

# Intrauterine Fetal Death and the COVID-19 Pandemic: Looking beyond SARS- CoV-2 Infection

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## Abstract

**Background:** COVID-19 pandemic has caused high numbers of deaths and complications since 2020. Though the risk is the same as in the general population, pregnant women with COVID-19 are especially susceptible to developing complications because of their altered physiology. The objective of this retrospective study is to investigate the relationship between the COVID-19 pandemic period and intrauterine fetal death, which can help to take steps to reduce intrauterine fetal death during the pandemic.

**Materials and methods:** This retrospective study compared the intrauterine fetal death rate during the pre-pandemic (March 01, 2019 to February 29, 2020) and the pandemic period (March 01, 2020, to February 28, 2021) in a tertiary referral hospital in Bangladesh. Patient data were collected from the record-keeping register of the Department of Obstetrics and Gynecology and analyzed by computer-based software presented in graph, chart and table.

**Results:** Out of 21717 obstetric patients admitted patients, 821 (3.78%) were documented as cases of intrauterine fetal death in the pre-pandemic period, whereas in the pandemic period, the number was 895 (4.86%) out of 18424. Due to inadequate data records and considering the exclusion criteria, a total of 790 IUFD patients of the pre-pandemic period and 860 IUFD patients of the pandemic period were included in this study.

**Conclusion:** The percentage of IUFD on obstetric admission showed significantly ( $p < 0.001$ ) higher in the pandemic period compared to that in the pre-pandemic period. This result is important for providing insights to the policy makers for future planning, counseling of women wishing to become pregnant, and prioritizing their safety, including their vaccination.

**Key words:** COVID-19; Intrauterine Fetal Death (IUFD); Pandemic.

## INTRODUCTION

Coronavirus Disease 2019 (COVID-19), caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-COV-2) was declared a pandemic and a global health crisis in March 2020.<sup>1</sup> As of 8<sup>th</sup> March 2022, it has been reported across 227 countries and regions and has infected more than 493 million people with 6180527 deaths.<sup>2</sup> COVID-19 is a highly infectious disease and high numbers of deaths and complications have been reported.<sup>3,4</sup> Unlike other elective medical and surgical issues for which care can be deferred during the pandemic, pregnancies and childbirths have to continue. The physiological changes (e.g., reduction of functional residual volume, edema of respiratory tract mucosa) and immunological changes during pregnancy may increase susceptibility to viral infection and cause more severe consequences.<sup>5</sup> Evidence for similar viral diseases (SARS and Middle

East respiratory syndrome) shows that pregnant women and their infants are at higher risk of mortality.<sup>6,7</sup> Pregnant women are especially susceptible to developing complications not only by COVID-19 infection itself but also due to limited access to healthcare services.<sup>8</sup> In the initial phase, the imposition of lockdown to inhibit the spread of the pandemic resulted in the disruption of routine antenatal care and monitoring of pregnant women.<sup>9</sup> Social distancing, lack of social support, domestic violence, and psychological fear because of the pandemic further prevented pregnant women from seeking care and consulting healthcare providers.<sup>10</sup> Moreover, the economic impact of COVID-19 on the health of pregnant women is marked. Pregnant women who were living below the poverty line had limited access to proper nutrition and supplements during the pandemic. During the COVID-19 pandemic, all these contributing factors increased adverse pregnancy outcomes such as intrauterine fetal distress, preterm labor, fetal growth restriction, Intrauterine Fetal Death (IUID) and stillbirth in pregnant women not infected with COVID-19.<sup>11</sup> To date, most studies have only investigated and reported pregnancy and fetal outcomes in pregnant women with COVID-19 and have not compared the findings with outcomes in pregnant women without COVID-19.<sup>12</sup> The aim of the present study was to compare data on intrauterine fetal deaths occurring before the pandemic with those during the pandemic to determine the impact of the COVID-19 outbreak and subsequent lockdown on the incidence of intrauterine fetal deaths. This was done to understand the socio-demographic mechanisms that come into play in times of a pandemic, for providing insights to the policymakers for future planning to reduce intrauterine fetal death.

**MATERIALS AND METHODS**

It was a retrospective cohort study, comparing the intrauterine fetal death rate during the pre-pandemic (March 01, 2019, to February 29, 2020) and the pandemic period (March 01, 2020, to February 28, 2021) in a tertiary referral hospital of Bangladesh. Patient data has been collected retrospectively from the record-keeping register of the Department of Obstetrics and Gynecology of Chittagong Medical College Hospital, Chattogram, Bangladesh. Pregnant women diagnosed with intrauterine fetal death during the mentioned period were included. Gestational age was calculated according to the last menstrual period or first-trimester ultrasound if the last menstrual period was not known. The definition of intrauterine fetal death includes antepartum death occurring beyond the period of viability.<sup>13</sup> According to WHO, IUID means antepartum deaths beyond 20 weeks of gestation or birth weight 500 gm when the gestation age is not known.<sup>14</sup> In the developing country fetal viable age is always more than that of the developed country. In our center, we considered it 26 weeks of gestation. Intrauterine Fetal Demise (IUID) was confirmed by ultrasound before delivery. Women having medical complications and multiple pregnancies were

excluded. Data has been documented and analyzed by computer-based software presented in graphs, charts, and tables. A p-value less than 0.05 indicates statistical significance.

**RESULTS**

A total of 821 patients were documented as cases of Intrauterine Fetal Death (IUID) in the pre-pandemic period between 01/03/2019 and 29/02/2020 whereas in the pandemic period, between 01/03/2020 and 28/02/2021 the number was 895. Due to inadequate data record and considering the exclusion criteria, a total of 790 IUID patients of the pre-pandemic period and 860 IUID patients of the pandemic period were included in this study. Descriptive statistics and chi-square tests were used to compare the rates between the pre-pandemic and the pandemic period.

**Table I** Statistics of the Department of Gynecology and Obstetrics of CMCH

Variable	Total Admission (Gyne. & Obs.)	Total Obstetric admission	Total delivery	Total perinatal death	Total IUID
Pre-pandemic Period:					
March 2019 to February 2020	26,490	21,717	16,468	1,517	821
Pandemic Period:					
March 2020 to February 2021	22,410	18,424	13,484	1,612	895

**Table II** Comparison of IUID rates in pre-pandemic and pandemic periods

Variable	Total delivery	No of IUID	p value
Included in study			
Pre-pandemic Period: March 2019 to February 2020	16,468	790	.001 <sup>s</sup>
Pandemic Period: March 2020 to February 2021	13,484	860	

**Table III** IUID rate per thousand deliveries

Variable	Total delivery	Total IUID	IUID rate per 1000 deliveries
Pre-pandemic Period: March 2019 to February 2020	16,468	821	49.9
Pandemic Period: March 2020 to February 2021	13,484	895	66.4

In the mentioned pre-pandemic period total of 26,490 patients were admitted to the Obstetric and Gynecological Department of Chittagong Medical College Hospital. Among them, 21,717 were obstetric patients. The total number of deliveries was 16468 and 13484 in pre-pandemic and pandemic, respectively. The number of pregnant women with intrauterine fetal death was 821. Which is 3.78% of total obstetric admission and 49.9 per 1000 deliveries. On the other hand, during the pandemic, the total admitted and obstetric patients were 22410 and 18424, respectively. Among them, cases of intrauterine fetal death were 895, which is 4.86% of total obstetric admission and 66.4

per 1000 deliveries. The percentage of IUFD on obstetric admission showed significantly ( $p < 0.001$ ) higher in the pandemic period than in the pre-pandemic period.

**Table IV** Socio-demographic profile

Variable	Level	Pre-Pandemic period		Pandemic period	
		Number of patients	Percentage	Number of patients	Percentage
Age group (Years)	16 - 20	118	14.9%	104	12.1%
	21 - 25	227	28.7%	274	31.9%
	26 - 30	254	32.2%	299	34.8%
	31 - 35	173	21.9%	166	19.3%
	> 35	18	2.3%	17	2.0%
Residence	Rural	538	68.1%	475	55.2%
	Urban	252	31.9%	385	44.8%

Table IV portrays the socio-demographic profile of the patients with IUFD during the Pre-pandemic and the Pandemic periods. Most of the patients in both the groups belong to the age group 26-30 years and hailed from rural areas. But percentage of the patients from urban area raised from 31.9% during the Pre-pandemic period to 44.8% during the Pandemic period with a corresponding fall of the percentage of rural patients from 68.1% to 55.2%. This may reflect difficulty in transportation and hospital admission of the patients hailing from far reaching rural areas.

**Table V** Obstetric profile

Variable	Level	Pre-Pandemic period		Pandemic period	
		Number of patients	Percentage	Number of patients	Percentage
Para	Nulliparous	244	30.9%	274	31.9%
	Multiparous	546	69.1%	586	68.1%
Gestational age (week)	26-30	159	20.1%	148	17.2%
	31-33	292	37.0%	296	34.4%
	36 - >40	339	42.9%	416	48.4%
Previous history of IUFD	Yes	88	11.1%	59	6.9%
	No	702	88.9%	801	93.1%
Previous history of abortion	Yes	214	27.1%	183	21.3%
	No	576	72.9%	677	78.7%

It is also noted (Table V) that the majority of the patients in both groups with intrauterine fetal death were multiparous and most of them were detected at 36 to >40 weeks of gestational age. During the pre-pandemic period, 11.1% and 27.1% of patients had previous history of IUFD and abortion respectively, whereas in the pandemic period there were 6.9% and 21.3% respectively

## DISCUSSION

Fetal death at any point during gestation is a miserable experience and a great cause of stress not only to the parents but also to the obstetricians. Bangladesh is a developing country that is the sixth most densely populated country in the

world. It becomes the number one most densely populated country if city-states and small archipelagos are excluded.<sup>15</sup> This retrospective single-center study highlighted the impact of the COVID-19 outbreak on the rate of IUFD by comparing and analyzing the data of IUFD from a tertiary hospital between COVID-19 and pre-COVID-19 periods. The pandemic has resulted in a significantly higher incidence of IUFD not only by COVID-19 infection itself but also due to limited access to healthcare services which disrupted the healthcare delivery in obstetric patients.<sup>8,9</sup> The outbreak has overstressed all the systems including the economic and health systems of the country because of internal and global lockdown. The result is consistent with the result of a study carried out at the University of Tennessee Health Science Center, Memphis, TN, whereas a study at Duke University, Durham, North Carolina showed that there is no increase in IUFD rate during the pandemic.<sup>16,17</sup> Another retrospective cohort study at the tertiary care labor and delivery unit in Los Angeles, CA had compared and showed that there was no difference in the IUFD and the rate was similar for the last five years.<sup>18</sup>

Though there are many immunological and pathological factors, which may induce IUFD in COVID-19 infection, it is still unknown whether the infection in the first and second trimesters might increase the possibility of fetal and neonatal death.<sup>19</sup> However, SARS during pregnancy is associated with high incidences of spontaneous miscarriage, preterm delivery, and intrauterine growth restriction.<sup>20</sup>

Another cross-sectional study in a tertiary care hospital in Lahore, Pakistan has shown that the IUFD rate per 1000 live births from 15/03/2020 to 15/06/2020 had gone up to 41.99, which was more than the rate (28.57/1000 LB) of last one year of pre-pandemic period.<sup>20</sup> A recent meta-analysis demonstrated an increased risk of adverse pregnancy outcomes in Low-to-Middle-Income Countries (LMICs) when compared with high-income countries.<sup>21</sup> In another study carried out in India has shown that the rate of IUFD was significantly higher during the COVID-19 pandemic compared with that during the pre-pandemic period ( $p = 0.006$ ).<sup>22</sup>

## LIMITATIONS

The main limitation of the present study was its retrospective nature, conducted at a single center and observation done for a short period of time. It was also unknown whether the patients became COVID-19 positive at any time of gestation. It was not possible to assess vaccination status in this analysis. There is a possibility that the fetal outcome has been affected by other factors beyond the COVID-19 pandemic. For more accurate data, better-designed multiple-center research should be performed.

## CONCLUSION

In this study pandemic period appeared to be associated with an increased risk of IUFD. This study provides evidence to understand the socio-demographic mechanisms that come into play in times of a pandemic, for providing insights to the policy

makers for future planning, counseling of women wishing to become pregnant, and prioritizing the safety of pregnant women including their vaccination. However, better-designed multiple-center research should be carried out to reach further conclusions.

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#### DISCLOSURE

All the authors declared no competing interest.

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