

A Prospective Study to Evaluate the Psychosocial Effects of COVID-19 on Antenatal and Postnatal Women in a Tertiary Care Hospital in South India

Krishna Priya Leela¹, Poornima Chinnappa², Poorani Devi³, Anuja S Panicker⁴, Ramya Thangavelu⁵, Keerthiga Jothimani⁶

Received on: 13 February 2024; Accepted on: 26 March 2024; Published on: 29 April 2024

ABSTRACT

Aim and background: Pandemics are known to have effects on the mental health of the populace. Studies on the effect of coronavirus disease-19 (COVID-19) on the general population have brought out the psychological effects of the pandemic. However, the psychosocial impact of COVID-19 on pregnant and postnatal women has not been assessed. The study aimed was to assess the level of psychosocial stress in postnatal and antenatal women during the pandemic and its association of various sociodemographic and pregnancy-related factors with high fear of COVID-19 scores.

Materials and methods: This cross-sectional study included antenatal and post-natal women attending the outpatient clinic. Patients were given questionnaires to document the sociodemographic details, pregnancy-related fear during a pandemic, and fear of COVID-19 scale.

Results: A total of 648 women participated in the study. Among the stressors assessed, better support from the partner ($n = 623$), satisfactory interaction with healthcare workers ($n = 627$), and lower social deprivation ($n = 371$) was reported; the participants denied domestic abuse ($n = 574$) or fear of infecting the newborn ($n = 482$). Positive associations were observed between high fear of COVID-19 scores and sociodemographic factors like low-income status ($p = 0.026$), domestic abuse during lockdown ($p = 0.0034$), difficulty in getting together with family and friends ($p = 0.0001$), and adverse effect on the financial status of the family ($p = 0.0008$), difficulty in transport to the hospital ($p = 0.007$) and fear of the newborn getting affected ($p = 0.0002$).

Conclusion: COVID-19 did not appear to negatively affect the mental health of pregnant and postnatal women or factors assessed in the present study. A high anxiety score was associated with increased anxiety and stress related to COVID-19.

Clinical significance: This prospective study provides a basic idea of different risk factors that could affect psychosocial stress in antenatal and postpartum women. The study also emphasizes the importance of support from partners and interactions with healthcare workers to improve the psychosocial status of pregnant and postnatal women.

Keywords: Coronavirus disease-19, Patient preference, Patient safety, Questionnaires, Surveys.

Journal of South Asian Federation of Obstetrics and Gynaecology (2024): 10.5005/jp-journals-10006-2418

INTRODUCTION

The coronavirus disease-19 (COVID-19) pandemic has affected people physically, mentally, and economically. It has affected overall health, and emotional and social functioning among the general population. The elderly population, those with compromised immune function, and comorbidities such as preexisting psychiatric illness were at higher risk for psychosocial impact of a pandemic.^{1,2} Social isolation, fear of contracting the disease, uncertainty, and economic distress can lead to depressive and anxiety symptoms.³

While the impact of COVID-19 on people, young or old has been immense, the impact was no less on pregnant women and new mothers. Apart from being vulnerable to the infection, they are more prone to psychological distress compared to pre-pandemic levels.⁴ Pregnant women and newborns infected with COVID-19 were reported to have a higher risk of maternal morbidity and neonatal mortality, respectively. However, unlike previous coronavirus-related diseases such as severe acute respiratory syndrome (SARS) and middle east respiratory syndrome (MERS), there is no evidence of intrauterine transmission of the virus to fetuses from COVID-19 infected mothers.^{5,6}

In addition to the increased incidence of depression due to hormonal changes during pregnancy, COVID-19 also has been shown to impair psychosocial functioning in antenatal and postnatal

^{1-3,5,6}Department of Obstetrics and Gynaecology, PSG Institute of Medical Science and Research, Coimbatore, Tamil Nadu, India

⁴Department of Psychiatry, PSG Institute of Medical Science and Research, Coimbatore, Tamil Nadu, India

Corresponding Author: Krishna Priya Leela, Department of Obstetrics and Gynaecology, PSG Institute of Medical Science and Research, Coimbatore, Tamil Nadu, India, Phone: +91 9566775094, e-mail: krishnapriyal@yahoo.co.in

How to cite this article: Leela K, Chinnappa P, Devi P, et al. A Prospective Study to Evaluate the Psychosocial Effects of COVID-19 on Antenatal and Postnatal Women in a Tertiary Care Hospital in South India. *J South Asian Feder Obst Gynae* 2024;16(3):233–238.

Source of support: Nil

Conflict of interest: None

women.⁷ Increase in clinical depression and anxiety along with an increased phobia of contracting the disease has been reported in different countries and this was known to increase the risk of miscarriage, premature birth, low birth weight, and postpartum depression.⁸⁻¹⁰ Reduced social support and psychological stress were known to increase the incidence of preterm births and low birth weight.¹¹

There is a lacuna regarding the psychosocial status of pregnant and postnatal women during the COVID-19 pandemic in India, particularly in South India. A literature search revealed only one study conducted in a tertiary center in Jodhpur, India, which evaluated the overall effect of the pandemic on antenatal and parturient women due to delays in seeking healthcare.¹² Another study conducted in South India reported the disruption of routine antenatal care and its effect on pregnant women, as it was considered a non-emergency service due to COVID-19.¹¹ Thus, the paucity of literature raises a need to evaluate the psychosocial impact in ante- and postnatal women during the first and second waves of COVID-19 in India. We also studied the association of fear of COVID-19 scores with demographic and pregnancy factors.

MATERIALS AND METHODS

This prospective study was conducted on antenatal and postpartum patients attending an outpatient clinic in a tertiary care hospital in South India. The study was approved by the Institutional Human Ethics Committee (Project no. 20/179). Patients were recruited for the study between December 2020 and July 2021.

Depending on the prevalence of depression in antenatal and postpartum periods, the sample size was calculated as based on the results of a study by Leigh et al. wherein the prevalence of depression in antenatal and postpartum periods was found to be 13%.¹³

$$\begin{aligned} \text{Sample size} &= 4pq/l^2 \\ p\text{-prevalence (13\%)} \\ q &= 100-p = 87 \end{aligned}$$

$$l\text{-precision which is } 20/100 \text{ of prevalence} = 20/100 \times 13 = 2.6$$

$$\text{Sample size} = 4 \times 13 \times 87/2.62 = 670$$

Taking into consideration incomplete and incorrect information sample size is to be kept at 700.

Antenatal and postpartum patients till 6 months after delivery who were between 18 and 40 years of age and during any time of gestation attending outpatient clinics were enrolled in the study. Patients who did not consent to participate and those who were unable to read and understand English or Tamil were excluded from the study.

Written informed consent was obtained from each patient. The participants were then given questionnaires for documenting the socio-demographic details, pregnancy status, and pregnancy during COVID-19 and assessing anxiety during COVID-19.

COVID-19-related questions during pregnancy were used to analyze the fears associated with pregnancy and delivery during the pandemic. The fear of COVID-19 scale (FCV-19S), a 7-item scale developed by Ahorsu et al., was used to assess the fear of COVID-19 in general.¹⁴ The Tamil version, validated by Bharatharaj et al., was used to assess fear of COVID-19 in patients who could read and understand Tamil.¹⁵ Responses were obtained in the form of a five-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree. Scores ranged between 7 and 35. Higher scores indicated higher anxiety.

STATISTICAL ANALYSIS

Means of categorical variables were determined using descriptive statistics. Comparison of different variables was carried out using a *t*-test, Chi-square test. Multivariate logistic regression analysis was used to assess the relationship between dependent and

Table 1: Sociodemographic distribution of patients

Sociodemographic	Subdivisions	Number
Age	18–25	271
	26–35	360
	>35	17
No. of years since marriage	<5	522
	5–10	110
	>10	16
Gravida	1	374
	2	336
	3	32
	4	11
	5	5
No. of children	0	312
	1	268
	2	66
	3	2
Family type	Nuclear	340
	Joint	308
Working status	Not employed	498
	Employed	150
Education	School	31
	Graduate	421
	Postgraduate	130
	Professional	66
Income (INR)	<1 lakh	280
	1–5 lakh	243
	5–10 lakh	102
	>10 lakh	33

independent variables and to adjust for potential confounders. The *p* < 0.05 was considered statistically significant.

RESULTS

A total of 648 antenatal and postpartum women consented to participate in the study. The sociodemographic details of the patients are listed in Table 1. The majority of the women were in the age group 26–35 years (*n* = 360, mean age = 28.75), married for < 5 years (*n* = 522), lived in a nuclear family (*n* = 340), were unemployed (*n* = 498), had completed graduate level of education (*n* = 421), drew an income of < INR 1 lakh (*n* = 280) and did not report any relationship problems (*n* = 631). The majority of them were primigravidae (*n* = 374).

Of antenatal patients, the majority were in their third trimester or >28 weeks (*n* = 280), and among 51 postpartum women, 30 had a normal delivery and 21 had cesarean section. No major pregnancy-related complications were observed in the majority of them (*n* = 580). Most patients did not have any history of psychiatric illness (*n* = 639). Overall, only 165 patients took a COVID test, among which 148 tested negative and 17 tested positive (Table 2).

On assessing the psychosocial impact of COVID-19 in antenatal and postpartum women, we found that majority of the patients



were not afraid to visit the hospital for checkup ($n = 476$), were confident about the precautions taken to avoid COVID-19 infection ($n = 639$), were happy with their interaction with doctors and other health workers ($n = 627$), felt they should be tested for COVID-19 ($n = 336$), were not scared of their baby getting infected ($n = 482$), were not worried about travel to hospital during labor pain ($n = 498$), had enough support from family/partner during lockdown ($n = 623$), did not suffer from increased domestic abuse during lockdown period ($n = 574$), did not miss getting together with friends and family ($n = 371$) and felt COVID-19 affected family's financial status ($n = 400$) (Fig. 1).

Fear of COVID-19 questionnaire comprised of seven questions. Positive responses were considered when responded as 'disagree' and 'strongly disagree' and those who responding with 'agree' and 'strongly agree' were considered as negative responses. Total

scores ranged from 7 to 35. The higher the score, the more severe the anxiety. Among the positive responses received, 320 of them were not afraid of coronavirus, 328 did not feel uncomfortable thinking about coronavirus, 521 of them did not fear losing their life because of coronavirus, 420 were not anxious or nervous watching news about coronavirus, 557 did not lose any sleep worrying about contracting coronavirus and 547 did not experience heart palpitations while thinking about getting infected by a coronavirus (Fig. 2).

Finally, we assessed the association of sociodemographic and psychosocial impact with fear of COVID-19 scores, after adjusting for age. We found that the odds of being afraid of COVID-19 were lower with higher income (OR – 0.38; 95% CI, 0.17–0.89; $p = 0.026$); however, other factors like age, years since marriage, type of family, working status, education, etc., were not associated with fear of COVID-19 (Table 3).

Women with high fear of COVID scales were afraid to visit hospital for checkup (OR – 11.27; 95% CI, 4.9–25.82, $p = 0.0001$), worried about getting tested for infection (OR – 3.5, 95% CI, 1.66–7.37, $p = 0.001$), were afraid of baby getting infected (OR – 4.91; 95% CI, 2.09–11.5, $p = 0.0002$), were bothered about problems with transportation during labor pain (OR – 3.41; 95% CI, 1.4–8.29, $p = 0.007$), suffered more domestic abuse during lockdown (OR – 5.81; 95% CI, 1.79–18.75, $p = 0.0034$). Difficulty in getting together with friends and family (OR – 4.57; 95% CI, 2.16–9.67, $p = 0.0001$), and family's poor financial status (OR – 3.69; 95% CI, 1.72–7.93, $p = 0.0008$) increased the odds of COVID-19 related fear and anxiety (Table 4).

Table 2: Ante-natal and postpartum details of patients

Ante- and postnatal factors	Sub parameters	Number
Weeks of pregnancy	Up to 12 weeks	168
	12–28 weeks	149
	>28 weeks	280
Type of delivery	Delivered	51
	Caesarean	21
	Normal	30
Pregnancy complications	Antenatal	597
	No	580
	Yes	68
Psychiatric illness	No	639
	Yes	9
COVID-19 test done	No	483
	Yes	165
COVID-19 Results	Negative	148
	NA	483
	Positive	17

DISCUSSION

This was a prospective, single-center study conducted to evaluate the psychosocial impact of COVID-19 on 648 antenatal and postpartum women who visited a Tertiary Care Hospital in South India, during the first and second waves of the pandemic.

In our study, there was no impact of the pandemic on pregnant patients. Previously during the Spanish influenza pandemic of 1918, patients in the third trimester were mostly infected and a higher mortality was observed.^{16,17} The Spanish influenza pandemic, as

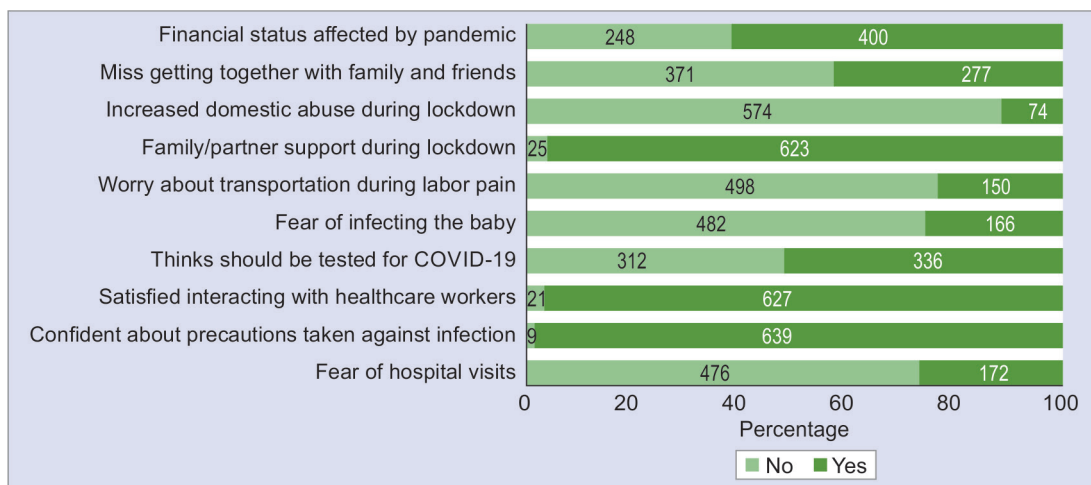


Fig. 1: Psychosocial status of pregnant and postnatal women ($n = 648$)

A bar graph that depicts data collected based on the psychosocial status of pregnant and postnatal women. It shows that financial status and family/partner support were affected by the imposed lockdown, but responses related to transport during labor pain and fear, infecting the baby, and fear of hospital visits showed positive responses

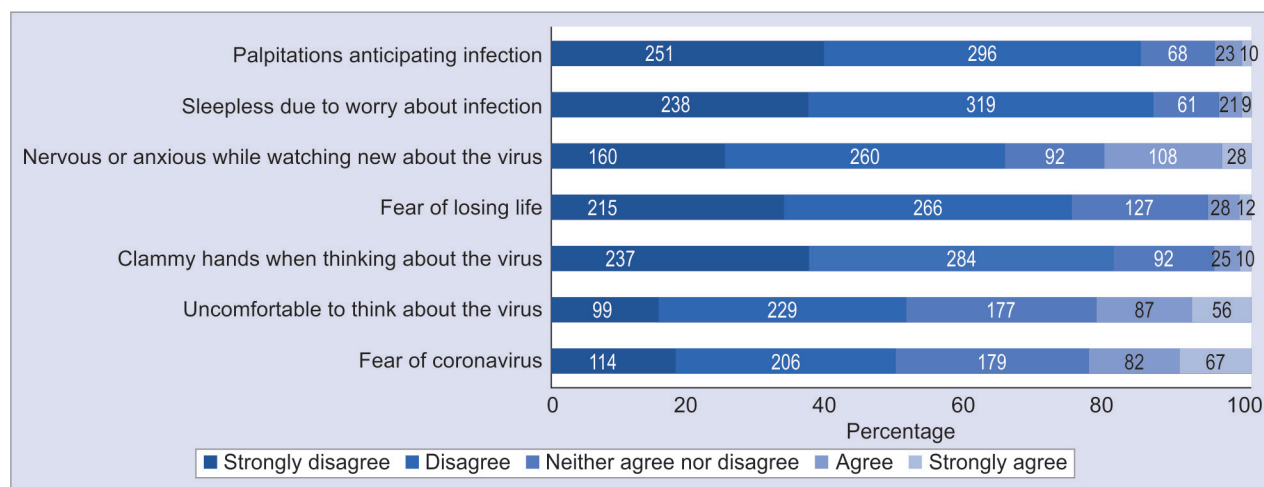


Fig. 2: Fear of COVID-19 scale (n = 648)

A bar graph that depicts data collected using the fear of COVID-19 scale. It shows reduced levels of fear among participants

Table 3: Association of sociodemographic and fear of COVID score (adjusted for age)

	OR	95% CI		p-value
		Lower	Upper	
Age	0.91	0.8266	1.0017	0.0546
Years since marriage	0.913	0.8034	1.0375	0.1631
Family type	0.8043	0.3737	1.731	0.5777
Working status	0.965	0.3936	2.3659	0.938
Relationship problems	1.7243	0.1648	18.0465	0.6494
Education	0.6548	0.8173	50.9762	0.0774
Income	0.3888	0.1693	0.8928	0.0263*
Pregnancy complications	0.6888	0.2026	2.3366	0.5491
Psychiatric illness	0.5782	0.0234	14.2953	0.738

*Indicates statistical significance (p < 0.05)

noted by clinicians, manifested as nervous sequelae, including delirium, dementia praecox, and psychoses of influenza.¹⁸ However, the mental health effects of Spanish influenza in pregnant women were not explored at that time. Probably, COVID-19 has not affected obstetric patients with as much intensity even though there were mortalities and morbidities, the lower impact could be attributed to advanced healthcare management in the present times. Similarly, pregnancy-related complications were not seen in the majority (n = 580) of the patients in our study, which was not the case during Spanish influenza where a study reported almost 75% of the cases suffering from pregnancy-related complications like pregnancy loss.¹⁷

The present study evaluated the psychological and social impact of COVID-19 on pregnant women by assessing their fear of the pandemic in general and specifically during pregnancy (both ante- and postnatal).

Among the social factors assessed during the pandemic, fear of contracting the virus while commuting to hospitals and fear of their newborns getting infected was a major concern for expectant mothers.^{7,19} However, we found that the majority of the patients (n = 476) were not afraid to visit the hospital for checkups and

Table 4: Association of psychosocial factors during pregnancy and fear of COVID score (adjusted for age)

	OR	95% CI		p-value
		Lower	Upper	
Fear of hospital visits	11.27	4.9	25.82	0.0001*
Confident about precautions taken against infection	0.4171	0.017	10.2505	0.5927
Satisfied interacting with healthcare workers	1.6776	0.2019	13.94	0.6322
Thinks should be tested for COVID-19	3.5035	1.6651	7.3716	0.001*
Fear of infecting the baby	4.9139	2.0983	11.5074	0.0002*
Worry about transportation during labor pain	3.409	1.4022	8.2899	0.007*
Family/Partner support during lockdown	2.0546	0.2937	14.371	0.4684
Increased domestic abuse during lockdown	5.8065	1.7983	18.748	0.0034*
Miss getting together with family and friends	4.5746	2.163	9.6749	0.0001*
Financial status affected by pandemic	3.6933	1.7195	7.9328	0.0008*

*Indicates statistical significance (p < 0.05)

did not fear their baby contracting the disease (n = 482). Studies conducted to assess the psychosocial impact of COVID-19 on pregnant women reported that they valued the support of their partner during antenatal care, but were concerned with their limited support postnatally, due to hospital-imposed restrictions.^{4,7}

In the current study, around 96% of them reported support from their family or partner, suggesting better antenatal and postnatal assistance to the patients.

Increased social support was also known to reduce psychological stress which was found in this study, as patients were happy with their interaction and support from doctors and other healthcare workers (97%), apart from support from their partners.¹¹

Other concerns of pregnant women due to household confinement included the inability to meet family and friends.^{7,11} However, most patients in this study (around 57%) did not miss getting together with their friends and family. Domestic abuse or violence on the other hand has reportedly increased due to the imposition of lockdowns, but the majority of the patients (89%) in the present study did not report any incidence of domestic abuse during the pandemic.²⁰

Among the psychological factors (including FCV-19S and fear of COVID-19 specifically during pregnancy and childbirth) assessed, the majority of the patients in our study did not report any sleeplessness ($n = 557$), anxiety and nervousness ($n = 420$) and fear of losing life due to coronavirus ($n = 521$), which was in contrast with studies that reported increased insomnia and anxiety due to fear of coronavirus in pregnant women, which was, in turn, said to deteriorate mental health by increasing depressive symptoms and stress.^{8,19} Another study also reported higher anxiety and depressive symptoms in pregnant and postpartum women when compared to the pre-pandemic levels.¹⁰ Though the current study did not compare the psychological stressors at pre-pandemic level, an overall positive psychological status was observed in this study among patients during both waves of the pandemic.

COVID-19 is said to have affected the low- and middle-income countries disproportionately. A study conducted in Pakistan reported financial status as a stressor in increasing anxiety and stress levels during COVID-19 in pregnant women.²¹ On comparing the financial income with high fear of COVID-19 scores, a significant association ($p = 0.026$) was observed, indicating increased odds of being afraid of the pandemic due to lower income (OR – 0.38; 95% CI, 0.17–0.89). Other sociodemographic factors such as age, education, number of years since marriage, etc., did not show any significant associations with fear of COVID-19.

On the evaluation of the association of high fear of COVID-19 scores with pregnancy-related factors, fear of visiting the hospital for checkups ($p = 0.0001$) and transportation during labor pain ($p = 0.007$) were found to be significantly associated with high fear of COVID-19 scores. A scoping review conducted by Kotlar et al. in 2021, reported an increase in stress in pregnant women during hospital visits and postpartum period due to COVID-19 which restricted their partner or family to accompany them.^{22,23} Pandemic-associated movement restrictions and social distancing could have been a factor in our patients that increased their odds of being afraid of COVID-19 by 11.27–3.41 times during their visits to the hospital for checkups and transportation during labor, respectively.

While there was lower fear of newborns contracting the virus among our patients ($n = 482$), it was significantly associated with high fear of COVID-19 scores ($p = 0.0002$). This trend was observed in other factors such as patients thinking they should be tested for COVID-19 ($p = 0.001$), increased domestic abuse during lockdown ($p = 0.0034$), missing getting together with family and friends ($p = 0.0001$), and financial status of family being affected by the pandemic ($p = 0.0008$) which were significantly associated with higher scores of COVID-19 related fear. At least 10% of women

have reported having faced domestic violence either during pregnancy or postpartum; this has increased during the pandemic due to lockdown-imposed restrictions. Social deprivation was also recognized as a risk factor for deteriorating maternal health during a pandemic. Financial instability due to job losses during the pandemic has also exacerbated maternal psychosocial stress.^{23–25}

The present study was associated with a few limitations. The estimated sample size was not fulfilled in the present study. This study used a self-reporting anxiety scale; hence a chance of obtaining biased responses cannot be overruled. The present study did not screen participants for prior mental health difficulties or family stressors, pre-pandemic.

CONCLUSION

Overall, COVID-19 did not appear to have negatively affected psychological and social factors in a majority of the antenatal and postnatal patients in the present study. However, higher anxiety and stress related to COVID-19 were significantly associated with pregnancy-related factors like hospital visits, newborn's health, social interaction, financial status, domestic violence, etc. This prospective study provides a basic idea of different risk factors that could affect psychosocial stress in antenatal and postpartum women. The study also emphasizes the importance of support from partners and interactions with healthcare workers to improve the psychosocial status of pregnant and postnatal women.

Clinical Significance

This prospective study provides a basic idea of different risk factors that could affect psychosocial stress in antenatal and postpartum women. The study also emphasizes the importance of support from partners and interactions with healthcare workers to improve the psychosocial status of pregnant and postnatal women.

REFERENCES

1. Pfefferbaum B, North CS. Mental health and the Covid-19 pandemic. *N Engl J Med* 2020;383(6):510–512. DOI: 10.1056/NEJMp2008017.
2. Knight MJ, Baune BT. Psychosocial dysfunction in major depressive disorder-rationale, design, and characteristics of the cognitive and emotional recovery training program for depression (CERT-D). *Front Psychiatry* 2017;8:280. DOI: 10.3389/fpsy.2017.00280.
3. Sher L. The impact of the COVID-19 pandemic on suicide rates. *QJM* 2020;113(10):707–712. DOI: 10.1093/qjmed/hcaa202.
4. Atmuri K, Sarkar M, Obudu E, et al. Perspectives of pregnant women during the COVID-19 pandemic: A qualitative study. *Women Birth* 2022;35(3):280–288. DOI: 10.1016/j.wombi.2021.03.008.
5. Schwartz DA. An analysis of 38 pregnant women with COVID-19, their newborn infants, and maternal-fetal transmission of SARS-CoV-2: Maternal coronavirus infections and pregnancy outcomes. *Arch Pathol Lab Med* 2020;144(7):799–805. DOI: 10.5858/arpa.2020-0901-SA.
6. Villar J, Ariff S, Gunier RB, et al. Maternal and neonatal morbidity and mortality among pregnant women with and without COVID-19 infection: The INTERCOVID multinational cohort study. *JAMA Pediatr* 2021;175(8):817–826. DOI: 10.1001/jamapediatrics.2021.1050.
7. Kumari A, Ranjan P, Sharma KA, et al. Impact of COVID-19 on psychosocial functioning of peripartum women: A qualitative study comprising focus group discussions and in-depth interviews. *Int J Gynaecol Obstet* 2021;152(3):321–327. DOI: 10.1002/ijgo.13524.
8. Puertas-Gonzalez JA, Mariño-Narvaez C, Peralta-Ramirez MI, et al. The psychological impact of the COVID-19 pandemic on pregnant women. *Psychiatry Res* 2021;301:113978. DOI: 10.1016/j.psychres.2021.113978.

9. Lebel C, MacKinnon A, Bagshawe M, et al. Elevated depression and anxiety symptoms among pregnant individuals during the COVID-19 pandemic. *J Affect Disord* 2020;277:5–13. DOI: 10.1016/j.jad.2020.07.126.
10. Farrell T, Reagu S, Mohan S, et al. The impact of the COVID-19 pandemic on the perinatal mental health of women. *J Perinat Med* 2020;48(9):971–976. DOI: 10.1515/jpm-2020-0415.
11. Ulaganeethi R, Dorairajan G, Ramaswamy G, et al. 'I was scared I will end up in another abortion': A mixed-methods study assessing the impact of COVID-19 pandemic and lockdown on the antenatal care of pregnant women in Puducherry, South India. *Fam Pract* 2021;38(Suppl 1):i23–i29. DOI: 10.1093/famppra/cmab042.
12. Goyal M, Singh P, Singh K, et al. The effect of the COVID-19 pandemic on maternal health due to delay in seeking health care: Experience from a tertiary center. *Int J Gynaecol Obstet* 2021;152(2):231–235. DOI: 10.1002/ijgo.13457.
13. Leigh B, Milgrom J. Risk factors for antenatal depression, postnatal depression, and parenting stress. *BMC Psychiatry* 2008;8:24. DOI: 10.1186/1471-244X-8-24.
14. Ahorsu DK, Lin CY, Imani V, et al. The fear of COVID-19 scale: Development and initial validation. *Int J Ment Health Addict* 2020;20(3):1537–1545. DOI: 10.1007/s11469-020-00270-8.
15. Bharatharaj J, Alyami M, Henning MA, et al. Tamil version of the fear of COVID-19 scale. *Int J Ment Health Addict*. 2022;20(4):2448–2459. DOI: 10.1007/s11469-021-00525-y.
16. Harris JW. Influenza occurring in pregnant women: A statistical study of thirteen hundred and fifty cases. *JAMA* 1919;72(14):978–980. DOI: 10.1001/jama.1919.02610140008002.
17. Woolston WJ, Conley DO. Epidemic pneumonia (Spanish Influenza) in pregnancy: Effect in one hundred and one cases. *JAMA* 1918;71(23):1898–1899. DOI: 10.1001/Jama.1918.02600490030008.
18. Kępińska AP, Iyegbe CO, Vernon AC, et al. Schizophrenia and influenza at the centenary of the 1918-1919 Spanish influenza pandemic: Mechanisms of psychosis risk. *Front Psychiatry* 2020;11:72. DOI: 10.3389/fpsy.2020.00072.
19. Salehi L, Rahimzadeh M, Molaei E, et al. The relationship among fear and anxiety of COVID-19, pregnancy experience, and mental health disorder in pregnant women: A structural equation model. *Brain Behav* 2020;10(11):e01835. DOI: 10.1002/brb3.1835.
20. Almeida M, Shrestha AD, Stojanac D, et al. The impact of the COVID-19 pandemic on women's mental health. *Arch Womens Ment Health* 2020;23(6):741–748. DOI: 10.1007/s00737-020-01092-2.
21. Premji SS, Shaikh K, Lalani S, et al. COVID-19 and women's health: A low- and middle-income country perspective. *Front Glob Womens Health* 2020;1:572158. DOI: 10.3389/fgwh.2020.572158.
22. Kotlar B, Gerson E, Petrillo S, et al. The impact of the COVID-19 pandemic on maternal and perinatal health: A scoping review. *Reprod Health* 2021;18(1):10. DOI: 10.1186/s12978-021-01070-6.
23. Lucas DN, Bamber JH. Pandemics and maternal health: The indirect effects of COVID-19. *Anaesthesia* 2021;76 Suppl 4(Suppl 4):69–75. DOI: 10.1111/anae.15408.
24. Garg R, Lal P, Agrawal P, et al. Menstrual cycle changes after COVID-19 infection: Does coronavirus-induced stress lead to hormonal change? *J South Asian Feder Obst Gynae* 2022;14(3):248–252. DOI: 10.5005/jp-journals-10006-2027.
25. Agarwal N, Garg R, Singh S, et al. Coronavirus disease 2019 in pregnancy: Maternal and perinatal outcome. *J Educ Health Promot* 2021;10(1):194. DOI: 10.4103/jehp.jehp_954_20.