

Original Article



COVID-19 and Anxiety in Perinatal Women

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Abstract

Introduction: With a global pandemic like coronavirus disease 2019 (COVID-19) spreading across borders, creating an extensive fear amongst all groups alike due to the increased morbidity and mortality, there is uncertainty in all patients affected. The government policy of quarantine of pregnant and postnatal women with COVID-19 in hospitals leads to ironic isolation and loneliness, mounting anxiety and fear of unknown outcomes. This study was undertaken to assess maternal anxiety in relation to COVID-19 and to observe factors influencing anxiety, drawing on anxiety scoring scales and a comparison of the levels of anxiety between antenatal and postnatal mothers.

Methods: This cross-sectional descriptive study was conducted on 123 perinatal women with COVID-19 and their levels of anxiety were assessed on the basis of a pre-formed questionnaire, using the Coronavirus Anxiety Scale (CAS) and Generalized Anxiety Disorder-7 Questionnaire (GAD-7). The levels of anxiety between antenatal and postnatal mothers were compared based on these 2 scoring systems, using IBM.SPSS statistics software Version23.0.

Results: Although both groups were having high scores of anxiety, antenatal women were found to possess statistically significant higher level of anxiety, compared to postnatal women, as determined by CAS.

Conclusion: Better assessment on antenatal and postnatal women will lead to need-based counselling from healthcare workers during their hospital stay and better use of resources for the identification of the vulnerable group and their management.

Introduction

The coronavirus disease 2019 (COVID-19) is a pandemic that has assumed a huge proportion.¹ This not only causes a physical burden to the infected individual but also poses a challenge to psychological wellbeing. In the wake of reports regarding the adverse psychological impact, it is imperative to devise strategies to reduce the mental agony of the patients suffering with the disease.²

All the countries of the world took rigorous steps to prevent the spread of the pandemic in the form of lockdown and curfews. There was uncertainty in the minds of people about how life would go on further. Such steps were taken by the Indian government as well. Pregnant women with COVID-19 had to get hospitalized if the facility of home isolation was not available in their household or the hospital was not easily accessible.³ This led to further desolation of these mothers from their families leading to emotional and psychological discomfort.⁴

In these unprecedented circumstances, pregnant and postnatal women are more prone to the development of anxiety and stress related to acquiring the disease and further transmitting it to their child during pregnancy,

birth or lactation. Also the fetal effect of this infection during pregnancy on growth and development is under evaluation. Therefore, the burden of mental health disorders as a consequence of the pandemic needs vigilance as it may have short-term as well as long-term effects on the mother and the child. Uncertainty shrouding the COVID-19 vaccine has contributed immensely to the fear and anxiety associated with this disease.⁵

Due to the lack of knowledge and fear and stigma related to COVID-19, the stress in the less educated population is created through social media and newspaper reporting. There is a lack of interaction between relatives and neighbors if someone in their house comes as COVID-19 positive. They are also concerned about the financial situations health of loved ones, and the outcome and experience of childbirth.⁶

Studies have been conducted studying the pathophysiology of COVID-19 and its vertical transmission in pregnancy but very few emphasize the psychological impact that this disease has on mothers.⁷ Pregnant and postnatal women suffering from COVID-19 become a highly vulnerable group to develop anxiety.⁷ The

present study was undertaken to assess the antenatal and postnatal women affected with COVID as regards to their levels of anxiety during the pandemic. The data obtained from the study may be used to devise an evidence-based treatment of this vulnerable group. On carrying out thorough literature search we could not find any Indian study that assessed anxiety in pregnant and postnatal women.

The World Health Organization (WHO) has emphasized that a mother's mental health also influences the physical, mental, cognitive and psychological development of the child.⁸ Hence the level of anxiety must be assessed to improve the outcome of pregnancy.

It is presumed that COVID-19 positive antenatal mothers are more prone to the development of anxiety due to the uncertainty regarding fetal outcome and mother-to-child transmission of the disease adding to the fear of isolation and quarantine in comparison to postnatal mothers.⁹ Once the patient has delivered the baby, she is explained about the precautions to be taken to prevent mother-to-child transmission of COVID-19 thereby providing a support to the mother and reducing anxiety. This study was conducted to provide a scientific evidence to this.

This study was conducted to identify the more vulnerable population using a scoring system specifically designed for COVID-19 so that the timely management will be targeted towards that subgroup of patients to use the resources in a proper manner.

Materials and Methods

This cross-sectional descriptive study was conducted at a tertiary care Centre for COVID-19 between April to November 2020. A total of 123 perinatal patients were admitted at our centre in this period.

These patients were diagnosed as COVID-19 positive by quantitative reverse transcriptase polymerase chain reaction (RT-PCR) done by nasopharyngeal and pharyngeal swab testing at the Indian Council of Medical Research (ICMR) approved centers nearby.¹⁰

All pregnant women affected with COVID-19 between the age of 18-40 years and gestational age of more than 20 weeks and postnatal women affected with COVID-19 were included in the study.

Women who had experienced any stressful situations in their family life such as loss of a loved one in the past 6 months, history of addictions, any neurological disorders leading to inability to participate in the study, history of previous miscarriage or history of infertility treatment or any documented pre-existing psychological illness were excluded.

Maternal anxiety was assessed using a pre-formed questionnaire including the Coronavirus Anxiety Scale (CAS)¹¹ and Generalized Anxiety Disorder-7(GAD-7)¹² Questionnaire.

Patients near term were admitted in the pre-labor ward,

whereas others (pre-term and postnatal) were admitted in the isolation wards of the hospital. Proper social distancing and hand sanitization norms were followed and explained to the patient as well on admission. If the patient was asymptomatic, she was managed on antenatal medications, whereas in a symptomatic patient, treatment was provided based on the complaint. The mode of delivery was guided by the obstetric indications.

Asymptomatic patients were discharged on the 10th day of admission, as per Ministry of Health and Family Welfare guidelines.¹³ They were advised one week of strict quarantine at home.⁹

All eligible participants were included after taking a written and informed consent. The data collection was done with the help of a pre-designed questionnaire that was given to the patients on the day of admission. The questionnaire consisted of socio-demographic information such as age, educational qualifications, and occupation and socioeconomic status. It also the emotional thoughts that the patient experienced during the course of treatment ranging from anxiety, depression, fear, anger or concern.

Lee et al¹⁴ have formulated the CAS to determine whether the patient had probable coronavirus related anxiety. Each point of the CAS is rated on a 5-point scale from 0 (not at all) to 4 (nearly every day) based on experiences over the past 2 weeks. This scaling format is consistent with the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)'s cross cutting symptom measure. A CAS total score of ≥ 9 indicates probable coronavirus related anxiety. This may indicate problematic symptoms for the individual that might warrant further assessment and treatment. It has good reliability ($\alpha = 0.92$).¹⁴

GAD-7 Questionnaire¹² is a valid and efficient tool for assessing GAD (Cronbach's alpha = 0.89). It also helps in assessment of its severity. It is a 7-item scale (feeling nervous, anxious or on the edge, not being able to stop or control worrying, worrying too much about different things, trouble relaxing, being so restless that it is hard to sit still, becoming easily annoyed or irritable, feeling afraid as if something awful might happen) in which the participant has choices to answer such as "not at all, several days, more than half the days and nearly every day" having a score of 0, 1, 2 and 3 respectively. A total score is calculated ranging from 0 to 21. A score from 0-4 is classified as minimal, 5-9 as mild, 10-14 as moderate and > 15 as severe GAD. Both these scales were used to determine the anxiety levels in the subjects.

All maternal data was collected and proportions and percentages were calculated to conclude the results. At 10% allowable error with 95% confidence interval, taking 52.66 as the proportion of pregnant women with anxiety, the sample size was calculated to be a minimum of 96 patients.⁹ The power of antenatal patients was determined as 0.4783 and postnatal patients was 0.2596.

The collected data were analysed with IBM.SPSS

statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean (SD) was used for continuous variables. To find the significant difference between the bivariate samples in independent groups the Un-paired sample *t* test and Mann-Whitney U test was used. To find the significance in categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's exact was used. In all the above statistical tools the probability value 0.05 is considered as significant level.

Results

In this period of 8 months, a total of 123 perinatal COVID-19 positive mothers were admitted. Out of these, 82 antenatal patients were managed conservatively. Out of 41 postnatal patients, 13 underwent vaginal delivery and 18 caesarean sections and 10 were delivered outside on admission.

The mean (SD) age of the antenatal patients was 24.26 (4.39) years and postnatal patients was 23.51 (4.27) years. Majority of patients were housewives by occupation. Most of the women were educated up to high school. About 73.2 % (n=90) women belonged to the lower middle class followed by 14.6% (n=18) women who belonged to the upper middle class. Maximum patients belonged to a joint family. No statistically significant difference was found between antenatal and postnatal patients in terms of socio-demographic profile and clinical history (Table 1).

Most of the patients presenting to our hospital were more than 37 weeks of gestation. About 67.3% (n=76) were multigravida. Maximum patients belonged to the rural area as our institution is located in the outskirts. However, the distribution of rural and urban subjects were comparable. Maximum patients presenting to us were asymptomatic whereas 24.3% (n=30) had symptoms of COVID-19 due to which testing was done. COVID testing was easily accessible for 89.4% (n=110) patients. About 24.3% (n=30) patients had family members who had tested positive for COVID-19.

The patient was given a questionnaire on admission to perceive her general attitude towards the disease and factors influencing anxiety.

It was determined that 89.4% (n=110) patients were concerned about their unborn child's health whereas 84.5% (n=104) patients were worried about the health of their children and elder's at home. About 89.4% (n=110) women felt anxious to come to the hospital alone while their family was in quarantine. Most of them 85.3% (n=105) felt that social media influenced their feelings and fear for Coronavirus. Maximum patients (n=118) coped up during this time of isolation by talking to their family members over telephone or video calls.

About 18.3% (n=15) antenatal mothers and 14.6% (n=6) postnatal mothers had a score of >9 denoting clinical anxiety (Table 2).

Patients were scored based on questioning using GAD-7 Questionnaire. About 23.2% (n=19) pregnant mothers and 19.5% (n=8) postnatal mothers were suffering from severe anxiety. (Table 3).

On comparing the scores of antenatal and postnatal patients using CAS and GAD-7 questionnaire a statistically significant score of anxiety was found using the CAS Scoring system as compared to the GAD-7 Scoring (Table 4).

Table 1. Socio-demographic profile and clinical history

Variables	No. (%)		P value ^a
	Antenatal (n=82)	Postnatal (n=41)	
Age (years)	24.26 (4.39)	23.51 (4.27)	0.37
Educational status			
Postgraduate	3 (3.7)	3 (7.4)	
Graduate	10 (12.2)	5 (12.2)	
High school	60 (73.2)	26 (63.4)	0.70
Elementary	4 (4.8)	4 (9.6)	
Uneducated	5 (6.1)	3 (7.4)	
Occupation			
Skilled/semi-skilled	5 (6.1)	2 (4.8)	
Housewife	77 (93.9)	39 (95.2)	1.00
Socio-economic status			
Upper class	5 (6.1)	3 (7.4)	
Upper middle class	12 (14.6)	6 (14.6)	
Lower middle class	60 (73.2)	30 (73.2)	0.98
Upper lower class	5 (6.1)	2 (4.8)	
Lower class	0 (0)	0 (0)	
Residency			
Rural	55 (67.1)	25 (60.9)	
Urban	27 (32.9)	16 (39.1)	0.50
Type of family			
Joint	57 (69.5)	29 (70.8)	
Nuclear	25 (30.5)	12 (29.2)	0.88
Parity in present pregnancy			
Nullipara	29 (35.3)	10 (24.4)	
Para 1	24 (29.3)	13 (31.7)	
Para 2	19 (23.2)	11 (26.8)	
Para ≥3	10 (12.2)	7 (17.1)	0.11

^aPearson's chi square test.

Table 2. Assessment of mother's perinatal anxiety of COVID using coronavirus anxiety scale

Coronavirus anxiety scale score	Pregnant mothers (n=82)	Postnatal mothers (n=41)
0-9, No. (%)	67 (81.7)	35 (85.4)
Dysfunctional coronavirus related anxiety >9, No. (%)	15 (18.3)	6 (14.6)
Total	82	41
Mean rank	66.79	52.43
Sum of ranks	5476.50	2149.50

Table 3. Assessment of generalized anxiety disorder using (GAD-7) questionnaire

GAD-7 score	Pregnant mothers (n=82)	Postnatal mothers (n=41)
Minimal 0-4, No. (%)	18 (21.9)	13 (31.7)
Mild 5-9, No. (%)	30 (36.5)	14 (34.2)
Moderate 10-14, No. (%)	15 (18.4)	6 (14.6)
Severe >15, No. (%)	19 (23.2)	8(19.5)
Total	82	41
Mean rank	65.19	55.62
Sum of ranks	5345.50	2280.50

Table 4. Comparison of scores of anxiety between antenatal and postnatal patients using coronavirus anxiety scale and GAD-7 questionnaire

Scoring system	Mann-Whitney U test	P value
CAS score	1288.50	0.03*
GAD-7 score	1419.50	0.16

*Statistically significant.

Thirteen patients underwent vaginal delivery and 18 caesarean sections were done at our institution during this period. On observing their perceptions regarding transmission of the disease to the child, it was found that even after counselling done regarding precautions to be taken for prevention of transmission of COVID-19, 38.7 % (n=12) and 29 % (n=9) of women had a fear of transmission of disease to the child through skin-to-skin contact and breast milk respectively.

Discussion

The current pandemic of COVID-19 is a unique stressor with potential repercussions for pregnancy and beyond. Elevated levels of anxiety and fear can have a negative impact on the mother and the developing fetus. Pregnant mothers have been physically isolated from their family, friends and community due to increased susceptibility to infections.

In our study, the anxiety scores of antenatal and postnatal mothers were compared using the CAS and GAD-7 scoring systems. About 18.3% (n=15) of antenatal mothers and 14.6% (n=6) of postnatal mothers were suffering from dysfunctional anxiety according to the CAS. 23.2% (n=19) of antenatal mothers and 19.5% (n=8) of postnatal mothers were suffering from severe anxiety according to GAD-7 Scoring. The levels of anxiety were found to be more in antenatal women as compared to postnatal women and were statistically significant (P=0.03) using CAS.

In our study in 24.3% (n=30) of patient’s family members had tested positive for COVID-19, whereas in a study conducted by Salehi et al,² 2.3% of patients had history of COVID in family. In Salehi et al study, 68.5% (n=152) of subjects were multigravida, whereas in our study 67.3% (n=76) of subjects were multigravida.

A study by Liu et al¹⁵ determined that age, education,

occupation, parity and period of gestation determined the anxiety developed to the disease. In our study population, no significant statistical difference was found with respect to these parameters between antenatal and postnatal women.

In a study conducted by Corbett et al,¹⁶ 83.1% of women did not worry about their health previously. Fifty percent were worried about self, 83.3% of them were worried about their relative’s health, 66.7% about their children at home and 63.4% have concern for their baby. Some of our findings were similar to this study. In our study, more women (84.5%) were concerned about their family’s health as compared to their own health. Contrary to the above study, a whopping 89.4% (n=110) mothers were concerned about the health of their baby.

Family and fetal health were the major maternal concerns. They were worried about the health and wellbeing of the family members and children at home. Also, they were worried about the vertical transmission of the disease to their unborn child. Due to low levels of literacy, ignorance and poverty, most of the deliveries in the residential areas near our hospital are conducted by auxiliary nurse midwives. They have less knowledge about COVID-19 and do not counsel the mothers regarding the same. The variation in the concern regarding the baby’s health may be due to lack of knowledge regarding disease transmission.

In a study conducted in Wuhan and Chongqing, China 84.3% patients derived information regarding the illness from Media channels.¹⁵ In our study, in 85.3% (n=105) subjects social media and television influenced the patients perceptions regarding the disease. Maximum patients coped up in the period of isolation by talking to their family members over phone or video call.

Even after being counseled regarding the precautions needed to be taken to prevent mother-to-child transmission of the disease, and answering of their queries, most women felt that COVID would get transmitted to the baby through skin-to-skin contact and had fear of breastfeeding the child. This can be attributed to the poor educational status of the mothers and lack of understanding.

Out of 31 childbirths, 2 were documented intra-uterine deaths. Twelve babies were admitted in the Neonatal Intensive Care Unit. All babies tested negative for COVID-19 infection. In a study conducted by Yan et al,¹⁷ 86% of babies who underwent testing for SARS-CoV tested negative for it. NICU admission of their child also influenced in the development of anxiety in the mother, especially in the physical absence of family members and tender love and care which they need the most during this time.

In a study conducted by Wang et al¹⁸ in the initial phase of the outbreak, 29% of women reported moderate to severe anxiety. In our study, 18.3 % of antenatal mothers and 14.6% of postnatal mothers had clinical coronavirus related anxiety according to CAS requiring intervention.

In a study conducted by Preis et al on studying the severity of anxiety on the basis of the GAD-7 questionnaire, 21.1%, 35.6%, 21.6% and 21.7% of subjects had minimal, mild, moderate and severe anxiety levels, respectively.¹⁹ In our study, results were similar. In antenatal patients, 21.9% patients had minimal, 36.5% had mild, 18.4% had moderate and 23.2% had severe anxiety. In postnatal mothers, 31.7%, 34.2%, 14.6% and 19.5% subjects had minimal, mild, moderate and severe anxiety.

The GAD-7 scoring has also been used in a study by Kajdy et al²⁰ to determine risk factors for anxiety and depression in pregnant women during the COVID-19 pandemic. In a study conducted in Belgium by Ceulemans et al, 47%, 39.4%, 8.4%, and 5.2% patients suffered from minimal, mild, moderate and severe anxiety respectively.⁹

On comparison of anxiety between antenatal and postnatal mothers, a statistically significant difference ($P=0.03$) in anxiety was found in between the two groups using CAS as compared to the GAD-7 scoring system.

This established that anxiety was more in antenatal mothers as compared to postnatal mothers as prior to the delivery, as pregnant mothers have a tendency to be more anxious about the baby's perinatal outcome and their health status and this contributed to anxiety along with isolation and loneliness during the quarantine. The limitation of our study was that it was a single centred trial and a small sample size was included. We recommend that multicentre randomized trials are needed for better community application.

Conclusion

The lesson learned so far from COVID-19 makes it clear that mental health consequences can be dealt by health professionals only with better support and reassurance tools with counselling as an integral part of it.

Health professionals will have to assess the psychological wellbeing with anxiety scoring system specifically designed in relation to the pandemic. Maternal and foetal outcomes were found to depend not only on physical wellbeing but psychosocial impact of infectious disease must be looked into.

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Authors' Contributions

RN, NC, AL: Conception and design, analysis and interpretation of the data, drafting of the article, Data collection; Writing-original draft preparation, final approval of the article; RN, AL, RKV, SSP: Drafting of the article, Supervision, Critical revision of the article for important intellectual content, final approval of the article. All authors have read and agreed to the published version of the manuscript.

Ethical Issues

The study was approved by the Institutional ethics committee (TMMC&RC/IEC/19-20/037).

Conflicts of Interest

No conflict of interest.

Research Highlights

What is the current knowledge?

- There is a lacunae in the knowledge about the vertical transmission of the COVID-19 and its effects on the mother and baby-thus contributing to the development of anxiety in pregnant and postnatal COVID positive mothers.

What is new here?

- As pregnancy in itself is a highly vulnerable state, the resurgence of COVID-19 has led to severe anxiety and uncertainty related to the maternal and fetal outcomes especially related to hospital isolation of poor patients.
- It is imperative to assess such patients with an anxiety scale different from the usual such as the Coronavirus Anxiety Scale addressing all aspects of the disease rather than a general anxiety scoring system such as GAD-7.
- Also, counselling of the patients by the health care professionals must be done in the absence of family members during the period of isolation and quarantine to provide better psychological support to the mothers.

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