

CLINICAL ARTICLE

Obstetrics

The effect of the COVID-19 pandemic on maternal health due to delay in seeking health care: Experience from a tertiary center

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Abstract

Objective: To assess the effects of the COVID-19 pandemic on obstetric care and outcomes.

Methods: A prospective observational single-center study was performed, including all antenatal and parturient women admitted from April to August, 2020. Data were collected regarding number of admissions, deliveries, antenatal visits, reason for inaccessibility of health care, and complications during pregnancy, and compared with data from the pre-COVID period of October 2019 to February 2020.

Results: There was a reduction of 45.1% in institutional deliveries ($P < 0.001$), a percentage point increase of 7.2 in high-risk pregnancy, and 2.5-fold rise in admission to the intensive care unit of pregnant women during the pandemic. One-third of women had inadequate antenatal visits. The main reason for delayed health-seeking was lockdown and fear of contracting infection, resulting in 44.7% of pregnancies with complications. Thirty-two symptomatic women who tested positive for COVID-19 were managed at the center with good maternal and fetal outcomes.

Conclusion: Although COVID-19 does not directly affect pregnancy outcomes, it has indirect adverse effects on maternal and child health. Emergency obstetric and antenatal care are essential services to be continued with awareness of people while maintaining social distancing and personal hygiene.

KEYWORDS

Complications, COVID-19, Delay, Health care, Maternal, Pregnancy

1 | INTRODUCTION

The COVID-19 pandemic has grossly affected the lives of people since its onset in December 2019 across the world.¹ The pandemic resulted in major changes in government policies, including the healthcare system. There have been curfew restrictions in hotspot areas, and certain places have become containment zones from

where a large cluster tested positive for coronavirus. This has also led to poor or inadequate delivery of many services, especially the health services. This mass restriction of activities was intended to prevent community spread of the infection and to allow for preparedness of the medical services for the pandemic. On the other hand, the routine healthcare system was disrupted and people faced problems when seeking medical advice. Although COVID-19 disease

itself does not cause increased maternal mortality compared to the general population directly, unsupervised pregnancies and the absence of routine antenatal visits may have indirect adverse effects on maternal health.²

During epidemics in the past, health systems were crippled to provide routine services to a large extent due to the sudden increase in demand and the redirection of the workforce towards the epidemics. Hence, the utilization of routine health services significantly reduces during every outbreak.³ As has already been said by WHO, "People, efforts, and medical supplies all shift to respond to the emergency. This may lead to the neglect of routine essential health services. People with health problems unrelated to the epidemic find it harder to get access to health care services".⁴ During the Ebola virus outbreak in West Africa in 2014, the indirect effects of the epidemic on maternal health were more severe than the outbreak itself.⁵ It was estimated that, during this outbreak, there was a decrease of 22 percentage points in antenatal care coverage, of 8 percentage

points in in-facility delivery, and of 13 percentage points in post-natal care.⁶ This decrease was mainly due to fear of contracting the disease from medical staff and other patients, loss of faith in the health system, and the exact source of the disease being unknown.⁷ A similar reduction in healthcare utilization was seen during the severe acute respiratory syndrome (SARS) epidemic in 2003. In Taiwan, ambulatory care decreased by 23.9% and inpatient care decreased by 35.2%.⁸

The current coronavirus disease (SARS-CoV-2 infection) was declared a global pandemic by WHO on March 11, March 2020.⁹ Social restrictions and isolation challenged the care of pregnant women. Telehealth was introduced to tide over the situation to some extent. Certain medical conditions can be diagnosed only on physical evaluation of the patient. In the absence of routine care, high-risk factors in pregnant women are missed, which can lead to dreaded complications. This pandemic has resulted in the non-accessibility of antenatal women to care providers in an emergency. These are major concerns in the utilization of health services for all.

Taking lessons from past epidemics, the Ministry of Health and Family Welfare, India (MOHFW) and FOGSI (Federation of Obstetricians & Gynecologists of India) declared pregnant women to be a high-risk group and mandated guidelines to provide essential maternal health services as well as to patients with suspected or confirmed COVID-19.¹⁰ Guidelines have been laid down for modified prenatal care.¹¹⁻¹⁴ In low- and middle-income countries such as India, the impact of containment and other policies on maternal health will be more devastating. Even in the days before the pandemic, timely maternal healthcare services were unavailable or inaccessible for millions of women in low-resource settings. The restrictions on travel and limited health facilities with infection-control preparedness have further exacerbated the negative impact on women's health. There has been a drastic decline in the number of institutional deliveries, which ultimately deteriorates maternal and child care. The side effects of lockdown on maternal health have so far been largely unexplored. Therefore, the aim of the present study

was to assess the indirect effect of the COVID-19 pandemic on the health of pregnant women and fetal-maternal outcomes.

2 | MATERIALS AND METHODS

The present study was conducted in the Department of Obstetrics and Gynecology at All India Institute of Medical Sciences, Jodhpur for a period of 5 months from April 1, 2020, to August 31, 2020. It was a prospective observational single-center study that included all pregnant women admitted during the study period. The study was approved by the Institutional Ethics Committee and informed consent was obtained from the study participants. The number of admissions, deliveries, high-risk women, and referrals was assessed. These data were compared with those from routine pre-COVID-19 days, from October 1, 2019, to February 29, 2020, just before the pandemic (Table 1). March 2020 was not included in the analysis as the lockdown started in the middle of the month and these data were inconclusive. During the pandemic, the institute provided antenatal services through telemedicine, and physical visits were scheduled as per regional guidelines for low-risk women. High-risk women were called more frequently as needed. Moreover, emergency services were continued and all patients were treated, whether they were registered or not. Any delays in routine antenatal checkup and reasons for the delay were noted in all pregnant or delivered women during the COVID-19 period. The effect of delay in seeking health care on maternal complications was assessed.

2.1 | Statistical analysis

Data entry was carried out using MS Excel Software and analyzed using SPSS version 21 (SPSS Inc.). The descriptive and analytical statistics are presented in frequency tables and graphs. The categorical variables were briefed as numbers and percentages. The Student *t*-test was used to analyze the demographic data. $P < 0.05$ was considered statistically significant.

TABLE 1 Comparison in statistics between the pre-COVID-19 and COVID-19 periods in the Department of Obstetrics^a

	Pre-COVID-19 (n = 1116)	COVID-19 (n = 633)	P value ^b
Admissions	1116	633	<0.001
Deliveries	1062	583	<0.001
High-risk pregnancies	505 (45.25)	332 (52.45)	<0.05
ICU stay ^b	3 (0.2)	8 (1.26)	<0.05
Mortality	0 (0)	2 (0.31)	

Abbreviation: ICU, intensive care unit.

^aValues are given as number (percentage).

^bStudent *t*-test; $P < 0.05$ is considered significant.

^c χ^2 test.

3 | RESULTS

A total of 633 pregnant women were admitted to the Department of Obstetrics over a period of 5 months from April to August 2020 during the COVID-19 pandemic. During routine pre-COVID-19 times, the study center had almost double the number of admissions in the department: a total of 1116 patients were admitted from October 2019 to February 2020. Thus, a fall in admissions of about 43.27% was witnessed during the pandemic. From the end of March to the middle of May, the country was undergoing a strict lockdown during which transportation was badly affected. This was reflected in the significant fall in the number of institutional deliveries during April and May (Figure 1). When compared with pre-COVID-19 times, this is a fall of 45.1% in the number of deliveries at the study center, which was statistically significant ($P < 0.001$). The total number of deliveries in pre-COVID-19 times was 1062 over 5 months (October 2019 to February 2020), while in COVID-19 times, it was 583 (April to August 2020). Of these 583 deliveries during COVID-19 times, 315 (54.03%) were vaginal deliveries and 268 (45.96%) were cesarean deliveries.

During the pandemic, it was found that there was a surge in the number of high-risk pregnancies by 7.2 percentage points. In comparison to 505 (45.2%) high-risk admissions in pre-COVID-19 times, the institute had 332 (52.4%) high-risk admissions to the hospital during the pandemic. Thirty-two patients were referred from other hospitals due to the presence of high-risk factors. Out of the total number of admissions, eight patients required admission to the intensive care unit (ICU) for their co-morbidities, whereas, in the pre-COVID-19 months, only three women were admitted to the ICU in the same time frame ($P < 0.05$). There were two maternal mortalities in these 5 months while there were no maternal deaths between October 2019 and February 2020.

Thirty-two pregnant women were positive for COVID-19 in the described time frame; of these, 25 were referred to as COVID-19-positive pregnancies. Seven were diagnosed using reverse transcription polymerase chain reaction (RT-PCR) tests at the study institute and they delivered with a good fetal-maternal outcome. Three patients had vaginal deliveries while four underwent

cesarean deliveries for obstetric indications, namely transverse lie, fetal distress, suspected scar dehiscence, and previous cesarean not willing for a trial of labor. All the infants delivered were moved motherside and were negative for COVID-19. Forty-seven women were admitted to the isolation facility on suspicion of having COVID-19 but were later moved back to the ward after a negative RT-PCR report.

Of the 633 admissions during the pandemic, 206 (32.5%) pregnant women had fewer antenatal visits than advised. Many women avoided routine checkups during the strict lockdown for at least 3 months, from March to May 2020. In addition, of all admissions, 28 (4.42%) women had no antenatal visits (Table 2). This resulted in missing a significant number of co-morbidities relating to pregnancy. The remaining 427 (67.4%) women had regular hospital visits, including at least one visit in the third trimester. When enquired about the reason for delay in health-seeking, 50.9% of women quoted the strict lockdown and lack of transportation, while 33.4% avoided visits due to the fear of catching infections (Table 3).

Of the 332 high-risk pregnancies during the pandemic, 144 (44.7%) had one or more complications aggravated by the delay in seeking health care. Anemia was overlooked in most women, followed by pregnancy-induced hypertension. It was observed that most of the patients preferred to wait at home until labor or preferred home deliveries during the pandemic. There were 26 post-dated pregnancies during this time and many patients were received in an advanced stage of labor. In addition, a significant number of patients were seen with eclampsia, acute renal failure, sepsis, and pneumonia (Table 4).

4 | DISCUSSION

Though COVID-19 has not directly affected maternal and fetal outcomes, the present study shows that COVID-19 has definitely affected pregnancy outcomes indirectly. It was found that there was a drastic fall in the number of institutional deliveries, especially during the period of strict lockdown. The women preferred home deliveries or deliveries at a nearby health facility, due to either inaccessibility,

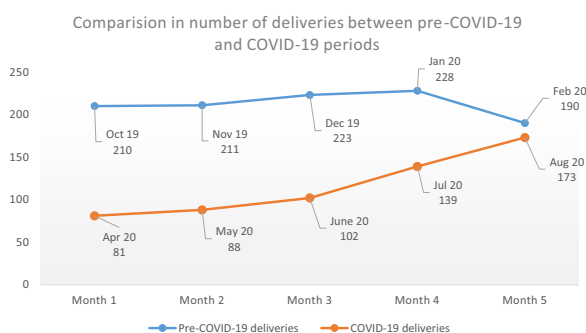


FIGURE 1 Comparison in the number of deliveries between the pre-COVID-19 and COVID-19 periods

TABLE 2 Reduced number of antenatal visits by women ($n = 633$) delivered in the institute^a

Antenatal visits	
No antenatal visit	28 (4.42)
Single antenatal visit	10 (1.57)
No visit for 3 consecutive months	48 (7.58)
No visit for 4 consecutive months	72 (11.37)
No visit for 5 consecutive months	15 (2.36)
No visit for 6 consecutive months	25 (3.94)
No visit for 7 consecutive months	8 (1.26)
Total	206 (32.5)

^aValues are given as number (percentage).

TABLE 3 Table showing reasons for the delay in health-seeking

Reason for delays	Number of patients (n = 206)
Lack of transportation/lockdown	105 (50.9)
Fear to catch the infection	69 (33.4)
Ignorance about antenatal care	32 (15.5)

^aValues are given as number (percentage).

lack of transport, or fear of contagion from big institutes. Widespread disruption of the healthcare system, the stay-at-home policy, and reduced access to hospitals and food have affected maternal outcomes and may continue to have an impact in the future. Countries such as India expect to see a large increase in maternal and child deaths. This lockdown or stay-at-home policy has also affected the population economically, leading to reduced purchasing power of society, thus compounding the delay in seeking healthcare facilities.

When examined on a larger scale, such a major fall has challenged international safe motherhood programs. The reduced number of antenatal visits and institutional deliveries will lead to a marked increase in pregnancies with complications and the need for intensive care. The main reason for admission to the ICU in the present study was an increase in morbidities such as multiorgan failure and acute renal failure. An increase in the maternal mortality rate was also observed. Thus, it appears that the COVID-19 pandemic will indirectly cause a big setback to the international efforts of achieving sustainable development goals.

In the study by Davis et al,¹⁵ it was found that women are preferring home deliveries instead of institutional deliveries due to the fear of contagion from institutes. However, this should only be accepted in women who are considered low risk. The main reasons behind the home deliveries was the patients avoiding visiting hospitals until an emergency due to transportation issues and resistance to approaching care providers.

One-third of women (32.5%) have avoided routine visits, considering pregnancy to be normal physiology and feeling safe at home. The reason for the delay in health-seeking was the strict lockdown for half of the women and their inability to leave the containment zone, while 33.4% avoided visits due to fear of contagion. This has not been elaborated in the literature so far. India is a middle-income country where illiteracy and ignorance about routine antenatal care are prevalent—this was the third reason for the delay in seeking health care. Lockdown and fear of catching infections due to hospital visits have worsened the scenario. Some patients avoided investigations and antenatal ultrasounds, such as anomaly scans, to reduce the risk of exposure, even after a routine antenatal visit.

Almost half of the high-risk factors during pregnancy were missed due to delays in health-seeking. Among these, the majority of women had moderate to severe anemia. Women did not take routine iron and folic acid supplementation during pregnancy, leading to anemia and its related complications and an increased number of blood transfusions. Women were also not having examinations; therefore, early diagnosis and necessary management were not

TABLE 4 Complications missed due to delays in seeking health care

Complication	No. of patients
Anemia	41
Postdatism	26
Pregnancy-induced hypertension	26
Fetal growth restriction	17
Malpresentations in labor	09
Acute renal injury	09
Stillbirth	08
Multiorgan dysfunction/sepsis	08
Antepartum hemorrhage	07
Eclampsia	07
Admission in the second stage	07
Pneumonia/pulmonary edema	07
Heart disease-related complications	06
Extreme preterm	05
Gestational diabetes mellitus	05
Thrombocytopenia/HELLP	05
Liver disease	03
CNS complications	03
Congenital anomaly	03
Rh isoimmunization	02

Abbreviations: CNS, central nervous system.

possible. The second most common missed complication was pregnancy-induced hypertension.

Fakari et al¹⁶ observed that COVID-19 has increased the stress and anxiety of pregnant women, which can indirectly cause an increase in the number of patients with pre-eclampsia, nausea and vomiting, preterm labor, and depression. Some additional concerns of the women in the study are the arranging of a birth attendant, excessive use of detergents and alcohol-based sanitizers that may cause skin problems and toxicity, avoidance of hospital visits, and issues relating to the postpartum period.

India has rapidly prepared itself for this pandemic by increasing the number of beds, manufacturing and providing personal protective equipment (PPE), and setting treatment and antenatal visit policies. However, ignorance in society has made COVID-19 a devastating pandemic with an exponential rise in the number of cases where the worst is yet to come.¹⁷ This is causing an increase in hospital occupancy and the need to rapidly expand the health-care facility. This can lead to major detrimental effects on maternal and child health.

The strength of the present study is that it was prospective in nature and all the participants were followed up until delivery without any recall bias. At the same time, some limitations of the study include it being a single-center study at a tertiary hospital so generalizability cannot be ensured. Second, the women who were admitted to the institute were analyzed, while those coming to the outpatient department were not included. Lastly, the small sample size and

observational nature of the study affected the detailed analysis of other independent predictors of patient delay. Large multicentric studies and worldwide surveys are needed to confirm these findings and better preparedness of obstetrics.

As in other pandemics, the healthcare system faces a great challenge during the COVID-19 pandemic, showing its indirect effects on the vulnerable antenatal group and an increase in pregnancy-related complications. Along with healthcare services, there is the need to educate patients about the importance of regular visits, precautions such as physical distancing, wearing masks, and personal hygiene. Leaving the home should be avoided but not at the cost of compromising health.

CONFLICT OF INTEREST

The authors have no conflicts of interest.

AUTHOR CONTRIBUTIONS

MG: conception and designing of study manuscript drafting, data collection, critical revision. PS: conception, manuscript supervision. KS: manuscript supervision. SS: manuscript supervision. NA: data collection, data analysis, preliminary writing, and manuscript drafting. SM: supervision of work and manuscript. MG and NA contributed equally to the drafting of the manuscript.

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