

DEMOGRAPHIC PROFILE AND OUTCOME OF COVID-19 OBSTETRIC PATIENTS UNDERGOING CAESAREAN SECTION IN A TERTIARY CARE GOVERNMENT HOSPITAL IN DHAKA, BANGLADESH

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Abstract

Background: Pregnancy itself is a hypercoagulable state. COVID-19 infection makes it more deleterious. As a consequence of exaggerated inflammatory response in COVID 19 infected mothers, there is alterations of coagulation system occurs, causing thrombi (micro and macro) in various organs reducing blood flow in capillaries, followed by emboli formation mainly in lung, heart, brain and kidney, resulting in multiple organ failure even death. The present study aims to observe retrospectively the clinical outcome of parturients with COVID-19 infection undergoing caesarean sections.

Methods: This observational study was done in the COVID dedicated operation theatre of Department of Anaesthesia, Pain, Palliative and Intensive Care, Dhaka Medical College Hospital, Bangladesh, between May 2020 and December 2021. A total 640 obstetric patients undergoing caesarean section (both COVID positive and suspected) were observed. The demographic and outcome data of mothers (transferred from post-operative ward to parent ward/ICU) were collected. Informations of ultimate fate (alive/death) of operated mothers were also noted. Demographic (sex) data and outcome data of newborn baby (alive/dead) were also included. The statistical analysis was carried out by using the Statistical Package for Social Sciences version 22.0 for Windows.

Results: In this study, the age of the most (n=532, 83.13%) of the pregnant mothers belongs to 18-30 years of age group, remaining 16.86% patients are within the age group of 31-45 years (n=108). Although 18.75% study subjects were illiterate below class VIII(31.25), SSC(17.97%), HSC(16.40%), Graduate(12.5%), masters(3.13%), miscellaneous type of occupational status [home-maker(70%), service holder(19.85%), entrepreneurship(1.56%) & others(8.59%). and came from different category of social class] most of the patients belong to lower(54.68%) and lower middle class (27.81%) socioeconomic status]. Among total study sample (n=640), 55.63% (n=356) patients were infected with COVID 19 virus confirmed by RT-PCR and 44.38% (n=284) mothers were clinically COVID infected or suspected cases. The majority of the pregnant mothers (n=565, 88.28%) experienced sub-arachnoid block or spinal anaesthesia whereas only 6.09% (n=39) patients got experience of general anaesthesia. Apparently, 93.44% (n=598) of mothers come back to the parent ward after observing in post-operative ward. Of them, (n=640), 2.19% of mothers were not survived in operation theatre or post-operative ward and 4.34% (n=21) of patients had to go to Covid dedicated Intensive Care Unit. Survivors mothers (n=619, 96.72%) were greater than that of non-survivors (n=21, 3.28%). Among the delivered new born babies, the number of female babies (n=330, 51.56%) were slightly higher than that of male (n=310, 48.44%). In a total 640 babies, 560 babies (87.50%) were survived but 12.50% (n=80) of babies were not survived.

Conclusions: This observational study represents that among 640 number of COVID positive or suspected pregnant mothers who were undergoing caesarean section, 93.44% of mothers come back to the parent ward, 2.19% of mothers were expired in operation theatre or post operative ward because of complications. Unfortunately, 4.34% of mothers had experience to go to Intensive Care Unit. Survivors mothers were greater than that of non-survivors. New born babies of confirmed and suspected COVID mothers were slightly female predominant. Total of them, 87.50% of babies were survived.

Keywords: COVID-19 infections, demographic profile, pregnant mothers, caesarean section, clinical outcome

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Introduction:

The emergence of severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), termed corona virus disease 2019 (COVID-19), in Wuhan, Hubei Province, China since early December 2019, still now is a morbid issue around the world. In Bangladesh, the first Covid-19 positive case was identified at 8th March, 2020. From the very beginning, Dhaka Medical College Hospital, the most renowned hospital in Bangladesh, has dealt with COVID-19 patients. Department of Anaesthesia, Pain, Palliative and Intensive Care in DMCH first started Operation Theatre for COVID-19 positive patients from 2nd May, 2020. Topmost indication for operation of covid-19 positive patients is Caesarean section of pregnant mothers.

Pregnancy, itself is a delicate situation both physiologically and pathologically. Covid-19 pandemic has made it more dangerous. Most common indications of Caesarean section are APH, PIH, eclampsia, bad obstetric history, malposition and malpresentation of foetus etc.

Normal pregnancy is associated with substantial hemostasis, resulting in relatively hypercoagulable state. The activity of the majority of the coagulation factors (I, VII, VIII, IX, X, XII) is increased, whereas the activity of physiologic anticoagulants is decreased. The latter includes a significant reduction in protein S activity and an acquired activated protein C resistance. Deep vein thrombosis occurs in 1 per 1000 deliveries, which is 5.5-6 times higher than the rate in the general female population of child bearing age, and reaches a maximum at 4-6 weeks postpartum.¹

In the body of COVID-19 infected person, there is exaggerated inflammatory response occur, commonly called cytokine storm resulting in acute respiratory distress syndrome (ARDS).²⁻⁴ As a consequence of this, alterations of coagulation system also occurs, causing thrombi (micro and macro) in various organs reducing blood flow in capillaries, followed by emboli formation mainly in lung, heart, brain and kidney, resulting in multiple organ failure even death.^{5,7-8}

Pregnancy itself is a hypercoagulable state. COVID-19 infection make it more deleterious. For this, interpretation of coagulation tests and possible abnormality is more challenging as confounded by pregnancy induced coagulation changes. In normal pregnancy, fibrinogen concentration and D-dimer values increase, platelet count may decrease, both activated partial thromboplastin time (APTT) and prothrombin time are shorter due to the important rise of the plasma concentration of most coagulation factors. With COVID-19 infection, additional coagulation changes may occur- An increase in D-dimer concentration as well as a prolongation of both APTT and PT, and also increase in international normalised ratio (INR) values.³

So, hypercoagulability increases morbidity as well as mortality of pregnant patients by increasing the thromboembolic risk.

The aim of this study is to observe retrospectively the clinical outcome of parturients with COVID-19 infection undergoing caesarean section.

Methods:

In this retrospective observational study, a total 640 obstetric patients undergoing caesarean section (both covid positive and suspected) who had been admitted from May 2020 to December 2021 at tertiary dedicated COVID positive government hospital were included. Data were collected in structured data collection sheets from COVID dedicated operation theatre, post-operative ward and ICU registers. The demographic, and outcome data of mothers (transferred from post-operative ward to parent ward/ICU) were collected. Informations of ultimate fate (alive/death) of operated mothers were also noted. Demographic (sex) data and outcome data of newborn baby (alive/dead) were also included from registers. The statistical analysis was carried out by using the Statistical Package for Social Sciences version 22.0 for Windows.

Results:

Finally data were analyzed for 640 patients with respect to demographic variables (age, educational, occupational and social status), Covid category, clinical presentation, laboratory

parameters before caesarean section, mode of oxygen delivery in operation theatre, types of anaesthesia, moving to different area after C/S, outcome of mothers and new born babies according to surviving condition were analyzed.

The various characteristics of the study participants are presented in following tables:

Table-I

Distribution of the patients according to age:

Age(year)	Frequency	Percentage (%)
18-30	532	83.13
31-45	108	16.86
Total	640	100.00

Values are expressed in frequency and percentage

Patients in age group of 18-30 yrs are predominant (83.13%) than that of other age group (31-45).

Table-II

Distribution of the patients according to educational status

Educational status	Frequency	Percentage (%)
Illiterate	120	18.75
Below Class VIII	200	31.25
SSC/Equivalent	115	17.97
HSC/ Equivalent	105	16.40
Graduate	80	12.5
Masters & above	20	3.125
Total	640	100

Among study sample, 31.25% patients had a level of education below class VIII. 18.75% were illiterate, whereas 12.5 % had a degree of bachelor in different specialty. Only 3.13% were master degree holder. Most of the study subjects were SSC & HSC (17.97% & 16.40% respectively) passed.

Table III

Distribution of the patients according to occupational status

Occupation	Frequency	Percentage (%)
Housewife/Home-maker	448	70
Service holder	127	19.85
Entrepreneur	10	1.56
Others	55	8.59
Total	640	100

Values are expressed in frequency and percentage

Majority (70%) of mothers were home-maker, second most (19.85%) one were service holder. Entrepreneur were only 1.56%. Rest (8.59%) of the patients had miscellaneous occupation.

Table-IV

Distribution of the patients according to social status

Social status	Frequency	Percentage (%)
Lower class	350	54.68
Lower-middle class	178	27.81
Middle class	77	12.03
Upper class	35	5.46
Total	640	100

Values are expressed in frequency and percentage

Most of the patients belong to lower (54.68%) and lower middle class socioeconomic status (27.81). Only 5.46% patients coming from upper class. Remaining 12.03% had middle class socioeconomic status.

Table V

Distribution of the patients according to COVID category:

COVID category	Frequency	Percentage (%)
Confirmed Covid (RT-PCR positive)	356	55.63
Clinically Covid (Suspected/ RT-PCR negative)	284	44.38
Total	640	100.00

Values are expressed in frequency and percentage

Among the study sample, 55.63% of patients are confirmed Covid positive and 44.38% of pts are suspected or clinically having Covid.

Table VI

Clinical presentations of pregnant mothers with COVID -19 infection(confirmed/suspected)

Presenting symptoms	Frequency	Percentage(%)
Fever	396	61.87
Cough	230	35.94
Dyspnoea	105	16.40
Diarrhoea	102	15.94
Running nose	107	16.72
Sore throat	147	22.96
Asymptomatic	44	6.87
Others	53	8.28

Values are expressed in frequency and percentage

Clinically, 61.87% patients developed fever, 35.94% had cough, 22.96% had sore throat. Others presentation included dyspnoea (16.40), diarrhea(15.94%), running nose (16.72%). Only 6.87% were asymptomatic.

Table VII

Mode of oxygen delivery in operation theatre

Delivery apparatus	Frequency	Percentage(%)
Simple oxygen face mask	522	81.56
Non-rebreathing mask	79	12.34
Others	39	6.09

Values are expressed in frequency and percentage

In operation theatre, 81.56% patients got oxygen by simple oxygen face mask, 12.34% by non-rebreathing mask. Rest of the mothers (6.09%) got oxygen through other apparatus like BiPAP, HFNC, ventilation etc.

Table VIII

Laboratory parameters before caesarean section among pregnant mothers:

Parameters	Frequency	Percentage (%)
Normal/decreased WBC	582	91
Reduced lymphocyte	352	55
Raised CRP	602	94
Raised Ferritin	589	92
Raised D-dimer	576	90
Raised LDH	224	35
Raised ALT/AST	115	18
Raised pro-calcitonin	32	05
Raised APTT but within normal range	582	91
Raised PT but within normal range	582	91

Values are expressed in frequency and percentage

91% of patients had normal/reduced lymphocytes, whereas 55% of patients had reduced lymphocytes. CRP (94%), Ferritin (92%), D-dimer (90%), LDH (35%), ALT/AST (18%), pro-calcitonin (05%) – all were raised. APTT (91%) and PT(91%) also raised in pregnant mothers but within normal range.

Table IX

Distribution of the mothers according to application of type of anaesthesia:

Type of anaesthesia	Frequency	Percentage (%)
General anaesthesia	39	6.09
Spinal anaesthesia	565	88.28
Total	640	100.00

Values are expressed in frequency and percentage

Majority (88.28%) of the patients got spinal anaesthesia, whereas less frequent patient (6.09%) got General anaesthesia

Table-X

Distribution of the delivered new born babies according to sex:

Sex	Frequency	Percentage (%)
Male	310	48.44
Female	330	51.56
Total	640	100.00

Values are expressed in frequency and percentage

Female new born babies are predominant (51.56%) than male(48.44%)

Table XI

Outcome of the mother’s status after caesarean section

Outcome	Frequency	Percentage (%)
Going to Postoperative ward	598	93.44
Going to parent ward	598	93.44
Going to ICU	28	4.34
Death	14	2.19

Values are expressed in frequency and percentage

Most of the pregnant mothers (93.44%) after C/S went to the parent ward after observation in post-operative ward. Only 4.34% patients had to go to ICU. Deaths occurred in (2.19%) post operative ward.

Table XII

Distribution of COVID positive operated mothers according to surviving condition:

Surviving status	Frequency	Percentage (%)
Survivor	619	96.72
Non-survivor	21	3.28
Total	640	100.00

Values are expressed in frequency and percentage

Survivor mothers (96.72%) were greater than that of non-survivors (3.28%).

Table XIII

Distribution of the delivered new born babies according to surviving condition:

Surviving status	Frequency	Percentage (%)
Survivor	560	87.50
Non-survivor	80	12.50
Total	640	100.00

Among the delivered new born babies, 87.50% were survivors and rest (12.50) were non-survivors.

Discussion

From the very beginning of the COVID PANDEMIC since 2020, the only tertiary level government hospital in Bangladesh, Dhaka Medical College and Hospital at a time successfully delivered health services (both medical and surgical) for both covid and non-covid patients continuously which is still continuing. It is the only one hospital, in where operation theatre is available for any emergency surgery for covid positive and suspected patients round the clock. In this retrospective observational study, no data of surgical or neurological operations is included. Demographic data and clinical outcome of only covid positive and suspected pregnant mothers who undergoing caesarean section for child birth from May 2020 to December 2021 are included. Demographic data and clinical outcome of delivered new born babies of covid positive mothers are also noted. Chowdhury L et al. also worked with faetomaternal outcome of covid positive mothers in their study.⁹

In this study, a total 640 covid positive and suspected pregnant mothers were included. The age of the most (n=532, 83.13%) of the pregnant mothers belongs to 18-30 years of age group, remaining 16.86% patients are within the age group of 31-45 years (n=108). That means younger pregnant mothers are more affected with covid 19 infections than older one.

This findings are approximately similar to the study of Priyadharshini CB et al. (2021), where affected mothers were also young and belonged to the age group of 21-25 years(N=154, 40.4%)¹⁰

According to educational statistics, 31.25% of patients had a level of education below class

VIII. 18.75% were illiterate, whereas 12.5 % had a degree of bachelor in different specialty. Only 3.13% were master degree holder. Most of the study subjects were SSC & HSC (17.97% & 16.40% respectively) passed.

Majority (70%) of mothers were home-maker, second most (19.85%) one were service holder. entrepreneur were only 1.56%. Rest (8.59%) of the patients had miscellaneous occupation.

In this study, most of the patients belong to lower (54.68%) and lower-middle class socioeconomic status (27.81). Only 5.46% patients coming from upper class. Remaining 12.03% had middle class socioeconomic status.

Among total study sample (n=640), 55.63% (n=356) patients were infected with covid 19 virus confirmed by RT-PCR and 44.38% (n=284) mothers were clinically covid infected or suspected cases.

Clinically, 61.87% patients developed fever, 35.94% had cough, 22.96% had sore throat. Others presentation included dyspnoea (16.40%), diarrhea(15.94%), running nose (16.72%). Only 6.87% were asymptomatic.

In respect of mode of oxygen delivery in operation theatre, 81.56% patients got oxygen by simple oxygen face mask, 12.34% by non-rebreathing mask. Rest of the mothers (6.09%) got oxygen through other apparatus like BiPAP, HFNC(High flow nasal cannula), ventilation etc.

On the basis of laboratory parameter before C/S, 91% of patients had normal/reduced lymphocytes, whereas 55% of patients had reduced lymphocytes. CRP (94%), serum ferritin (92%), D-dimer (90%), LDH (35%), ALT/AST (18%), pro-calcitonin (05%) – all were raised. APTT (91%) and PT(91%) also raised in pregnant mothers but within normal range.

It is possible to confined the majority of the pregnant mothers (n=565. 88.28%) to sub-arachnoid block or spinal anaesthesia for safe and successful caesarean section. Only 6.09% (n=39) patients got experience of general anaesthesia. Chen et al observed that indication of all nine pregnant mothers were pre-eclampsia, placenta abruption, twins pregnancy, foetal distress.¹¹

Apparently, 93.44% (n=598) of mothers come back to the parent ward after observing in post-operative ward. Of them, (n=640), 2.19% of mothers were not survived in operation theatre or post-operative ward. Disgracefully, 4.34% (n=21)of patients had to go to Covid dedicated Intensive Care Unit for better management.

In a study by Priyadharshini CB et al., among 381 Covid-19 positive mothers, 378(99.2%) were discharged and 3 (0.8%) expired.¹⁰

Survivors mothers (n=619, 96.72%) were greater than that of non-survivors (n=21, 3.28%) which is consistent with the study of Priyadharshini CB et al.¹⁰ In their study, survivors mothers (n=341, 97.2%) were greater than non-survivors (n= 10, 2.8%).

Demographic data of delivered new born babies were also noted. The number of female babies (n=330, 51.56%) were slightly higher than that of male (n=310, 48.44%).

Surviving condition of new born babies were not satisfactory. Among 640 babies, 560 babies (87.50%) were survived but 12.50% (n=80) of babies were not survived.

Priyadharshini CB et al. showed that of 353 babies born at time of discharge to covid-19 positive mothers, 343 (97.2%) were alive and 10 (2.8%) dead (either aborted or spontaneous expelled).¹⁰ On the contrary, Takahashi K et al. 2022 found no neonatal adverse outcome in their study.¹²

Conclusion

This retrospective observational study represents that among 640 number of COVID-19 positive or suspected pregnant mothers who were undergoing caesarean section , younger mothers were more affected with COVID infection than older one. Among total study sample (n=640), 55.63% (n=356) patients were infected with COVID 19 virus confirmed by RT-PCR and 44.38% (n=284) mothers were clinically COVID infected or suspected cases. Although 18.75% study subjects were illiterate, they had assorted type of educational qualification (eg, below class VIII, SSC, HSC, Graduate, masters), miscellaneous type of occupational status (home-maker, service holder, entrepreneurship & others etc.) and came from different category

of social class(most of the patients belong to lower and lower middle class socioeconomic status). After operation (caesarean section), 93.44% of mothers come back to the parent ward. 2.19% of mothers were expired in operation theatre or post operative ward because of complications. Unfortunanelly, 4.34% of mothers had experience to go to Intensive Care Unit. New born babies of confirmed and suspected COVID mothers were slightly female predominant. Total of them, 87.50% of babies were survived.

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