

Anxiety and depression among women with COVID-19 infection during childbirth—experience from a tertiary care academic center



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BACKGROUND: Pregnancy and postpartum are vulnerable periods for mental health problems and distress. Studies conducted worldwide have highlighted the role of the COVID-19 pandemic in adding to the rates of depression and anxiety in the perinatal period. However, there are very few reports on mothers who were identified as having COVID-19 infection at the time of childbirth.

OBJECTIVE: Our study aimed to find the prevalence of depression and anxiety among pregnant women who were admitted for labor and tested positive for COVID-19 infection. We also aimed to study the association of various sociodemographic, social support, and obstetrical factors and that of COVID-19-related worries with depression and anxiety.

STUDY DESIGN: The study was conducted at the obstetrics inpatient setting in a public hospital in New Delhi, which had a separate designated COVID-19 block. Pregnant and postpartum women >18 years of age who were admitted to the COVID-19 maternity ward for delivery were included for this study. The women were interviewed within the first week of admission and after 6 to 8 weeks of childbirth. The sociodemographic and obstetrical details and COVID-19-related worries and concerns were assessed. Depression and anxiety were assessed using the Patient Health Questionnaire version 9 and the Generalized Anxiety Disorder 7-item Scale, respectively.

The normally distributed variables are expressed as mean±standard deviation and continuous variables with skewed distribution as median (interquartile range). The categorical data presented as proportions of categorical variables were compared using the chi-square or the Fischer exact test. All the tests are 2-sided, with a significance level of 5%. The data were analyzed using the SPSS software version 24. The rates of depression and anxiety were calculated and univariate analysis was done to identify the factors associated with moderate and severe anxiety and depression using various sociodemographic and obstetrical variables, the total COVID anxiety scale scores, and the social support score.

RESULTS: The mean age of the women was 26.86 years (±4.31). Of the 243 women assessed using the Patient Health Questionnaire version 9, 168 (69.13%) had mild depressive disorder, and 29 (11.3%) had moderate depressive disorder. Of the 187 women who were assessed at the 6-weeks follow-up, 31 (16.57%) had minimal depression, 131 (70.05%) had mild depression, and 25 (13.36%) had moderate depression. Mild anxiety was seen in 121 cases (49.79%) and 13 (5.34%) had moderate anxiety symptoms. Women reported several worries, especially about the stigma of COVID-19 infection, support for infant care, and access to infant health services.

CONCLUSION: Screening for common mental illnesses with the timely identification of associated risk factors should be done, with a liaison between obstetricians and mental health professionals. Obstetricians can address and reassure pregnant women regarding concerns about contracting the infection, worries about the possible effects of COVID-19 on the fetus and the newborn, and concerns about future consultations. In case the worries are out of proportion and necessitate intervention by mental health professionals, referral services should be made available. Hence, identifying and addressing the mental health concerns will help provide the optimum perinatal care during the pandemic.

Keywords: anxiety, childbirth, COVID-19, depression, postpartum women

Introduction

The COVID-19 pandemic has posed major challenges for pregnant and postpartum women the world over through direct and indirect consequences. The direct consequences include infection

risk to the mother, the risk of vertical transmission, preterm birth, and maternal and fetal complications, and the indirect consequences include an increase in stress levels, anxiety, and depression,^{1,2} and a higher risk of

intimate partner violence.^{3,4} Women in the perinatal period have faced difficulties because of isolation and quarantine, and changes in healthcare policies and infrastructures have resulted in a reduction in hospital visits for antenatal or

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Why was this study conducted?

Pregnancy and postpartum are vulnerable periods for mental health problems and distress. This study analyzed the effects of COVID-19 infection with regard to mental health problems.

Key findings

Women reported several worries, especially about the stigma of COVID-19 infection, support for infant care, and access to infant health services. There was an increased incidence of anxiety and depression in the postpartum period.

What does this add to what is known?

This study adds to the research on the effects of COVID-19 infection on women at childbirth and the postpartum period. It proposes steps to mitigate these effects.

postnatal care.^{5–7} Women have been especially worried about testing protocols, inconsistent breastfeeding policies, a lack of information in general, and not allowing for the caregiver's presence during labor. Associated economic stressors because of loss of their own or their partners' jobs have added an additional burden.⁸

In India, the first case of COVID-19 was detected on January 30, 2020, and one of the worst affected cities was the national capital region of Delhi.

On March 2, 2020, New Delhi recorded its first case of COVID-19. During the first wave of the COVID-19 pandemic in New Delhi, the cases started rising gradually until May 2020. On an average 3900 new cases were detected per day by the end of June 2020 and an average of 4430 cases per day were seen by mid-September 2020. The peak total positivity rate in mid-July 2020, was 23.28%, which reduced gradually to 6.33% in September 2020. However, there was a spike in the positivity rate in November 2020 to 15.33% before reducing to 0.44% in January 2021, and 140 cases per day were recorded by the end of January 2021.⁹ A lockdown was implemented on 23rd March 2020, wherein apart from essential and emergency services, everything was shut down, including travel and outpatient departments in hospitals.

These rates meant that during this period many pregnant and postpartum women had to handle the stress of lockdowns and restrictions. Several studies

have shown that there was an increase in anxiety and depression in the initial days of the pandemic in the women in their perinatal period, which gradually reduced over a period of time.¹⁰ In Low and Middle Income Countries (LAMIC), the problems that pregnant and postpartum women faced were compounded even further because of difficulties in self-isolation, living in a crowded household with an affected person, limited access to goods or services and to routine or emergency health such as transport during labor, and lack of social care (2).

In India, where the birth rate was 17.59 per 1000 people in the year 2020¹¹ and 67,385 babies were born every day according to the United Nations Children's Fund,¹² the lockdown in March 2020 and the issues related to the pandemic thereafter were quite challenging. Various precautionary measures such as quarantine, social distancing, and containment strategies were implemented during the country-wide lockdown. Most of the tertiary care hospitals in the national capital region were converted into COVID-19—only facilities. Unexpected challenges of mass laborer immigration, disruption of transport services, and closure of local private health facilities resulted in antenatal women being received in an advanced stage of labor and other complications in the COVID-19 designated hospitals.

The pandemic has therefore added to factors that might cause emotional

distress in an already vulnerable period. Research studies on anxiety and depression among women during the COVID-19 pandemic have found varying rates of depression and anxiety based on the time of the study concerning the pandemic, the trimester of pregnancy, and the assessment methods.^{13,14} A review of studies on the impact of COVID-19 on women during pregnancy and the postpartum period indicated that overall there were a large number of studies, but only a few were from the LAMIC. Most of the studies were conducted through web-based surveys and some through face-to-face interviews during clinical consultations. The results showed a significant increase in anxiety and depression during the COVID-19 pandemic, with the prevalence of anxiety and depression during pregnancy being 69.4%¹³ and 39.2%¹⁴, respectively, and that in postpartum being 35.8%¹⁵ and 14.8%¹⁶, respectively.

A recent meta-analysis done by Fan et al¹⁷ on the psychological effects of COVID-19 on pregnant women including 19 studies with 15,875 participants showed a 42% prevalence of anxiety and 25% prevalence of depression. Another meta-analysis done on both pregnant and postpartum women,¹⁸ which included 20,569 participants from 23 studies, showed high rates of anxiety and depression (37% and 31%, respectively), during pregnancy. The postpartum prevalence of depression was 22%.

In addition to the above, in an online survey from India, obstetricians reported that the most frequent concerns reported to them by women and their families were fears related to hospital visits for antenatal check-ups and ultrasound scans, protecting themselves from infection, social media messages, infant health after delivery, and breastfeeding.¹⁹

Although depression and anxiety were a problem in pregnant and postpartum women during the pandemic, not much is known about mental health and the associated challenges specifically faced by women who have been diagnosed positive for COVID-19 infection, especially around the time of

childbirth. Only 2 studies on women with COVID-19–positive status are available.^{20,21} These studies were done using face-to-face interviews, and the Patient Health Questionnaire version 9 (PHQ-9) and the Generalized Anxiety Disorder 7-item Scale (GAD-7) were used to assess anxiety and depression. The sample sizes in both the studies were quite small (28 women and 11 women). One study showed no difference in anxiety between the COVID-19–positive and the COVID-19–negative pregnant women, and the study on 11 COVID-19–positive pregnant women showed lower levels of anxiety and depression at the tail end of a pandemic wave.

Our study aimed to a) find the prevalence of depression and anxiety among the pregnant women who were admitted for labor and tested positive for COVID-19 infection, and b) study the association of various sociodemographic, social support, and obstetrical factors and that of COVID-19–related worries with depression and anxiety.

Materials and Methods

The study was conducted at the obstetrics inpatient setting in a public hospital in New Delhi, which had a separate, designated COVID-19 block.

The COVID-19 ward setup

A separate, dedicated COVID-19 block was set up in the super-specialty block of the hospital in May 2020. It had facilities for asymptomatic and mildly symptomatic COVID-19–positive pregnant women, including a dedicated negative pressure operation theater. Women were housed in a 30-bedded ward with 5 cubicles. Government policies were followed, and COVID-19–positive pregnant women who were asymptomatic or mildly symptomatic were admitted for isolation.

The pregnant women were transferred to the COVID-19 ward in an ambulance accompanied by a hospital worker. They could not meet their families physically for 10 days but could communicate with them through a landline phone at the nurses' workstation and their mobile phones. Following

delivery, babies were roomed in with them, and they were encouraged to use hand hygiene and sanitizers and wear masks at all times, especially while handling and feeding babies.

There was a separate delivery area within the same ward, and all deliveries were conducted here. On a few occasions, the clinical condition of some patients deteriorated in the ward, and they were shifted to the intensive care unit.

Pregnant and postpartum women >18 years of age who were admitted to the COVID-19 maternity ward for delivery were included for this study. None of them had any past or family history of psychiatric illness. Women with any severe mental illness or a severe medical illness were excluded.

Of the 274 women admitted between May 1, 2020 and December 31, 2020, 243 were recruited after obtaining written informed consent. The women were interviewed over the telephone during admission to the COVID-19 ward and were again interviewed in-person during the postnatal follow-up after 6 weeks by the investigator. Each interview was conducted over 30 to 40 minutes. All the assessments were conducted within the first week of diagnosis of COVID-19 infection. Written informed consent was obtained when the patients were admitted, and it was taken from all the participants before they were interviewed in-person. The study was approved by the institutional ethics committees of Vardhman Mahavir Medical College and Safdarjung Hospital.

Of the 243 women, 156 were diagnosed COVID-19–positive before delivery, and 86 got their results after delivery. Anxiety and depression were assessed for 243 women when they were admitted and for 187 at their first follow-up, usually 6 to 8 weeks after delivery.

The sociodemographic details included age, religion, education, occupation, marital status, socioeconomic status, place of stay (rural or urban), and the family type (nuclear, joint, or extended).

The obstetrical details included parity, antenatal booking status, mode of

delivery, pain in the stitch line of a cesarean delivery if postpartum, complications in the current pregnancy, previous pregnancy complications, previous history of psychiatric illness, and COVID-19 status of the baby.

The details of puerperium and infant care that were noted were whether the infant was breastfed within an hour, whether the mother was bathing the baby, the sanitization of hands before infant feeding sessions, assistance received for feeding the baby during isolation, frequency of feeding the baby in 24 hours, care of the baby while visiting the washroom during isolation, being attended by the healthcare worker when called, difficulty in sleeping, how tiring it was to take care of the self and the baby all on their own, and the stigma after being informed about COVID-19 positive status.

Depression was assessed using the PHQ-9, which is an instrument used for screening, diagnosing, and measuring the severity of depression, including perinatal depression. The PHQ-9 has been used in several studies in India, and the Hindi version was used for this study.²² Scores of 1 to 4, 5 to 9, 10 to 19, and 20 to 27 represent minimal, mild, moderate, and severe depression, respectively.²³ Anxiety was measured using the Hindi version of the GAD-7, which is a tool for screening and assessing the severity of anxiety. Scores of 0 to 4, 5 to 9, 10 to 14, and 15 to 21 are taken as the cut-off points for minimal, mild, moderate, and severe anxiety, respectively.²⁴

All postpartum women were asked a list of COVID-19-related concerns using the COVID-19 anxiety scale constructed for use among women in the perinatal period. It consisted of a set of 20 questions on a Likert scale of 0 to 3, which included several aspects related to worries about the self and about the infant in the context of COVID-19 infection (Table 1). These questions were based on items from the perinatal anxiety screening scale,²⁵ which is a questionnaire on attitude and behavior related to COVID-19,²⁶ the coronavirus anxiety scale,²⁷ and expert advice from

TABLE 1

COVID-19 related worries in the perinatal period at the time of childbirth among COVID-19 positive mothers

Items	Scores of 2 or 3 on Likert scale N=243, n (%)
1 Worries or fear about stigma, discrimination related to the COVID-19 infection.	217 (89.29)
2 Worries and fear regarding lack of social support (emotional, domestic, financial, social relationships, and workplace) during pregnancy or after the birth of the baby in the context of the COVID-19 outbreak	216 (88.88)
3 Worries or fear about delayed postnatal consultation visits related to the COVID-19 infection.	187 (76.95)
4 Worries or fear about less access to medicines because of COVID-19 related lockdown	186 (76.53)
5 Worries or fear about the delay in immunizing child or pediatrician visits related to the COVID-19 infection.	157 (64.61)
6 Worries or fear about their postpartum care related to the COVID-19 infection.	149 (61.31)
7 Worries or fear related to social media and news reports related to COVID-19	129 (53.08)
8 Worries or fear related to social media and news reports related to COVID-19	129 (53.08)
9 Worries or fear about family members and elderly or other children at home contracting COVID-19 infection.	121 (49.79)
10 Worries or fear about family members and elderly or other children at home contracting COVID-19 infection.	121 (49.79)
11 Worries or fear about their own or spouse's job/financial burden related to COVID-19 infection	63 (25.92)
12 Worries or fear about others in the household not sanitizing enough	59 (24.27)
13 Worries or fear about not having childbirth-related cultural rituals and customs	40 (16.46)
14 Worries or fear about relationship difficulties due to forced confinement with not-so-supportive in-laws	34 (13.99)
15 Worries or fear of long-term consequences of COVID-19 infection on physical health	34 (13.99)
16 Worries or fear about dietary practices that may compromise immunity	23 (9.46)
17 Worries or fear related to the COVID-19 and infection their isolation, the size of their house	23 (9.46)
18 Worries or fear about neonates contracting the COVID-19 infection	21 (8.64)
19 Worries or fear about breastfeeding or lactational failure related to the COVID-19 infection.	65 (6.18)
20 Fear of rooming-in with baby if baby tested COVID-19 negative	10 (4.12)

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perinatal mental health professionals and obstetricians.

Statistical analysis

The normally distributed variables are expressed as mean±standard deviation and the continuous variables with skewed distribution as median (interquartile range). The categorical data presented as proportions of categorical variables were compared using the chi-squared or the Fischer exact test. All the tests are 2-sided, with a significance level of 5%. The data were analyzed using SPSS software version 24 (IBM Corp, Armonk, NY).

The rates of depression and anxiety were calculated and univariate analysis was done to identify the factors associated with moderate and severe anxiety and depression using various sociodemographic and obstetrical

variables, the total COVID-19 anxiety scale scores, and the social support score.

Results

The mean age of the subjects was 26.86 years (\pm 4.31). Although 153 women had primary school education or less, 90 women had education above high-school. Most of the women were married and were from an urban background, and 187 were from a lower socioeconomic status. Most (162/243) were living in a nuclear family, and 80 were living in a joint or extended family. Of the 243 women, 86 were primigravidas and 157 were multigravidas. Out of these 159 women never visited our facility.

Among the women admitted, 186 were diagnosed as COVID-19—positive

just before delivery when they got tested as part of the hospital protocol, and 86 women delivered by the time they received the results of COVID-19—positive status. The mode of delivery in 132 women was a normal vaginal delivery, and 109 women had a lower segment cesarean delivery.

Pregnancy complications including eclampsia and/or preeclampsia, medical illness (gestational diabetes, gestational hypertension, thyroid dysfunction, cardiac illness, renal complications), anhydramnios or polyhydramnios or oligohydramnios, severe anemia, thrombocytopenia, infections (hepatitis B and C virus), Rh-negative pregnancy, fetus-related complications (intrauterine growth retardation or shared circulation in twins) were seen in 92 of the 243 (37.86%) women.

Most of the women (227/243) reported having breastfed their baby within 1 hour of delivery. Only 10 of the 232 infants tested were found to be positive for COVID-19 infection.

Most women handled (194/243) bathing of the infant on their own, with only 37 women requiring help from the staff; most women did not require any assistance in feeding the infant. Over 24 hours, 5 women reported having breastfed fewer than 6 times, whereas 226 women had fed their infant more than 6 times. Most women (184/243) reported difficulties in sleep. Because the women did not have any birth companions in the COVID-19 facility as patients, most reported that other mothers in the ward helped them in looking after the infants. The women were satisfied with the healthcare workers, and 205 women reported that healthcare workers were always available on-call for help.

Of the 243 women assessed using the PHQ-9, within 7 days of being diagnosed with COVID-19, 45 (18.51%) had minimal depression, 168 (69.13%) had mild depressive symptoms, and 29 (11.3%) had moderate symptoms. One woman had a severe depressive disorder. At 6 weeks of follow-up, of the 187 women who were assessed, 31 (16.57%) had minimal depression, 131 (70.05%) had mild depression, and 25 (13.36%) had moderate depression. Of the 243 women assessed using the GAD-7 at the time of delivery, 109 (44.85%) had minimal anxiety, 121 (49.79%) had mild anxiety, and 13 had moderate anxiety symptoms based on standard cut-offs. At 6 weeks follow-up, of the 185 patients assessed, 140 (75.67%) had minimal anxiety, 44 (23.78%) had mild anxiety, and 1 woman (0.54%) had moderate anxiety.

The list of COVID-19-related worries and concerns is depicted in Table and indicates fairly high levels of concerns related to the following: support during the postpartum period, childcare support, stigma of having COVID-19 infection, poor access to health facilities for self and infant in postpartum, and the health of other family members. Interestingly, breastfeeding was not a

concern, which is also indicated by the high rates of women who started breastfeeding while still in hospital.

Univariate analysis using various sociodemographic and obstetrical variables, however, did not reveal any factors that were significantly associated with moderate anxiety or depressive disorder.

Discussion

Our study aimed to assess the prevalence of anxiety and depression in women who were diagnosed with COVID-19 just before their delivery. There are significant challenges that pregnant and postpartum women face, especially as the pandemic has created uncertainties and new challenges that may make vulnerable women in the perinatal period more prone to psychological impacts such as anxiety and depression.¹ Studies done during the COVID-19 pandemic have shown that pregnant women had fears of transmitting COVID-19 infection to the fetus, and this in turn related to increased anxiety. A multinational study also revealed an increased prevalence of anxiety and depression in both pregnant and breastfeeding women. The factors associated with psychological morbidity included chronic mental illness, smoking, and having an unplanned pregnancy.⁷ Moderate or severe maternal anxiety was associated with the fear of being unaccompanied at childbirth.²⁸

Although most of the available studies are among pregnant and postpartum women attending antenatal services during the time of the pandemic, there are only a handful of studies (albeit with small sample sizes) that have specifically looked at women who have been diagnosed as having COVID-19 infection at the time of childbirth. Labor and childbirth are known to be stressful times for mothers. During COVID 19, women didn't have any companion due to the fear of spread of infection but babies were roomed in with them for breast feeding. This could have led to more psychological stress due to exhaustion and isolation.

Our study tried to address this lacuna in the available literature and found the

prevalence of depressive and anxiety symptoms in women to be quite high within a week of childbirth after having been diagnosed with COVID-19 infection and for 6 weeks thereafter. Nearly 80.4% of the women had mild or moderate depressive disorder, and 61% had mild-to-moderate anxiety disorder. The rates of depression were slightly higher than baseline among the women who came for follow-up at 6 weeks (83% vs 80%) even though the anxiety rates had reduced. Various practices adopted in the course of the pandemic to mitigate these effects included frequent interaction between the patients and healthcare workers during ward rounds and on the telephone provided at the work station, telephonic conversations with family, facilitation of delivery of a few necessary things brought from home by family members, and also psychiatry consultation in the case of moderate and severe depression and anxiety. Previous studies from India and other LAMIC have shown the rates of anxiety to be 23%²⁹ and those of depression to be 9.18%–65.0%³⁰ in pregnancy and 22%³¹ in postpartum. During the COVID-19 pandemic, studies from LAMIC have shown the GAD-based rates for moderate depressive disorder to be 32.2%³² and the PHQ-9 rates of moderate depressive disorder to be 31%.³³

The high levels of concerns and worries specifically related to COVID-19 infection, stigma, and pandemic restrictions such as lockdowns are probably related to the high rates of anxiety and depression in our subjects. However, many of the previously identified factors associated with anxiety and depression in the perinatal period such as a younger age, lower education, low socioeconomic status, and poor social support did not show any association with moderate depressive or anxiety disorders in our sample.^{34–37}

The worries and concerns in Table indicate that stigma, poor access to infant health services, and fear of poor support in postpartum were high and possibly contributed to the high rates of anxiety and depression.

The strengths of the study include a fairly large sample size, systematic

assessments using standard scales, and having a follow-up assessment in the postpartum. More importantly, this is 1 of the few studies that has been done at the time of childbirth among a large sample of women diagnosed with COVID-19 infection. Assessments being done over the phone when the women were admitted and not face-to-face and a postpartum follow-up drop-out rate of 23.86% (58/243), are some limitations.

Conclusions

There needs to be increased screening for common mental illnesses with the timely identification of associated risk factors. Given the high rates of psychological distress, there is a strong need for a liaison between obstetricians and mental health professionals. Obstetricians can address and reassure pregnant women regarding concerns about contracting the infection, worries about the possible effects of COVID-19 on the fetus and the newborn, and concerns about future consultations. In case the worries are out of proportion and necessitate intervention by mental health professionals, referral services should be made available. If such mental health concerns are addressed early, it prevents long-term consequences on maternal mental health and also the maternal-infant relationship. Hence, identifying and addressing the mental health concerns will help to provide the optimum perinatal care during the pandemic.

Implications for future research

There is a paucity of literature on the effects of the pandemic on perinatal women who acquired COVID-19 infection during childbirth. Further systematic and long-term studies are required to identify and address the mental health concerns during the perinatal period, especially as the pandemic has added additional stress. ■

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