%) had gestational diabetes mellitus (GDM).

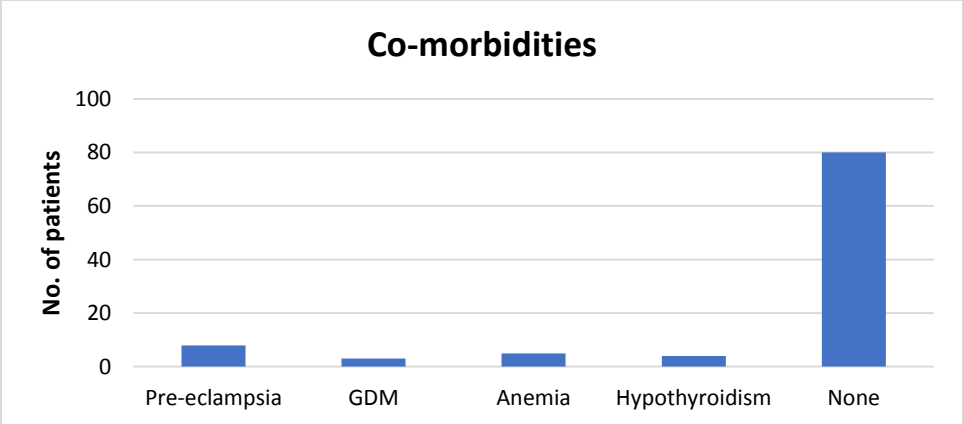


TABLE NO 7 : MODE OF DELIVERY

MODE OF DELIVERY	NO. OF PATIENTS	PERCENTAGE
ABORTION	7	7%
LSCS	55	55%
NORMAL VAGINAL DELIVERY	38	38%
TOTAL	100	100%

Among 100 women who were covid 19 positive, 55% of pregnant women had lscs, 38%had normal vaginal delivery and the remaining 7% of pregnant women had abortion.

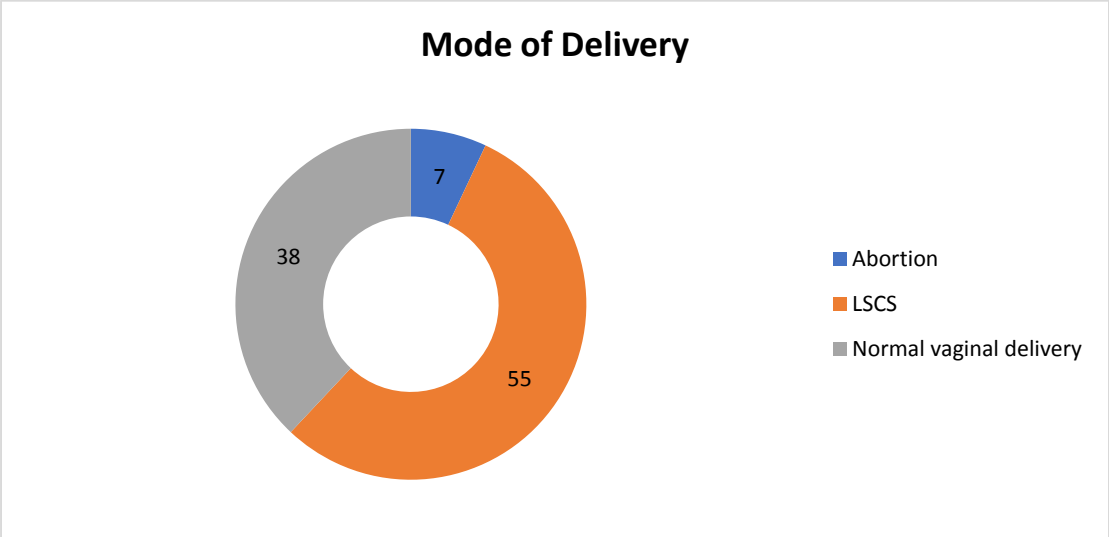


TABLE NO 8 : OUTCOME OF DELIVERY

OUTCOME OF DELIVERY	NO. OF PATIENTS	PERCENTAGE
LIVE BIRTH	86	86%
INTRAUTERINE FETAL DEMISE	14	14%
TOTAL	100	100%

Among 100 covid positive pregnant women 86% of women had livebirth and remaining 14% had intrauterine fetal demise.

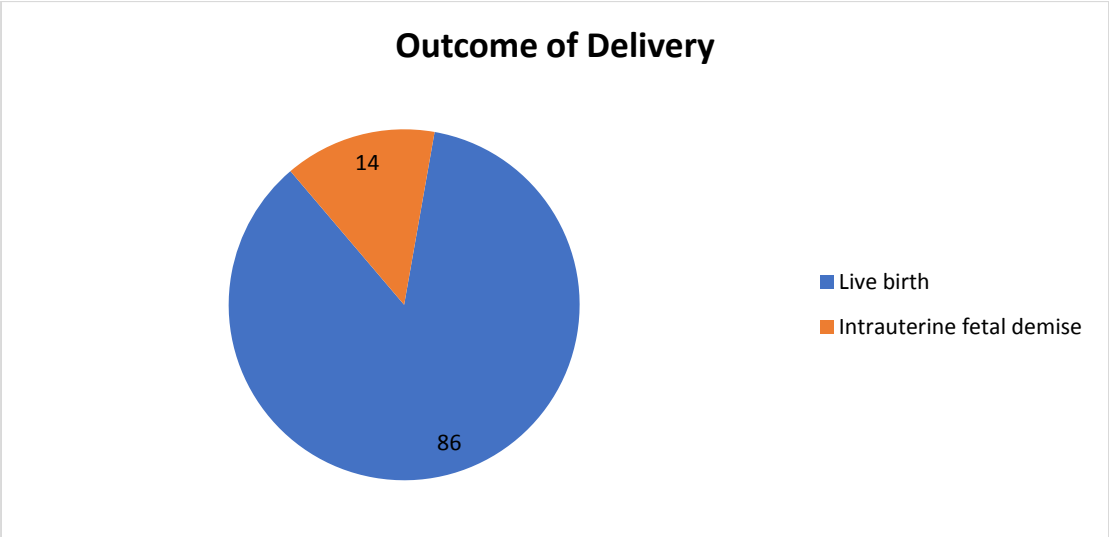


TABLE NO 9 : SEVERITY OF COVID19 SYMPTOMS

	NO OF PATIENTS	PERCENTAGE
ISOLATION WARD	79	79%
HIGH DEPENDENCY UNIT ADMISSION	13	13%
INTENSIVE CARE UNIT ADMISSION	8	8%
TOTAL	100	100%

Out of 100 patients, 79 patients (79%) were in isolation ward, 13 were admitted in High Dependency Unit (13%)and 8% were admitted in Intensive Care Unit.

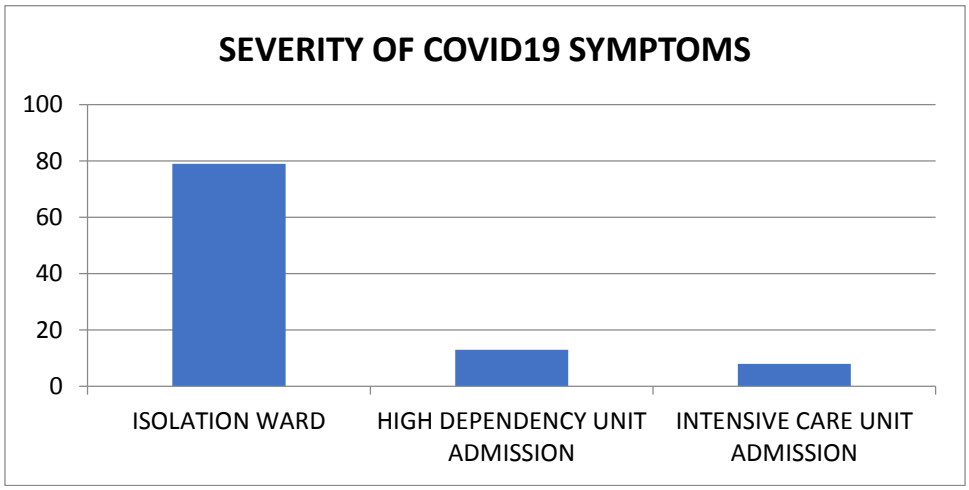


TABLE NO. 10 : NEONATAL COMPLICATIONS

COMPLICATIONS	NO. OF PATIENTS	PERCENTAGE
Neonatal intensive care unit admission	14	51.85
Neonatal death	13	48.15
Covid-19 positive	0	0
TOTAL	27	100

Out of the total 84 live births none of the newborns were COVID- 19-positive and 14 (14%) newborns were admitted to the NICU and 13% newborns were either stillbirth, IUFD.

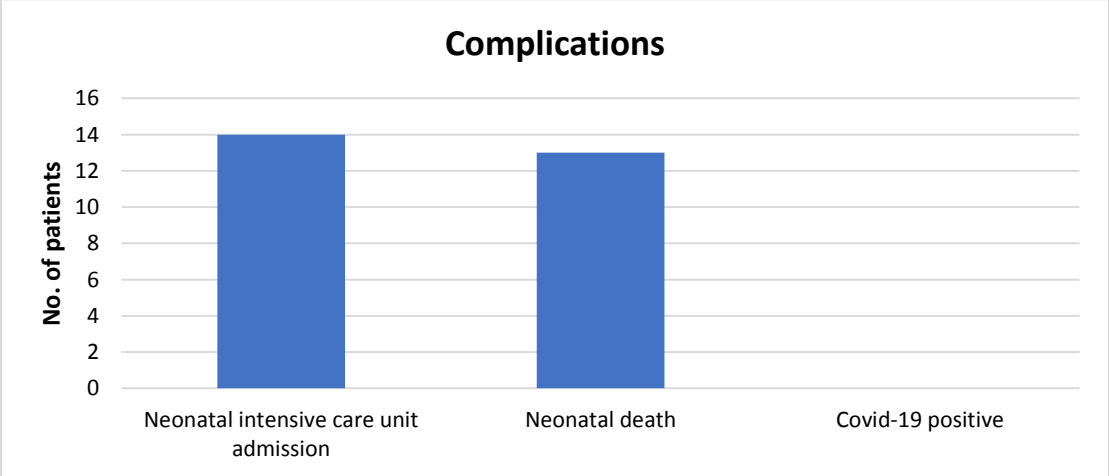


TABLE NO. 11: INDICATION OF LOWER SEGMENT CESAREAN SECTION

INDICATION	NO. OF PATIENTS	PERCENTAGE
Fetal distress	13	23.63
Meconium stained Liquor	6	10.91
previous cs with CPD Stage1	18	32.72
Primi with breech presentation	5	9.09

Deep transverse arrest	4	7.28
Severe oligohydramnios	9	16.37
Total	55	100

The percentage of normal vaginal delivery was 38% and cesarean section was 55%. The most common indication of cesarean section was pregnancies with previous cesarean section (32.72%), followed by fetal distress 23.6%), severe oligohydromnios (16.37%), meconium stained liquor (6%), primi with breech presentation (9.09%), deep transverse arrest (7.28%).

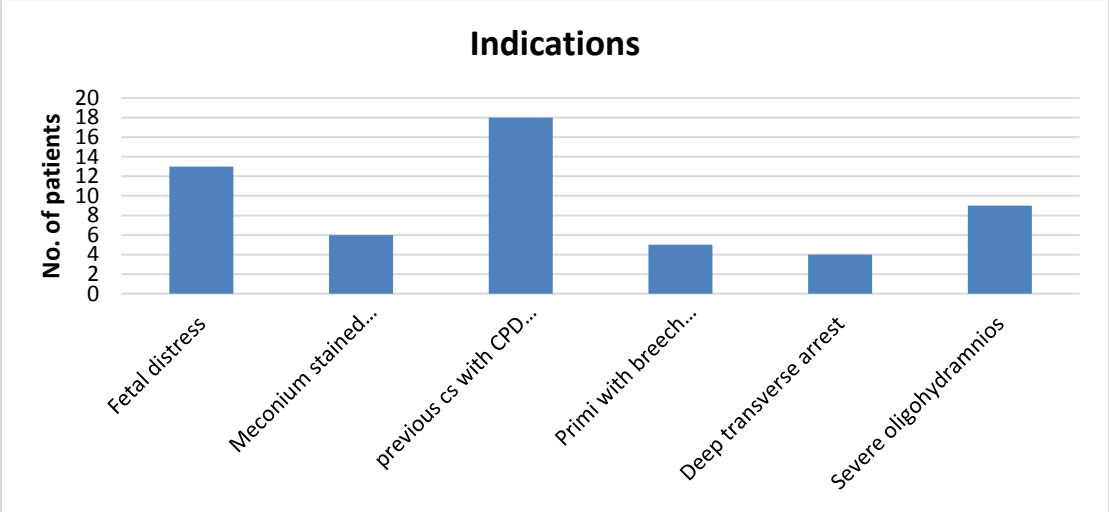
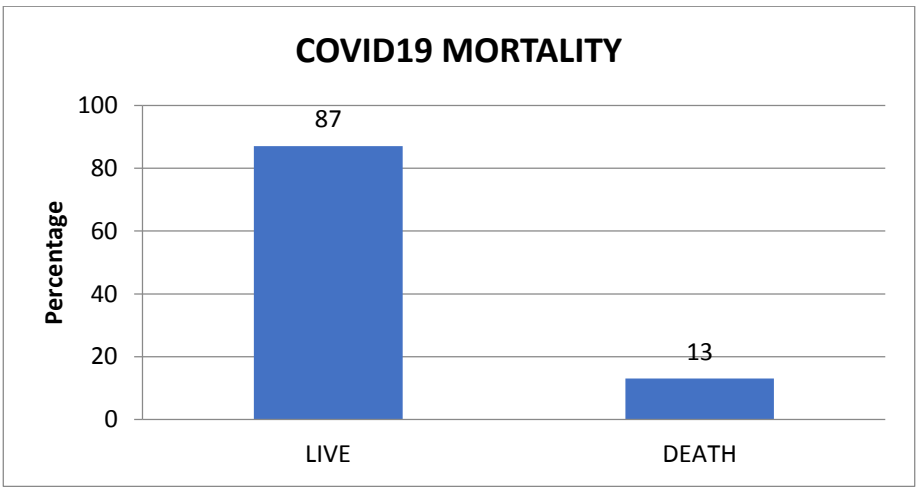


TABLE NO. 12 : COVID19 MORTALITY

	NO. 0F PATIENTS	PERCENTAGE
LIVE	87	87%
DEATH	13	13%

In this study among 100 patients, 13 patients(13%) expired due to covid19 with underlying comorbidities and the rest were discharged after effective covid 19 treatment.



V. DISCUSSION

- Among 100 women 45% were between 18-25yrs age group which is comparable to Shree et al (67.31%), Chavan et al(46.15%).
- Among 100 women maximum patients were multigravida (70%) which is similar to the results of Shree et al (59.5%), Chavan et al (63.92%).
- Among 100 patients 5% of people gave history of recent out of state travel, 20 % of patients had history of contact with covid19 positive patients and the rest of 75%, the source of infection could not be identified and

may be due to community transmission which is comparable to study of Shree et al study where 86.5% had no any travel or contact history. Similarly, Singh et al study also had around 89.39% of patients who had no any travel or contact history.

- In this study, the majority of patients presented at 35-39 weeks of gestation (74%) which is comparable to studies by Shree et al (39%) and Yan j et al(76%).
- In this study, COVID-19-positive pregnant patients were mostly asymptomatic (51). The most common presenting symptoms were cough (13%), fever (12%), and myalgia/malaise (11%). While in the study by Gupta et al., fever and myalgia were the most common presenting symptoms, followed by cough (10.8%. similarly in the study by Shree et al the most common presenting symptoms were cough (44.2%), fever (32.6%) followed by myalgia (19.2%) same as of our study.
- In this study, out of 100 women majority had no any comorbidities (80%), 8% had preeclampsia, 3% had GDM,5% had anemia and 4% had hypothyroidism. out of 52 women in Shree etal study, 43 (82.69%) women did not have any comorbidities, while four (7.69%) patients had hypothyroidism, two (3.84%) patients had anemia, two (3.84%) had GDM, and only one (1.92%) patient had pre-eclampsia. While in the study by Islam et al., the most common complications noted were gestational hypertension, pre-eclampsia, and premature rupture of membranes. However, fewer women had anemia, GDM, or hypothyroidism which is comparable to our present study.
- In this study, the percentage of normal vaginal delivery was 38% and cesarean section was 55% while 7% had an early first-trimester abortion. In the study by Singh et al., a cesarean section was performed among 78 (63.93%) women and 44 (36.07%) delivered vaginally [10]. However, high cesarean rates in COVID-19-infected pregnant women were also observed in some other studies
- In this study majority of the newborns of covid19 women were alive (86%), 14% of neonatal death included stillbirths due to abortion, IUFD which is comparable to Singh et al (96.8%) live birth and 3.2% of neonatal death.
- In this study 8% of patients required ICU admission which is comparable to shree et al (1.9%) and Gupta et al (2.7%). Most of the asymptomatic patients were in isolation ward in our study (79%) which is similar to shree et al (94.3%) and Gupta et al (72.9%). patients with comorbidities were in high dependency units (13%) similar to shree et al (3.8%) and gupta et al (24.4%).
- According to this study, (51.85%) neonates were admitted to NICU for observation, phototherapy, or in intubated state, thirteen (48.15%) of them had neonatal death either due to severe low birth weight or sepsis or presented with IUFD which is comparable to singh et al study where forty (33.33%) NICU admissions were done among which seven babies were intubated, three of which died, three were discharged and one transferred to higher centre. In the study by Singh et al., 40 (33.06%) babies were admitted to the NICU and two babies (1.65%) tested positive. In the study by Gupta et al., all neonates were COVID 19 negative on day one of their life which ruled out the intrauterine transmission of COVID-19 from positive mothers during the third trimester. The COVID-19 virus has been detected in vaginas, cervical, and anorectal swabs obtained from COVID-19-positive pregnant women in many studies, but we did not perform this test in our study.
- In this study, the most common indication of cesarean section was previous cesarean section (32.72%), followed by fetal distress (23.63%), and the less common indications were primigravida with breech (9.09%), severe IUGR (16.37%), and second stage arrest (7.28%). A similar finding was reported by Singh et al study.
- In this study around 13 % pregnant women had mortality especially during second wave of covid19 where asnayak et al study had 2.1% of maternal mortality.

VI. CONCLUSIONS

In this study, COVID-19-positive pregnant women were mostly asymptomatic. Neonates of COVID-19-infected women also mostly tested COVID-19 negative whether the baby was born vaginally or by cesarean section.As most of our patients presented to us in third trimester whether covid19 has any teratogenic effects couldnot be ascertained. As the disease is new and long-term follow-up is required to study any residual or delayed effects on the newborns, it could not be ascertained whether COVID-19 causes any abnormality in the fetus. More studies are needed with larger sample sizes to find out the effect of COVID-19 infection in pregnancy and neonates. This knowledge can be helpful in antenatal counseling and deciding management protocols for safe and favorable maternal and neonatal outcomes.

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