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Case-controlled Study

A case-control study on the severity postpartum depression among COVID19 positive mother

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ABSTRACT

Background: COVID19 pandemic has caused a variety of psychological problems including panic disorder, anxiety and depression. It is also associated with adverse psychological outcomes in pregnant women. The aim of this study was to compare the severity of postpartum depression in pregnant women with and without COVID-19 during the coronavirus epidemic.

Methods: This case-control study was performed on 102 pregnant women referred to the hospitals of (XXX). Using questionnaire, consisting of demographic and maternal data (age, number of pregnancies, type of delivery, history of any disease, history of drug use, breastfeeding experience, separation of mother from infant due to coronavirus) and score from Edinburgh postnatal depression scale (EPDS) score data from all the participants obtained and analyzed statistically using SPSSv23.

Results: The results showed that the mean EPDS score in COVID-positive mothers was 26.64 and in COVID-negative mothers was 24.76, which was statistically significant, $p < 0.001$. The score did not vary among the two group with respect to age group and type of delivery method. The score was significantly higher among the women with 3–4 pregnancies.

Conclusion: COVID-positive status is associated with increased postnatal depression among women. Perinatal and postnatal psychological consultancy is required in such patients along with monitoring of maternal and neonate physical and mental health.

1. Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causing COVID19 (coronavirus disease 2019) is a global pandemic and has affected more than 252 million people around the world and over 5 million deaths [1]. With the requirement of social distancing and quarantine, the incidence of psychological problems has been upsurged including depression and suicidal ideation [2].

Postpartum depression affects about 13–19% of women, that is presented by the feelings of sadness, anger, or frustration which can impede everyday activities following the birth of the child until a year [3]. Pregnant women, during this pandemic period, are among the vulnerable groups, owing to the concerns regarding the baby. This has been reported with increased psychological stress among pregnant women and mothers [4]. Deterioration of maternal mental health is associated with physical and psychological negative outcomes in infants. Studies have shown that during COVID19 period, maternal concerns regarding the transmission of the infection has heightened, even in

; SARS-CoV-2, Severe acute respiratory syndrome coronavirus 2; EPDS, Edinburgh Perinatal Depression Scale; CRP, C-reactive protein.

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mothers without COVID19. A recent pilot study by Govind et al., in London reported that maternal depression and anxiety levels dropped drastically at the end of the pandemic, where improved health care facilities and information regarding the management of COVID19 have played a significant role [5,6]. COVID19-related stress such as transmission of the infection, separation, isolation and quarantine and uncertainty regarding the pandemic have been reported as an important contributor to postpartum depression [7]. Added financial-stress, mood swings, insomnia and increased vulnerability is likely to contribute postpartum depression [8].

The aim of this study is to evaluate postpartum depression among COVID19 positive mothers using Edinburgh Perinatal Depression Scale (EPDS) and its correlation with maternal factors.

2. Methods

This case-control study was performed on 102 pregnant women who were divided in two groups of with and without coronavirus from 2020 to 2021 in the (XXX).

Patient group composed of COVID19 women with clinical symptoms where control group included women negative for COVID19 PCR and no symptomatic presentation. The data was obtained using a questionnaire. In the demographic section, history of depression, history of drug addiction, number of pregnancies, type of delivery, history of any disease, history of drug use, breastfeeding experience, separation of mother from infant due to coronavirus and related questions were included. The depression was evaluated using Postpartum increase in EPDS which is based on 10 questions. According to the EPDS scale, mothers with a score above 13 are more likely to suffer from depression of varying severity. This scale reflects the mother's feelings over the past week. It should be noted that the assessment of mothers through this questionnaire cannot detect cases of anxiety and fear or personality disorders.

The data obtained from the questionnaire was computerized and statistically evaluated using SPSS v23. P value less than 0.05 was considered to be statistically significant. Descriptive data were presented in the form of percentage, frequent, mean, and standard deviation.

Written consent was obtained, and the study was approved by institutional review board under code of ethics IR.SBMU.RETECH.REC.1399.749 https://ethics.research.ac.ir/ProposalCertificateEn.php?id=166518&Print=true&NoPrintHeader=true&NoPrintFooter=true&NoPrintPageBorder=true&LetterPrint=true.

The methods are presented in line with STROCSS 2021 guidelines [9].

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3. Results

A total of 51 patients were included in each group (patients and control), respectively. In the patient group, the 43.1% of mothers were in the 30–35 age group and 76.5% had a cesarean section. In terms of the number of pregnancies, the 74.5% of mothers had experienced 1–2 pregnancies in their lives. In the control group, 37.3% mothers were aged between 25 and 20 years and 51% mothers had received cesarean section recently. Also, in terms of the number of pregnancies, the 72.5% of mothers had experienced 1–2 pregnancies (Table 1).

The results showed that the mean postpartum depression in COVID19 group was 26.64 and control group was 24.76. In the patient group, the average postpartum depression in the age group of 25-25 years was 27.20, which was greatest relative to other age groups. In control group, the highest score, 25.21, was in the age group of 20–25 years.

In patient group, in vaginal delivery subgroup, the score was 26.58 and in cesarean section subgroup was 26.66 group. In control group, vaginal delivery group scored 24.92 and cesarean section scored 24.61. In patient group, patients who had 3-4 pregnancies had greatest score, 27.66, which was also true in control group, 24.83 (Table 2).

The value of Levene's test was 1.346 with a significant value of 0.197, which is more than the error coefficient of 0.05, so the assumption of equality of variance of groups in this model is confirmed. The results of the study showed the effect of each variable on the rate of postpartum depression in mothers using multivariate analysis of variance. The adjusted coefficient of determination of the present model has been seen to be 0.310, indicating that the independent variables of the model were able to explain the changes in the dependent variable of maternal depression by 31%. The effect of postpartum depression was significantly seen to be associated with COVID19 and the number of pregnancies, $p = 0.000$, respectively. The mean depression score in patient and control group was 25.66 and 23.55, respectively (Table 3). The depression score among patients with 1–2, 3–4 and 5–6 pregnancies was 25.42, 25.88 and 22.52, respectively. Mothers who experienced pregnancy 1–2 times with mothers who experienced pregnancy 5–6 times, the difference in the depression score was 2.896, which was significant. In addition, mothers with 3–4 pregnancies and mothers with 5–6 pregnancies with a mean difference was 3.359 which was also

Table 1
Descriptive study of the frequency and percentage of contextual variables in terms of two groups of mothers.

Percent	Frequency	Variables		Group
100	51	Covid		Covid
19.6	10	20–25	Age group	
17.6	9	25–30		
43.1	22	30–35		
19.6	10	35–40		
23.5	12	Vaginal delivery	Type of delivery	
76.5	39	Cesarean		
74.5	38	1–2	Gravida	
17.6	9	3–4		
7.8	4	5–6		
100	51	Control		Control
37.3	19	20–25	Age group	
15.7	8	25–30		
33.3	17	30–35		
11.8	6	35–40		
2	1	40–45		
49	25	Vaginal delivery	Type of delivery	
51	26	Cesarean		
72.5	37	1–2	Gravida	
23.5	12	3–4		
3.9	2	5–6		

Table 2
Descriptive study of mean and standard deviation of maternal depression rate after delivery.

SD	Mean	Variables		Group
2.22	26.64	Depression		Covid
0.78	27.20	20–25	Age group	
2.73	27	25–30		
1.95	26.22	30–35		
3.23	26.70	35–40		
2.02	26.58	Vaginal delivery	Type of delivery	
2.30	26.66	Cesarean		
1.80	26.78	1–2	Gravida	
1.22	27.66	3–4		
4.16	23	5–6		
1.43	24.76	Depression		Control
1.22	25.21	20–25	Age group	
2.18	24.75	25–30		
1.09	24.23	30–35		
1.47	25.16	35–40		
1.01	23	40–45		
1.52	24.92	Vaginal delivery	Type of delivery	
1.35	24.61	Cesarean		
1.48	24.81	1–2	Gravida	
1.33	24.83	3–4		
0.70	23.50	5–6		

Table 3
The effect of research variables on maternal postpartum depression.

Viewability	Effect Size	p-value	F-test	Degrees of freedom	sum of squares	Variables
1.000	0.265	0.000	33.487	1	100.883	Groups
0.353	0.048	0.331	1.166	4	14.045	Age
0.960	0.153	0.000	8.431	2	50.801	Gravida
0.116	0.006	0.451	0.572	1	1.723	Type of delivery

significant, p = 0.000 (Table 4).

4. Discussion

We evaluated that incidence of postpartum depression among COVID positive and negative mothers. Our results showed that maternal depression was significantly associated with COVID-status and previous pregnancies. EPDS score has been reported to be associated with inflammatory markers like IL-6, IL-10 and CRP (C-reactive protein) [10]. COVID19 in pregnant women is associated with alteration in cytokine profile such as increased in IL-2, IL-6, IL-17 and interferon-gramma [10]. A systematic review and meta-analysis showed that the frequency of clinical depression and/or severe depressive symptoms after COVID19 is 3–12% whereas, depressive symptoms following 12 weeks of the infection in likely to range from 11 to 28% [11]. Mazza, De Lorenzo [12] reported that high levels of anxiety and depression in COVID-19 survivors is correlated with an increase in baseline immune inflammation score which is indicative of immune response and systemic inflammation characterized with peripheral lymphocyte, neutrophil, and platelet counts. COVID19 is associated with exacerbation of systemic immunity, leading to increased inflammatory response [13].

Postpartum depression and anxiety have been reported to upsurge during the pandemic period [14]. In a Canadian study, conducted on postpartum depression during COVID19 period, Layton et al. [15], reported that the incidence of postpartum depression and anxiety is higher during this pandemic period. However, this was not likely to impact mother-infant bonding. Lebel et al. [16],also stated in their study that pregnant women during COVID19 period are presented with greater levels of depression and anxiety, which was associated with worries regarding COVID19 threat to the mother and body and social isolation that could affect the relationship of mother and the infant. Furthermore, women admitted to the hospitals due to high risk pregnancies during the pandemic period have a greater risk for depression [17].

In a longitudinal single-arm cohort study conducted on 72 mother infected with COVID19 during pregnancy or after with, Wang, Chen [18] showed that 19.8% of these cases opted for abortion. Following 3 months of abortion or delivery, 9.5% of the study participants were presented with the risk of post-traumatic stress disorder (PTSD), 7.9% had full PTSD and 6.3% and 11.1% had minor and major postpartum depression. Even after quarantine 49% mothers chose to maintain separation from their infants, owing to the risk of transmission of infection. Communication, gross-motor development of the infant and personal-social distancing was associated with negatively with mother-infant separation. A similar study by Mayopoulos, Ein-Dor [19] reported that 50% of pregnant women or recently-given birth mothers were presented by PTSD and acute stress. These COVID positive women had fewer visitors, relative to COVID negative women. Additionally, the findings also indicated lower birth weight of the infants, painful delivery and admission of infants of neonatal intensive care unit (NICU). Collins, Fruhman [20] reported that postpartum depression among COVID positive mothers is significantly greater than COVID negative women, with the odds ratio of 3.7. In Chinese population, Peng, Zhang [21] stated that COVID positive mothers have lesser Maternal Postnatal Attachment Scale score. However, the anxiety and depression scores among COVID confirmed, suspected and control cases did not differ significantly.

Our study suffers from a number of limitations such as sample size, lack of data regarding inflammatory parameters associated with depression and infant-related outcomes. Therefore, further studies including these data are recommended. Moreover, we recommend educational programs and consultation services to help mothers overcome this psychological burden that is also likely to be associated with infants' physical and mental development.

Table 4
A pairwise comparison of the mean difference of each of the variables in terms of maternal depression.

p-value	Mean	Variables		
000/0	113/2	Covid Control		Group
001/0	896/2	5–6	1–2	Gravida
000/0	359/3	5–6	3–4	

5. Conclusion

In light with previous studies and our results, in can be concluded that COVID19 is likely to be associated with greater incidence of postpartum depression. Considering high rate of postpartum depression in COVID positive mothers during their pregnancy, it is recommended that all mothers should be evaluated for COVID during pregnancy and postpartum period along with their psychological status.

Ethical approval

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Author contribution

Dr. Shideh Araiana and Dr. Maryam sadat Hosseini and Dr. Mojgan Khademi : conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript. Dr. Seyedeh Neda Kazemi and Dr. Elnaz Ghaffari: Designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript. Dr. Masoome Falahatie and Dr. Sedighe Asadi Shahmirzadi and Dr. Afsaneh Hosseini: Coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content.

Consent for publication

Not applicable.

Guarantor

Afsaneh Hosseini.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Availability of data and materials

The datasets used and/or analyzed during the current study are

available from the corresponding author on reasonable request.

Declaration of competing interest

The authors deny any conflict of interest in any terms or by any means during the study.

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