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Original Research Article

Pregnancy with COVID-19: feto-maternal outcome from a tertiary care hospital, Bangladesh

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ABSTRACT

Background: The objective was to determine the maternal and fetal outcomes of pregnant women with COVID-19 infection in the southeast part of Bangladesh.
Methods: A prospective observational study was conducted at Chittagong Medical College Hospital (CMCH), Bangladesh, for one year. Pregnant women were divided into suspected and confirmed groups based on the clinical features of COVID-19 and the results of RT-PCR (SARS-CoV2). Outcome measures were maternal death, ICU admission, mechanical ventilation, and stillbirth/neonatal death. The Mann-Whitney U test was applied for between-group comparisons. Binary logistic regression analysis was done for factors affecting feto-maternal outcomes. Results were presented as odds ratios (OR) and 95% confidence intervals (CI).
Results: A total of 144 pregnant women (n=144) were included in the study, divided into confirmed (n=71) and suspected (n=73). Complications were more in the confirmed group (p=0.315). Caesarean section was 69% and 64.4% in the confirmed and suspected groups, respectively (p=0.556). Eight women (5.55%) needed ICU admission, five (3.5%) required mechanical ventilation, and five (3.5%) women expired. Fetal distress was seen in 15 (10.41%) pregnancies. Stillbirth or neonatal death and the need for NICU admission were higher for suspected than in confirmed cases. Pregnancies with suspected COVID-19 had 3.91 times (OR: 3.913, 95% CI: 1.398-10.954) higher poor feto-maternal outcome. Unbooked status, COVID-19 test negativity, and use of antivirals were associated with poor feto-maternal outcomes.
Conclusions: Pregnancies with COVID-19 were prone to poor feto-maternal outcomes. The study pointed to an improvement in the ANC of pregnant women with COVID-19 in a public hospital like Bangladesh.

Keywords: Pregnancy, COVID-19, SARS-CoV-2, Maternal outcome, Neonatal outcome

INTRODUCTION

The coronavirus disease 2019 (COVID-19) is a global public health crisis caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).[1,2] About 216 countries and territories and 178 million people were infected, and 3.86 million people died (June 21, 2021).[3] Pregnancy increases the chance of acquiring any viral respiratory infection, resulting in severe pneumonia due to the physiologic changes in the immune and cardiopulmonary systems.[4,5] This new coronavirus is genetically closer to SARS-CoV-1. The previous study showed that SARS-CoV-1 and the Middle East respiratory syndrome coronavirus (MERS-CoV) are prone to cause adverse maternal effects. Neonatal outcomes include intrauterine growth restriction (IUGR), preterm birth, need for endotracheal intubation, intensive care unit (ICU) admission, renal failure, and death. Still, the chance of vertical transmission was minimal with those viruses.[6-10] A

recent systematic review of pregnancies infected with current and past coronavirus-related illnesses (including SARS-CoV-1 and MERS) has established a high risk of miscarriage, preeclampsia, preterm birth, and perinatal death.[11] A recently published review on confirmed and suspected pregnant women with COVID-19 reported that advanced maternal age, pre-existing co-morbidities, and increased body mass index (BMI) are the risk factors for severe COVID-19.[12] A systematic review of 2500 pregnant women showed increased maternal ICU admissions among women in higher age brackets and those with co-morbidities.13 A systematic evaluation of pregnant women (n=31016) from 62 studies showed that 78% presented to the hospital during the third trimester. And the severity of COVID-19 was presented in 9% of the studies. Of those, 14% of pregnant women had severe COVID-19.[14]

A connection between COVID-19 and preterm delivery and NICU hospitalisation was observed in a systematic review and meta-analysis of COHORT studies involving pregnant patients.[12] In a recent retrospective cohort analysis of pregnant patients giving birth at a single academic facility, Adhikari et al reported no correlation between COVID-19 and a composite poor perinatal outcome of preterm birth, preeclampsia with severe symptoms, or caesarean delivery.[15] Although 95% of the group had a silent or moderate illness, it is still unclear whether perinatal outcomes vary depending on the COVID-19 severity.

Bangladesh is a developing country with poor resources. That is why there is an urgent need for extensive study regarding the maternal and fetal outcomes of COVID-19 pregnancy. There are few reports of such studies in Bangladesh. So, the current study was done to see the feto-maternal outcome of COVID-positive (confirmed) and clinically suspected pregnant women.

METHODS

Study type

This was a prospective, observational study.

Study place

The study was conducted in the department of obstetrics and gynecology, Chittagong Medical College Hospital (CMCH), Bangladesh.

Study period

The study duration was from April 2020 to March 2021.

Inclusion criteria

Pregnant women with suggestive clinical features of COVID-19 (fever, cough, dyspnea, SpO_2) with positive (confirmed) or negative (suspected) RT-PCR (SARS-CoV2) results were included in the study.

Study procedure

Informed consent was obtained from the pregnant women who participated in the study. Nasopharyngeal and oropharyngeal swabs were collected from them and sent for RT-PCR for SARS-CoV2. According to the ICMR criteria, suspected and confirmed groups were defined.[16] Women who tested positive for COVID-19 (confirmed) were treated following hospital standard operative procedures (SOP) and Ministry of Health and Family Welfare (MOHFW) guidelines. In contrast, those who tested negative(suspected) received standard prenatal, intrapartum and postnatal care.[17,18] Women in both groups were evaluated in parallel regarding sociodemographic and obstetric characteristics, COVID-19 risk factors, clinical presentation, and feto-maternal outcome. The study patients were categorised into two groups depending on the outcome (good or poor). Women with poor outcomes had the following events: maternal death, ICU admission, or MV or neonatal death. On the other hand, the absence of maternal death, ICU admission, or MV or neonatal death meant good feto-maternal outcomes.

Hospital policy during the COVID-19 pandemic

According to hospital policy, confirmed patients were kept in isolation wards and were investigated following the guideline. They were prescribed immune boosters and common antenatal medications. Symptomatic pregnant patients were managed with the internist and pulmonologist in the red zone until the patient needed emergency obstetrics interventions. After the baby was born, the necessary details were recorded in a pre-structured questionnaire. The variables recorded were the gestational age at delivery, the mode of delivery and its results, the reason for the caesarean section (if applicable), the baby's birth weight, the Apgar score, and whether or not the baby required admission to the neonatal intensive care unit (NICU). Direct breastfeeding was supported in these patients while taking all the necessary safety precautions, such as donning a mask and gloves, cleaning hands, and using hand sanitiser.

Pregnant women with confirmed COVID-19 were allowed to deliver vaginally in a single isolated delivery room and under strict protection measures without birth attendance.

The caesarean section was done in a separate OT following the hospital's infection prevention and control policy (IPC). Neonates born by pregnant women with confirmed or suspected COVID-19 had their umbilical cords cut and cleaned as soon as possible to minimise exposure time and lessen the potential risk of neonatal infection through mother-to-child contact. In the current hospital setting, newborns of confirmed or suspected mothers were separated and admitted to the NICU as soon as possible for additional surveillance.

Ethics approval and consent to participate

All procedures performed in studies involving human participants were by the institutional and national research committee's ethical standards and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Chittagong Medical College Ethics Committee approved the study (ID-CMC/PG/2020/102;16/8/20).

Data analysis

Data analysis was performed using SPSS version 23. All variables were categorised and expressed as frequency and percentage, except the variable length of hospital stay. The median and interquartile range (IQR) was used to describe the length of hospital stay. Two groups of research participants: confirmed and suspected were created. The Mann-Whitney U test was employed for between-group comparisons of continuous data. Binary logistic regression analysis was used to identify the independent variables contributing to poor feto-maternal outcomes. Results were presented as odds ratios (OR) and their 95% confidence intervals (CI). All analyses had a significance threshold of 0.05.

RESULTS

A total of 144 (n=144), including confirmed (n=71) and suspected (n=73) COVID-19 with pregnancy at any trimester, participated in the study.

Most participants were young, aged between 21 and 30 (p=0.160) (Table 1).

Table 1: Age group of the study population stratified by COVID-19 test status (n=144).

Age groups (in years)	Confirmed (n=71)	Suspected (n=73)	Total (n=144)	P value
	N (%)	N (%)	N (%)	
≤20	9 (12.7)	16 (21.9)	25 (17.4)	0.16*
21-30	44 (62.0)	46 (63.0)	90 (62.5)	
>30	18 (25.4)	11 (15.1)	29 (20.1)	

*Chi-square test. Data presented as frequency (%).

Table 2: Obstetrics characteristics of the study population (n=144).

Variables	Confirmed (n=71)	Suspected (n=73)	Total (n=144)	P value
	N (%)	N (%)	N (%)	
BMI (kg/m$^{2)}$				
19-25	24 (33.8)	26 (35.6)	50 (34.7)	0.82*
>25	47 (66.2)	47 (64.4)	94 (65.3)	
Parity				
One	56 (74.6)	54 (74.0)	107 (74.3)	0.212*
Two-four	18 (25.4)	16 (21.9)	34 (23.6)	
More than four	0 (0)	3 (4.1)	3 (2.1)	
Pregnancy planning				
Planned	62 (87.3)	66 (90.4)	128 (88.9)	0.556*
Unplanned	9 (12.7)	7 (9.6)	16 (11.1)	
Gestational age at admission				
1st trimester (12 weeks)	7 (9.9)	4 (5.5)	11 (7.6)	0.177*
2nd Trimester	5 (7.0)	8 (11.1)	13 (9.0)	
3r Trimester (29-37)	25 (32.5)	16 (21.9)	41 (28.5)	
>37 weeks	33 (46.5)	45 (61.6)	78 (54.2)	
Post-partum	1 (1.4)	0 (0)	1 (0.7)	
Antenatal care				
Booked	68 (95.8)	65 (89.0)	133 (92.4)	0.128*
Unbooked	3 (4.2)	8 (11.0)	11 (7.6)	
Associated co-morbidity				
None	58 (81.7)	65 (89.0)	123 (85.4)	0.160*
Preeclampsia	7 (9.9)	3 (4.1)	10 (6.9)	
Eclampsia	1 (1.4)	4 (5.5)	5 (3.5)	
GDM	4 (5.6)	1 (1.4)	5 (3.5)	
Hypothyroidism	1 (1.4)	0 (0)	1 (0.7)	

Continued.

Variables	Confirmed (n=71)	Suspected (n=73)	Total (n=144)	P value
	N (%)	N (%)	N (%)	
Contact with COVID patient				
Yes	10 (14.1)	3 (4.1)	13 (9.0)	0.037*
No	61 (85.9)	70 (95.9)	131 (91.0)	

*Chi-square test. Data presented as frequency (%).

Table 3: Presentation and treatment modalities of COVID-19 of the study population (n=144).

Variables	Confirmed (n=71)	Suspected (n=73)	Total (n=144)	P value
	N (%)	N (%)	N (%)	
Symptoms and signs				
Fever	65 (91.5)	70 (95.9)	135 (93.8)	0.282*
Cough	47 (66.2)	55 (75.3)	102 (70.8)	0.227*
Dyspnea	43 (60.6)	55 (75.3)	98 (68.1)	0.053*
Sore throat	2 (2.8)	1 (1.4)	3 (2.1)	0.543*
Myalgia	7 (9.9)	5 (6.8)	12 (8.3)	0.515*
Diarrhoea	12 (16.9)	15 (20.5)	27 (18.8)	0.575*
SpO_2 <95% on admission	37 (52.1)	49 (67.1)	86 (59.7)	0.066*
Patient in labour	29 (40.8)	40 (54.8)	69 (47.9)	0.094*
Haemoglobin <10 mg/dl	21 (29.6)	23 (31.5)	44 (30.6)	0.802*
Abnormal radiology	18 (25.4)	22 (30.1)	40 (27.8)	0.595*
Treatment modalities used for the patients				
Oxygen required	47 (66.2)	46 (63.0)	93 (64.6)	0.690*
Enoxaparin used	21 (29.6)	9 (12.3)	30 (20.8)	0.011*
Antiviral used	17 (23.9)	7 (9.6)	24 (16.7)	0.021*
Steroid used	15 (21.1)	9 (12.3)	24 (16.7)	0.156*

*Chi-square test. Data presented as frequency (%).

Table 4: Maternal outcomes of the study population (n=144).

Variables	Positive (n=71)	Suspect (n=73)	Total (n=144)	P value
	N (%)	N (%)	N (%)	
Pregnancy complications				
None	45 (63.4)	52 (71.2)	97 (67.4)	0.315*
Preterm labor	0 (0)	1 (1.4)	1 (0.7)	1.0**
Fetal distress	8 (11.3)	7 (9.6)	15 (10.4)	0.384*
PROM	0 (0)	2 (2.7)	2 (1.4)	1.0**
APH	1 (1.4)	3 (4.1)	4 (2.8)	0.817**
H/O LSCS	17 (23.9)	7 (9.6)	24 (16.7)	0.021*
IUD	0 (0)	1 (1.4)	1 (0.7)	1.0**
Need ICU admission	4 (5.6)	4 (5.5)	8 (5.6)	0.968*
Need MV	2 (2.8)	3 (4.1)	5 (3.5)	0.672*
Length of hospital stay	5.0 (3.0-7.0)	6.0 (5.0-7.0)	5.0 (3.0-7.0)	0.154†
Final maternal outcome				
Discharged without morbidity	52 (74.3)	45 (61.6)	97 (67.8)	0.166*
Discharged with morbidity	15 (21.4)	26 (35.6)	41 (28.7)	
Maternal death	3 (4.3)	2 (2.7)	5 (3.5)	

*Chi-square test; **Fisher's exact test. †Mann-Whitney U test; MV-mechanical ventilation.

Table 5: Mode of delivery and maternal outcome of the study population (n=144).

Mode of delivery	NVD (n=35)	CS (n=96)	Total (n=131)	P value
	N (%)	N (%)		
COVID test status				
Positive	14 (22.2)	49 (77.8)	63	0.332*

Continued.

Mode of delivery	NVD (n=35)	CS (n=96)	Total (n=131)	P value
	N (%)	N (%)		
Suspect	21 (30.9)	47 (69.1)	68	
Maternal outcome				
Good outcome	23 (24)	73 (76)	96	
Poor outcome	12 (34.3)	23 (65.7)	35	

*Chi-square test. Data presented as frequency (%).

Table 6: Fetal outcomes of the study population (n=144).

Variables	Positive (n=62)	Negative(n=67)	Total (n=129)	P value
	N (%)	N (%)	N (%)	
Birth				
Live birth	50 (80.6)	40 (59.7)	90 (69.8)	0.013*
Birth asphyxia	5 (8.1)	5 (7.5)	10 (7.8)	
Stillbirth/neonatal death	7 (11.3)	22 (32.8)	29 (22.5)	
Birth weight (in kg)				
<2.5	6 (10.7)	10 (21.3)	16 (15.5)	0.103*
≥2.5	50 (89.3)	37 (78.7)	87 (84.5)	
Need NICU admission	9 (14.1)	16 (24.2)	25 (19.2)	0.141*

*Chi-square test; data presented as frequency (%); NICU-neonatal intensive care unit.

Table 7: Association of different factors with the composite feto-maternal outcomes (N-144).

Variables	Good outcome (n=109)	Poor outcome (n=35)	P value
	N (%)	N (%)	
Age (years)			
≤20	18 (16.5)	7 (20.0)	0.497*
21-30	71 (65.1)	19 (54.3)	
>30	20 (18.3)	9 (25.7)	
BMI (kg/m^2)			
19-25	41 (37.6)	9 (25.7)	0.198*
>25	68 (62.4)	26 (74.3)	
Parity			
Primi	86 (78.9)	21 (60.0)	0.026*
Multi	23 (21.1)	14 (40.0)	
Pregnancy planning			
Planned	100 (91.7)	29 (80.0)	0.054*
Unplanned	9 (8.3)	7 (20.0)	
Gestational age			
1st trimester	9 (8.3)	2 (5.7)	0.677*
2nd trimester	8 (7.3)	5 (14.3)	
3rd trimester	32 (29.4)	9 (25.7)	
>37 weeks	59 (54.1)	19 (54.3)	
Post-partum	1 (0.9)	0 (0)	
Antenatal care			
Booked	106 (97.2)	27 (77.1)	0.001*
Unbooked	3 (2.8)	8 (22.9)	
Associated preeclampsia	7 (6.4)	3 (8.6)	0.546**
Associated eclampsia	5 (4.6)	0 (0)	0.161**
Associated GDM	3 (2.8)	2 (5.7)	0.891**
Hypothyroidism	1 (0.9)	0 (0)	1.0**
COVID-19 test			
Positive	60 (55.0)	11 (31.4)	0.015*
Negative	49 (45.0)	24 (68.6)	
SPO2 <95% on admission	65 (59.6)	21 (60.0)	0.969*

Continued.

Variables	Good outcome (n=109)	Poor outcome (n=35)	P value
	N (%)	N (%)	
Patient in labour	47 (43.1)	22 (62.9)	0.042*
Haemoglobin <10 mg/dl	32 (29.4)	12 (34.3)	0.582*
Abnormal radiology	29 (26.6)	11 (31.4)	0.078*
Enoxaparin used	23 (21.1)	7 (20.0)	0.889*
Antiviral used	12 (11.0)	12 (34.3)	0.001*
Steroid used	14 (12.8)	10 (28.6)	0.030*
Mode of delivery			
NVD	36 (33.0)	12 (34.3)	0.891*
CS	73 (67.0)	23 (65.7)	

*Chi-square test; **Fisher's exact test.

Table 8: Independent predictors of poor outcome (Binary logistic regression analysis).

Variables	P-value	OR	95% CI for OR	
			Lower	Upper
Primipara	0.177	1.963	0.738	5.222
Unbooked	0.008	8.345	1.735	40.137
Test negative	0.009	3.913	1.398	10.954
Antiviral used	0.007	5.257	1.573	17.572
Steroid used	0.128	.405	0.126	1.297
Patient in labour	0.089	.448	0.177	1.131

OR: Odds ratio; CI: Confidence interval.

About three-fourths (74%) of suspects were primigravid in both groups (p=0.212). Most pregnancies were planned in the study population (88.9%) and were in their term at admission (54.2%). Only 7.6% of the pregnancies were unbooked in the study population, without significant differences between suspected and confirmed patients (p=0.128). Few patients had co-morbidity in the study, and both COVID-19 positive and negative pregnancies were similar in co-morbidities distribution. Although more than 90% of the patients did not give any contact history for COVID-19, a significantly higher proportion of the test-positive cases reported positive contact history than the COVID-19 negative cases (14.1% versus 4.1%, p=0.037) (Table 2).

Regarding the symptoms suggestive of viral infection, fever was the predominant presentation in both test-positive and tested-negative women (p=0.282). Other prevalent symptoms in the study patients were cough, dyspnoea, and diarrhoea. More than half of the women in each group had SpO_2 <95% on admission, and around 50% were in labour. As expected, enoxaparin and antiviral were used in a significantly higher proportion of the patients with confirmed COVID-19 (Table 3).

Pregnancy complications were more frequently seen among the COVID-19-positive parturient than the women who were negative for COVID-19, but the difference was insignificant (p=0.315). However, a significantly higher proportion of the test-positive women had H/O LSCS than the test-negative women (p=0.021). Most women in both groups were delivered by caesarean section (69% and 64.4%, respectively, in test-positive and test-negative cases, p=0.556). Out of 144 mothers, 5 (3.5%) expired in their perinatal period (Table 4).

The mode of delivery and maternal outcome were described in Table 5. It showed that around 2/3rd of each group was delivered by caesarean section. But the difference between both groups is not statistically significant. About 2/3rd of the good and poor outcomes had delivered the baby by caesarean section (CS).

Fetal and neonatal outcomes are presented in Table 6. It depicted that stillbirth or neonatal death and the need for NICU admission were significantly higher for women with negative test results than those with confirmed COVID-19.

Table 7 depicted that parity, booking status, labour at admission, antiviral use, and steroids were significantly associated with the feto-maternal outcome on univariate analysis. A significantly higher proportion of multigravida women, women without ANC, women with negative COVID-19 test, women in labour during admission, and women who received antiviral or steroids had poor outcomes than their counterparts.

On multivariate binary logistic regression, three factors-unbooked status, COVID-19 test negative, and use of antiviral for treatment were independently associated with poor feto-maternal outcomes in the study (Tabe 8). Pregnancies with suspected COVID-19 but negative COVID-19 test results were 3.91 times (OR: 3.913, 95% CI: 1.398-10.954) higher chance of having a poor feto-

maternal outcome than the women with confirmed COVID-19.

DISCUSSION

The study assessed the feto-maternal outcome of pregnant women with COVID-19, either clinically suspected or confirmed in a tertiary hospital in Bangladesh.

In this study, most of the patients, irrespective of the test results, were young, being 21-30 years of age (p=0.160). A study in India showed that participants ranged from 19 to 37 years.[19] Similarly, NFHS-4 data indicated that in Karnataka, 7.8% of them in the age group of 15-19 years were already mothers or pregnant.[20] Hassan et al in their study, reported the mean age of the study subjects as 27.3±4 years; the mean age of the study subjects in this study was 26.00±4.89 years.[21] Another study contradicted the current result, where pregnant women with severe COVID-19 were approximately 3.7 years older, and the risk of severe COVID-19 was higher among women in a higher age bracket (>35 years).[12]

In this study, around 74% were primigravida in both groups (p=0.212). Shah et al found higher proportions to be multigravidae, in line with our study findings.[22] Most pregnancies were planned in the current study population and were in their term at admission. Smaller groups of pregnancies were unbooked in the study population without significant differences between suspected and confirmed patients (p=0.128). Half of the women presented during labour.

Few patients had co-morbidity in the study, and both COVID-19 positive and negative pregnancies were similar in co-morbidities distribution. In another study, none of them was reported to have gestational diabetes, which might be because of the different sociodemographic profiles of the patients, which was similar to the current study.[19] In another study,12.9% had risk factors like PIH, oligohydramnios with anaemia, postdated, and twin gestation.[19] But in another study, the risk of severe COVID-19 was also higher among women who were obese, had smoked, had diabetes, and had preeclampsia. In earlier reviews, chronic hypertension, preeclampsia, diabetes, and GDM have been associated with severe COVID-19.[12] In contrast, co-morbidities have been identified as an explanatory variable for maternal admission to ICU.[13] The results of the review article indicated that the risk of severe COVID-19 was higher among pregnant women with risk factors and pre-existing co-morbidities, and the risk of poor pregnancy and perinatal outcomes of those women with severe COVID-19 were also higher. This was an area of concern as the COVID-19 pandemic was spreading worldwide, and most likely, many pregnant women will be affected.[23]

Though more than 90% of the patients did not give any contact history for COVID-19, a significantly higher proportion of the test-positive cases reported positive contact history than the COVID-19 negative cases (14.1% versus 4.1%, p=0.037).

In this study, fever was the predominant presentation in both test-positive and negative women (p=0.282). Other prevalent symptoms in the study patients were cough, dyspnoea, and diarrhoea. In another study, while almost half of all women were asymptomatic, fever, cough, fatigue, and anosmia/ageusia were the most commonly reported symptoms. Other reviews have reported similar findings.12,24,25 In another study, 6.5% of patients were symptomatic, 1.6% developed cough and breathlessness, and the rest were asymptomatic.[19] According to Nayak et al 97% were asymptomatic, had mild symptoms like fever or cough, and did not require oxygen therapy.

More than half of the women in each group had SpO_2 <95% on admission. In another study, the oxygen saturation was noted to be decreased by 6.5%.[19] But the risk of severe pneumonia during pregnancy was noted to be high, as highlighted by Nayak et al.[26]

Treatment

Enoxaparin and antiviral were used in a significantly higher proportion of the patients with confirmed COVID-19. Half of the women in one study were treated with antibiotics, anticoagulants, and hydroxychloroquine. And one in three was given antivirals. Nearly one in five were managed with corticosteroids.[13,23,27]

Pregnancy complication

In this study, pregnancy complications were more frequently seen among the COVID-19-positive parturient women who were negative for COVID-19, but the difference was not statistically significant (p=0.315). Muhidin et al in their systematic review, concluded that there might be an increased risk of premature rupture of membranes (PROM) with the onset of COVID-19 in the third trimester of pregnancy.[28] Concordantly, premature rupture of membranes (PROM) was the commonest maternal complication (6/62, 9.7%) among our subjects, and one of them (1.6%) had both PROM and decreased oxygen saturation.[19]

Most women in both groups were delivered by caesarean section (69% and 64.4%, respectively, in test-positive and test-negative cases, p=0.556). However, a significantly higher proportion of the test-positive women had H/O LSCS than the test-negative women (p=0.021).[19,26] The various obstetric indications in our study were previous LSCS (commonest), failure to progress, CPD, PROM with CPD, oligohydramnios, and anaemia. Nayak et al also reported LSCS as the commonest mode of delivery, performed for those with only obstetric indications, similar to another study.[19]

Out of 144 mothers, 5 (3.5%) expired in their perinatal period in the current study.

A systematic review found lower maternal (2.0%) and neonatal (1.6%) mortality rates, which are consistent with earlier studies in the domain.[12,13,27,29] Emerging evidence suggested that stillbirth and preterm birth rates might have changed substantially during the pandemic.[30,31] A reduction in healthcare-seeking behaviour and reduced provision of maternity services has been suggested as a possible cause.[30]

Fetal outcomes

Fetal and neonatal outcomes depicted that stillbirth or neonatal death and the need for NICU admission were significantly higher for women with negative test results than women with confirmed COVID-19. Hassan et al concluded that pregnancy increased the risk of several adverse outcomes, including LBW.[21] Another study noted the most common neonatal complication (14.3%) was LBW.[19] Similarly, Dubey et al in a systematic review and meta-analysis, reported LBW in 23% of them.[28]

In this study, women with poor outcomes had a maternal death, ICU admission, mechanical ventilation, or neonatal death. On the other hand, the study's absence of maternal death, ICU admission, or MV or neonatal death meant good feto-maternal outcomes. Based on univariate analysis, this study observed that parity, booking status, labour at admission, antiviral use, and steroids were significantly associated with the feto-maternal outcome. A significantly higher proportion of multigravida women, women without ANC, women with negative COVID-19 test, women in labour during admission, and women who received antiviral or steroids had poor outcomes than their counterparts in the current study. On multivariate binary logistic regression, three factors-unbooked status, COVID-19 test negative, and use of antiviral for treatment were independently associated with poor feto-maternal outcomes in the study. Pregnancies with suspected COVID-19 but negative COVID-19 test results were 3.91 times (OR: 3.913, 95% CI: 1.398-10.954) higher chance of having a poor feto-maternal outcome than the women with confirmed COVID-19.

In the WHO report, adverse pregnancy outcomes were more noted among those with other associated diseases such as preeclampsia or other complications. The respiratory syndromes may aggravate pulmonary oedema and decrease oxygen saturation.[26] In one study, of all pregnancies complicated with COVID-19 infection, 7% were admitted to ICU, 8% required mechanical ventilation, 15% non-invasive ventilation, and 0.3% ECMO. Almost half of all births occurred via cesarean section; one-quarter of all deliveries were preterm, less than one-fifth had LBW, and a quarter was admitted to NICU. However, the studies did not always report if babies needing intensive care were admitted to NICU or for isolation. Therefore, the results could be misleading. Earlier systematic compilation of published evidence also reported similar findings.[13,27,29]

The adverse effects of the COVID-19 pandemic on maternal and perinatal health are not limited to the morbidity and mortality caused directly by the disease itself. Nationwide lockdowns, disruption of healthcare services, and fear of attending healthcare facilities might also have affected pregnant people's and their babies' well-being.[32,33]

Limitation

It was a single-centre study with a limited sample and no control group. As a result, the quality of the evidence might be poor, and generalising the results is challenging. Additionally, the data were gathered from hospitalised patients; therefore, the situation in the general pregnant community might have been different. The data source will need to be updated now that the pandemic is over to make it better.

CONCLUSION

Antenatal and intra-natal factors impacted the feto-maternal outcome, especially booking status, COVID-positivity, and the need to use antiviral drugs. A better knowledge of the effects of COVID-19 infection on pregnant women and fetal outcomes might be possible with the help of this investigation. The study would produce data that might be used to investigate why it is difficult to manage COVID-19 pregnant women in a government facility in a resource-constrained developing country. The information will also be used as a baseline for Bangladeshi references in the future.

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