ORIGINAL ARTICLE

Risk of Postpartum Depression During COVID-19 Outbreak and its Associated Risk Factors

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ABSTRACT

Objective: The aim of this study was to evaluate the prevalence of postpartum depression (PPD) and related factors following the COVID-19 outbreak among women in Istanbul, Turkey.

Methods: This cross-sectional study was conducted between September 2020 to September 2021 in Istanbul Teaching and Research Hospital in Istanbul with 316 women at 4–6 weeks postpartum. We included women who spoke and understood Turkish and were ≥ 18 years of age. We collected the research data online, using an information form, the Edinburgh Postpartum Depression Scale, and the Coronavirus Anxiety Scale.

Results: Among 316 women, the risk of PPD was 91 (28.8%). Women aged ≤34 had a low risk of developing PPD (aOR 0.36, 95% CI 0.18 – 0.70). PPD was 5 times significantly higher among women with low-income level (aOR 4.94, 95% CI 2.32 – 10.51). PPD was 9 times significantly higher among women who had COVID-19 infection (aOR 8.65, 95% CI 4.48 – 16.68) and 2.3 times significantly higher among women who had fear of catching the COVID-19 virus at the hospital (aOR 2.34, 95% CI 1.23 – 4.44), and 5 times significantly higher among women with low levels of coronavirus anxiety (aOR 5.01, 95% CI 2.60 – 9.65).

Conclusion: A significant proportion of women have experienced PPD during the COVID-19 pandemic. The higher risk factors for PPD were being older than 34 years, low-income level, infected with COVID-19, fear catching the COVID-19, and having a low level of coronavirus anxiety women.

Keywords: Anxiety, Coronavirus, COVID-19, Depression, Midwifery, Postpartum Period.

INTRODUCTION

Postpartum depression (PPD) is one of the most prevalent mental disorders reported by women after giving birth.[1] The American Psychiatric Association has defined PPD as a depressive emotional disorder that emerges in the first four weeks after giving birth.[2] PPD prevalence may vary depending on the analyzed postpartum period, sampling size, research population, and diagnostic tools.[3] The American College of Obstetrics and Gynecology (ACOG) recommends that postpartum women be screened for mental health through a standardized and validated scale such as Edinburgh Postnatal Depression Scale (EPDS).[4] Postnatal hormonal changes, psychological adaptation to motherhood and associated fatigue, genetics, and sociocultural conditions may contribute to PPD development.[5] PPD is further exacerbated by the negative emotional experiences and societal and environmental stresses.[6]

The COVID-19 outbreak may also have a negative effect on the postpartum mental state of women. The COVID-19 pandemic originated in China in December 2019 and spread globally.[7] Several preventive measures, such as quarantine, curfew, and social distancing, were implemented globally for the management of the COVID-19 pandemic, however, the applied restrictions resulted in an increase in psychological disorders, including, depression, stress, mood variations, aggression, insomnia, and post-traumatic stress disorder.[8] For women, the transition to motherhood is a stressful period that may increase the vulnerability to potential mental health problems. This may further be aggravated by the altered life conditions and restrictions following the COVID-19 outbreak, and mental health disorders may be one of the most common long-term consequence of the COVID-19 pandemic.[9] Therefore, it is worthwhile to assess

potential psychological changes among postpartum women, following the COVID-19 pandemic. In Turkey, the city of Istanbul reported an increase in the incidence of COVID-19 associated morbidity and mortality. Considering the association between mental health disorders and the COVID-19 pandemic, we designed this study to assess the prevalence of PPD and associated factors among women in Istanbul, Turkey following the COVID-19 pandemic.

METHODS

This cross-sectional study was conducted at the Istanbul Teaching and Research Hospital in Istanbul, Turkey, between September 2020 to September 2021. The ethical approval for this study was granted by the University Medical Faculty Clinical Research Ethics Committee on 26.08.2020 (no: 2020/16).

The research sample comprised 316 participants, who gave birth between 37-42 weeks of gestation, selected through a random sampling method. By using open EPI sample size calculator taking proportion of PPD 19.2%, level of confidence 95%, 5% margin of error.[10] The estimated sample size was 227. However, During the data collection process, we included 316 women who met the inclusion criteria in the study.

In this study, we included women who spoke and understood Turkish, lived in Istanbul during the COVID-19 outbreak, were 18 years of age and older, had internet and an e-mail address, agreed to take part in the study, and answered online survey questions at 4-6 weeks postpartum period. Women with a psychiatric disorder history, stillbirth delivery, whose baby is in the intensive care unit, and who uncompleted or non-responded survey questions were excluded from the research.

We collected research data using the Information Form, Edinburgh Postpartum Depression Scale (EPDS), and Coronavirus Anxiety Scale (CAS).

A self-designed form was developed after an in-depth literature search.[9-11] The form comprised 29 questions in all, with ten questions regarding the socio-demographic characteristics of the woman, nine questions about the obstetric and neonatal characteristics, while the remaining ten questions probed into participants' concerns about the coronavirus. To ascertain the content validity of this form, ten lecturers from the departments of Midwifery and Obstetrics and Gynecology conducted a pilot study with ten women to check for the validity and comprehensibility of this form.

EPDS was developed by Cox to screen for PPD among women.[12] This scale was adapted to the Turkish language and validated for the Turkish population by Engindeniz.[13] In this study, the Turkish version of EPDS was administered. The scale has a total of 10 items and it is a 4-point Likert scale of which scores vary between 0 to 3. The total score obtained from the scale is between 0-30 and individuals with a total score of 12 and above are categorized as probable cases of PPD.

CAS was developed by Lee and adapted into the Turkish language and validated for the Turkish population by Biçer et al.[14-15] CAS was designed to assist in the effective diagnosis of individuals with impaired functionality due to coronavirus anxiety. Every single item in CAS was analyzed based on a 5-point scale from point 0 (not at all) to 4 (almost every day) based on the experiences within the last two weeks. A score of 9 and above is interpreted as the presence of coronavirus anxiety in the 5-question scale, where the lowest 0 points and the highest 20 points can be obtained. High scores from a specific item or a total scale score of ≥9 suggest problematic symptoms that require the participant to seek advanced examination/or treatment.

Prior to discharge from the hospital, women giving birth in the hospital were briefed about the content of the research, their written consents were sought and a researcher administered face-to-face interviews to complete the information form. Since this was the period when there was lockdown and quarantine restrictions in Turkey; therefore during the 46 week period after birth, the questionnaires were completed online. Four weeks after birth, EPDS and CAS forms were sent online to participants' e-mail addresses and they were requested to complete the questionnaires within two weeks of receiving them. All completed questionnaires were checked for consistency.

Data entry and analysis were done using a statistical package for social sciences (SPSS) version 20.0. Mean ± SD were computed for quantitative variables like, age and gestational age while frequency and percentages were computed for categorical variables like, level of education, employment status, family socio-economic status, gravida, number of living children, income level, unwanted pregnancy, being covıd-19 infected, mode of delivery, fear of contracting COVID-19 at birth, and CAS group. Inferential statistics were explored using Chi-square test to compare PPD with clinical and demographic chracteristics of women by using EPDS. The p-value of ≤ 0.05 was considered statistically significant. All those variables found significant in contingency table were included in binary logistic regression analysis. Both univariate and multivariate logistic regression were applied.

RESULTS

Of the 316 women, the mean age was 30.27 ± 7.64 years, and the average gestational age at the time of birth was 38.68 ± 1.10 weeks. Most of the participants were ≥35 years of age 185 (58.5%), had a high school education 138 (43.8%), were housewives 160 (50.6%), and belonged to the low-income level group 206 (65.3%). The majority of the women reported that their pregnancy was planned 200 (63.3%).

About half of the women 161 (50.8%) had a vaginal birth and 167 (52.8%) gave birth to a male. Among the women, 115 (36.5%) reported that they were infected with COVID-19, while 95 (30.2%) participants expressed their fear about the potential risk of the COVID-19 virus acquisition at the hospital. We determined that 91 (28.8%) of women were at a higher risk for PPD and 197 (62.4%) displayed a greater level of coronavirus anxiety. A significant association of PPD was found with age (p-value 0.003), the number of living children (p-value 0.034), income level (p-value <0.001), having an unwanted pregnancy (p-value 0.037), being infected with COVID-19 (p-value <0.001), fear of catching COVID-19 virus at the hospital (p-value 0.024), and level of coronavirus anxiety (p-value <0.001). (Table 1,2)

The findings of the multivariable analysis showed that after adjusting the variable mentioned in table 3, the likelihood of PPD was significantly lower among women aged ≤34 years as compared to those >34 years of age (aOR 0.36, 95% CI 0.18 – 0.70). The risk of PPD was 5 times higher among women with low socioeconomic status as compared to women who had moderate socioeconomic status (aOR 4.94, 95% CI 2.32 – 10.51). Similarly, women who had an unwanted pregnancy

Table 1: Association between PPD and demographic variables of women by using EPDS (n = 316)

Variables	Total	PPD Yes (n = 91)	PPD No (n = 225)	p-value
Age, Years				
≤34	131	26 (19.8)	105 (80.2)	0.003*
>34	185	65 (35.1)	120 (64.9)	
Education Level				
Primary School	80	25 (31.3)	55 (68.8)	0.947
Secondary School	71	20 (28.2)	51 (71.8)	
High School	138	39 (28.3)	99 (71.7)	
University	27	7 (25.9)	20 (74.1)	
Employment Status				
Employed	156	46 (29.5)	110 (70.5)	0.805
Housewives	160	45 (28.1)	115 (71.9)	
Family Socio-Economic Status				
Low	206	75 (36.4)	131 (63.6)	<0.001*
Middle	110	16 (14.5)	94 (85.5)	
Having Social Security				
No	61	13 (21.3)	48 (78.7)	0.161
Yes	255	78 (30.6)	177 (69.4)	
Number of Living Children				
0-2	294	89 (30.3)	205 (69.7)	0.034*
≥3	22	2 (9.1)	20 (90.9)	
Pregnancy Planning Status				
Not Planned	200	57 (28.5)	143 (71.5)	0.898
Planned	116	34 (29.3)	82 (70.7)	
Status of Wanting Pregnancy				
Not Wanted	81	16 (19.8)	65 (80.2)	0.037*
Wanted	235	75 (31.9)	160 (68.1)	

PPD: Postpartum Depression, EPDS: Edinburgh Postnatal Depression Scale
All data presented as number (%)
Chi-Square test applied, *p-value ≤ 0.05

Table 2: Association between PPD and clinical variables of women by using EPDS (n=316)

Variables	Total	EPDS Yes (n = 91)	EPDS No (n = 225)	p-value
Mode of Delivery				
Vaginal	161	47(29.2)	114 (70.8)	0.902
Caesarean	155	44 (28.4)	111 (71.6)	
Infant Gender				
Female	149	40 (26.8)	109 (73.2)	0.531
Male	167	51 (30.5)	116 (69.5)	
Infected with COVID-19				
Yes	115	58 (50.4)	57 (49.6)	<0.001*
No	201	33 (16.4)	168 (83.6)	
Fear of Contracting COVID-19 at Birth				
Yes	96	36 (37.5)	60 (62.5)	0.024*
No	220	55 (25.0)	165 (75.0)	
CAS Group				
≤8 (low risk)	119	49 (41.2)	70 (58.8)	<0.001*
≥9 (high risk)	197	42 (21.3)	155 (78.7)	

PPD: Postpartum Depression, EPDS: Edinburgh Postnatal Depression Scale, CAS: Coronavirus Anxiety Scale
All data presented as number (%)
Chi-Square test applied, *p-value ≤ 0.05

were 0.4 times significantly more likely to develop PPD (aOR 0.43, 95% CI 0.20 – 0.95) and women who had fear of catching the COVID-19 virus at the hospital were 2.3 times significantly more likely to develop PPD (aOR 2.34, 95% CI 1.23 – 4.44). Women infected with COVID-19 infection were 9 times more likely to develop PPD as compared to women who had no COVID-19 infection (aOR 8.65, 95% CI 4.48 – 16.68). Women with low levels of coronavirus anxiety during the current outbreak were 5 times more likely to develop PPD as compared to women whose levels of coronavirus anxiety were high (aOR 5.01, 95% CI 2.60 – 9.65). (Table 3)

DISCUSSION

This research was conducted to analyze the prevalence of PPD and associated factors among women in Istanbul, Turkey during the COVID-19 outbreak. We found that older maternal age, belonging to low-income group, having a planned pregnancy, being infected with COVID-19, fear of contracting COVID-19 infection at birth, and having low levels of CAS were significant risk factors for PPD.

We found that among our study sample, 28.8% of women were at risk of developing PPD. This finding is consistent with those reported by earlier studies.[10,11] In a prospective cohort study conducted before the COVID-19 outbreak in Istanbul, Turkey, using EPDS among 1700 women, PPD prevalence was 19.2%.[10]

Likewise, in a meta-analysis including the findings of 48 studies, the rate of PPD in Turkey was 24%.[11] A study that included 2883 women conducted in Wuhan, China, determined that as the number of people diagnosed with COVID-19 increased, PPD rates in the city increased by 1.4-2.6 times.[16] Globally, the prevalence of PPD, during the COVID-19 outbreak was found to be 60.7% in Saudi Arabia and 44% in Italy, indicating an increase in PPD rates during the COVID-19 pandemic.[17,18] This increase in PPD could also be partially attributed to COVID-19 preventive restrictions, such as social distancing, quarantine, and lockdowns. These restrictions might have resulted in a decrease in social interactions, with a resultant reduction in social and emotional support. Literature also suggests an association between a lack of social support and the risk of PPD.[19] These findings suggest that the COVID-19 outbreak has adversely affected the mental health of women in the postpartum period and calls for continuous, extensive, and sustainable monitoring of women's mental health, especially during challenging times like the COVID-19 pandemic.

Various socio-demographic risk factors for PPD have been reported.[20] O'hara and McCabe[21] defined socio-demographic risks for PPD as "buffering resources". In our research, we found that women's age and income level were the only socio-demographic risk factors affecting their PPD level. The prevalence of PPD was higher in low-income women and those aged 34 years

Table 3: Binary logistic regression analysis for variables predicting PPD among women in Istanbul by using EPDS

	Univariate analysis		Multivariable analysis	
	OR (95% C.I)	p-value	aOR (95% C.I)	p-value
Age, Years				
≤34	0.45 (0.27 – 0.77)	0.003[*]	0.36 (0.18 – 0.70)	0.003[*]
>34	1		1	
Number of Living Children				
0-2	4.34 (0.99 – 18.97)	0.050[*]	3.46 (0.67 – 17.7)	0.136
≥3	1		1	
Family Socio-Economic Status				
Low	3.36 (1.84 – 6.13)	<0.001[*]	4.94 (2.32 – 10.51)	<0.001[*]
Middle	1		1	
Status of Wanting Pregnancy				
Not wanted	0.52 (0.28 – 0.96)	0.039[*]	0.43 (0.20 – 0.95)	0.038[*]
Wanted	1		1	
Infected with COVID-19				
Yes	5.18 (3.07 – 8.73)	<0.001[*]	8.65 (4.48 – 16.68)	<0.001[*]
No	1		1	
Fear of Contracting COVID-19 at Birth				
Yes	1.80 (1.07 – 3.09)	0.025[*]	2.34 (1.23 – 4.44)	0.009[*]
No	1		1	
CAS Group				
≤8 (low risk)	2.58 (1.56 – 4.25)	<0.001[*]	5.01 (2.60 – 9.65)	<0.001[*]
≥9 (high risk)	1		1	

PPD: Postpartum Depression, EPDS: Edinburgh Postnatal Depression Scale, CAS: Coronavirus Anxiety Scale
aOR: adjusted odds ratio, CI: confidence interval, OR: odds ratio, [*]p-value ≤ 0.05

and older. This finding is consistent with previous literature that has reported a positive association between PPD and older maternal age, while some studies did not find any association between maternal age and PPD. [10,22,23] This inconsistency highlights the fact that the risk factors associated with PPD are caused by differences at the individual level and therefore it is important to evaluate each woman individually for PPD risk factors.

In this current study, the likelihood of developing PPD during the COVID-19 outbreak was 9 times higher among COVID-19-infected women and 2 times higher in fear of catching the COVID-19 virus at the hospital. Likewise in a case-control study comparing data from COVID-19-infected pregnant women and non-infected pregnant women, the PPD ratio was found to be significantly higher in the case group (53.3%) as compared to the control group (13.3%).[24] In another study among COVID-19-infected adults, nearly half of the study participants developed depression while they were sick.[25] Similar findings were reported during the Severe Acute Respiratory Syndrome (SARS) and

Middle-East Respiratory Syndrome (MERS) outbreaks, indicating that depression rates were higher among those having the infection.[26,27] These findings suggest that for greater public health interest, it is imperative that especially during challenging times like pandemics, postpartum women get systematically screened for mental health disorders, and provided with relevant treatment opportunities.

In this study, we found that women with a low level of coronavirus anxiety were at higher risk of developing PPD. This is in contrast with the findings of a systematic review including data from 191 studies, reporting that prenatal anxiety heightened the risk for PPD.[28] Similarly, in a meta-analysis integrating 52 studies; it was concluded that various mental health stressors can increase the risk for PPD.[19] Thus considering the small sample size of our study, this finding of having a negative association between low levels of anxiety score and higer PPD must be interperated cautiously. To the best of our knowledge, this research was one of the very first studies evaluating the effect of COVID-19 on the postpartum psychological state of women in

Turkey. This study attempted to fill gaps in our current knowledge about the effects of the COVID-19 pandemic on the mental health of postpartum women in Turkey. There were some limitations of this study. First, this was a cross-sectional study that limited the temporality of the events. Secondly, it was limited to the COVID-19 outbreak period, and because of quarantine restrictions, we could only collect online postpartum data. Moreover, research data were self-reported by the participants which could have introduced self-report bias. Finally, no clinical examination was conducted to diagnose PPD. Therefore, future studies with larger sample sizes, with prospective study designs, and applying standard clinical diagnosis of PPD are recommended. Moreover, we also suggest that midwives, doctors, and other healthcare providers should be trained in monitoring and providing supportive care for mental health disorders, especially during the pandemics and outbreaks, and integrate telemedicine methods with in-person monitoring of postpartum women.

CONCLUSION

This study found that during the COVID-19 pandemic, PPD prevalence among postpartum women was 28.8%. Risk factors for PPD were being older than 34 years of age, belonging to a low-income group, being infected with COVID-19, fear of catching the COVID-19 virus at the hospital, and having a low level of coronavirus anxiety score.

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