

# Prevalence and Factors Associated with Postpartum Depression during the COVID-19 Pandemic among Women in Jeddah, Saudi Arabia: A Cross-Sectional Study

Aisha Ibrahim Tarabay<sup>1</sup>, Dalal Boogis<sup>1</sup>, Aysha Tariq Tabbakh<sup>2\*</sup>, Raghad Akram Kemawi<sup>2</sup>, Layan Abduljalil Boogis<sup>3</sup>, Abdulrahman Tariq Tabbakh<sup>2</sup>, Maha Mohsen Al-Hadrami<sup>2</sup>, Manal Mohsen Al-Hadrami<sup>4</sup>

<sup>1</sup>Obstetrics and Gynecology Consultant, King Abdulaziz Hospital, Jeddah, KSA

<sup>2</sup>Medical Intern, IbnSina College, Jeddah, KSA

<sup>3</sup>Medical Student, Battarje Medical College, Jeddah, KSA

<sup>4</sup>Medical Student, IbnSina National College, Jeddah, KSA

Email: \*ayotab@gmail.com

**How to cite this paper:** Tarabay, A.I., Boogis, D., Tabbakh, A.T., Kemawi, R.A., Boogis, L.A., Tabbakh, A.T., Al-Hadrami, M.M. and Al-Hadrami, M.M. (2020) Prevalence and Factors Associated with Postpartum Depression during the COVID-19 Pandemic among Women in Jeddah, Saudi Arabia: A Cross-Sectional Study. *Open Journal of Obstetrics and Gynecology*, 10, 1644-1657.

<https://doi.org/10.4236/ojog.2020.10110148>

**Received:** October 28, 2020

**Accepted:** November 27, 2020

**Published:** November 30, 2020

Copyright © 2020 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

**Background:** Postpartum depression is the most common psychological health problem among females; it begins after the birth of the child and can occur at any time during the first year of delivery. The COVID-19 pandemic is a novel virus that is highly infectious and has several negative psychological impacts on individuals globally. **Aim:** Coronavirus disease 2019 (COVID-19) has been reported to increase the incidence rate of depression. We investigated the prevalence rate and associated factors of postpartum depression (PPD) among women in Jeddah, Saudi Arabia, during the COVID-19 period, thereby attempting to determine whether and how COVID-19 affected PPD. **Methods:** This is a cross-sectional study that was conducted on women at one week to six months postpartum using an online questionnaire. SPSS program was used for analyzing data. **Results:** This study included 150 participated women; 49.3% were in the age range of 25 - 34 years old. There were 30.7% reported being primigravida. Regarding the level of depression, there were 60.7% reported the presence of depression; the depression was affected by some demographics of females such as the education level ( $P = 0.021$ ) and other factors related to the COVID-19 pandemic such as visiting the doctor during quarantine ( $P = 0.049$ ), diagnosis with depression by the doctor ( $P = 0.006$ ), the impact of the pandemic on depression ( $P = 0.035$ ), experiencing symptoms of depression during pregnancy ( $P = 0.005$ ), family history ( $P = 0.043$ ), and difficulties during childbirth during the pandemic period ( $P =$

---

0.03). **Conclusion:** There was a high prevalence of PPD among women during the COVID-19 period, and it was higher than the prevalence of PPD before the COVID-19 period.

## Keywords

PPD, COVID-19, Prevalence, Associated Factors

---

## 1. Introduction

Postpartum depression (PPD) is a non-cyclic depression that begins after childbirth in the postpartum period, and it can occur at any time during the first year after delivery [1]. PPD is the most common psychological health issue among females, affecting 10% - 15% of females globally [2]. The main characteristics of PPD including emotional stress, anxiety, loss of appetite, tearfulness, guilt feelings, sleep disorders, suicidal thoughts, memory problems, concentration problems, irritability, feeling of weakness, and exhaustion [3] [4] [5].

There are several risk factors associated with PPD, such as life stress, labor pain, family history, socio-economic status, inadequate antenatal care, and nutritional deficiency [3] [4] [5] [6].

The international prevalence of PPD was reported to be 13%; however, the prevalence rates are based on the screening period, the country of the study and the screening method and tool used [3].

A study investigated the prevalence of PPD in Saudi Arabia reported that there was 33.2% of participants showed PPD symptom risk, with anemia and low hemoglobin being the risk factors for PPD [7]. A study from Riyadh reported that the prevalence of PPD among 174 females was 38.5%, and there were significant associations between PPD and each of the unsupportive husband and recent stressful events [8]. The prevalence of PPD among postpartum mothers in Jeddah was reported according to the EPDS score, and it was 12.7 with a range of zero to 30. The prevalence of PPD was associated with maternal age, education, occupation, medical problems, monthly income, previous psychological problems, and planning pregnancy [9].

On January 30<sup>th</sup>, the world health organization (WHO) announced the outbreak of the novel coronavirus (COVID-19) as a public health emergency of international concern [10]. COVID-19 is a highly infectious disease that has posed a global health threat [11]. The authorities in Saudi Arabia were monitoring the COVID-19 situation from the time it was first detected, and plans were established to prepare for the potential spread of the disease in the kingdom [12]. However, on March 2<sup>nd</sup>, the first COVID-19 case in Saudi Arabia was confirmed in a traveler returning from Iran through Bahrain with no declaration of his traveling history to Iran [13]. Umrah was completely pended, the two holy mosques in Makkah and Madinah were put for daily closure for cleaning and disinfection, and the schools and universities were depending on remote learning [13].

The COVID-19 resulted in significant negative psychological impacts on individuals globally. These impacts include stress, fear, pandemic, anxiety, depression, sleep disorders, insomnia, panic, and impaired quality of life [14]. These effects are close to the effects caused by PPD, so the presence of COVID-19 may enhance the occurrence of PPD. Although there were studies reported on the prevalence of PPD in Saudi Arabia, there was no study that investigated its prevalence during the COVID-19 period, so this study was conducted to assess the prevalence of PPD during the COVID-19 period.

## 2. Subjects and Methods

### 2.1. Subjects and Study Design

This is a cross-sectional study; it was performed during the period from March 2020 to August 2020 using an anonymous online questionnaire. The study included women from one week to 6 months postpartum. The Arabic version of the Edinburgh Postnatal Depression Scale and a questionnaire regarding associated factors were administered to all participants. Approval for the study was obtained before the beginning of the study with an IRB registration number with KACST, KSA: H-02-J-002.

### 2.2. Statistical Analysis

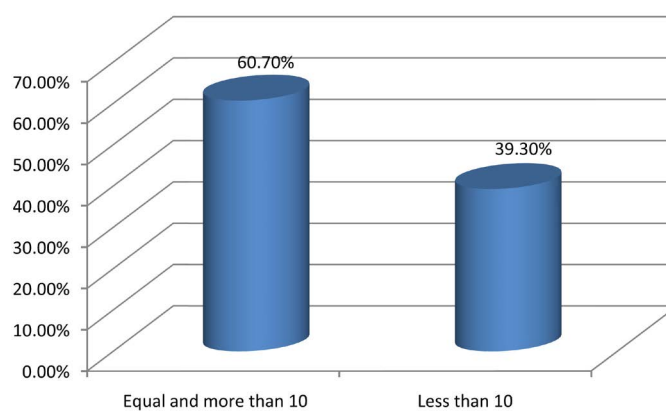
SPSS program version 22 was used to analyze the data; numbers and percents were used to represent qualitative variables. Multivariate logistic regression was used to determine factors that were significantly associated with PPD. P-value at  $\leq 0.05$  was considered significant.

## 3. Results

The present study included 150 women. The dominant age of participants was 25 - 34 years old 74 (49.3%). The large majority were Saudi females 135 (90%), only 15 (10%) were non-Saudi. Also, the large majority were married 143 (95.3%). There were 124 (82.7%) reported university education, whereas 26 (17.3%) had less than university education. Regarding the job, there 71 (47.3%) housewives, 63 (42%) employees, and 16 (10.7%) students. The highest monthly income of more than ten thousand was reported by 43 (28.7%) of participants. More than half of women, 77 (51.3%), reported two to four times of pregnancy, whereas 46 (30.7%) reported being primigravida, and 27 (18%) reported more than four times of pregnancy. **Table 1** shows the demographics and characteristics of the participated women.

We used the Arabic version of the Edinburgh Postnatal Depression Scale, so the depression score was calculated according to that scale. The maximum score of the scale is 30, the depression is predicted at ten scores and more. There were 91 (60.7%) of participants scored  $\geq$  ten scores, whereas 59 (39.3%) scored less than ten scores, **Figure 1**.

Investigation of the factors and depression characteristics during the COVID-19 of females was done through 25 questions; the questions and the



**Figure 1.** The scores of depression among the participated women.

**Table 1.** Demographics and characteristics of the participants.

Demographics	Description (n = 150)
<b>Age</b>	
<25	23 (15.3)
25 - 34	74 (49.3)
35 or more	53 (35.3)
<b>Nationality</b>	
Saudi	135 (90)
Non-Saudi	15 (10)
<b>Marital status</b>	
Married	143 (95.3)
Divorced/widow	7 (4.7)
<b>Scientific level</b>	
Less than university	26 (17.3)
University	124 (82.7)
<b>Job</b>	
Student	16 (10.7)
Employee	63 (42)
Housewife	71 (47.3)
<b>Monthly income</b>	
<5 K	66 (44)
5 - 10 K	41 (27.3)
>10 K	43 (28.7)
<b>The number of pregnancies</b>	
Primigravida	46 (30.7)
2 - 4 times	77 (51.3)
>4 times	27 (18)

**Table 2.** The questions related to the COVID-19 period and the depression of females.

Questions and answers	Description (n = 150)
1-Did you visit your doctor to monitor your pregnancy during the quarantine period?	
Yes	113 (75.3)
No	37 (24.7)
2-Did you find it difficult to visit your doctor during the quarantine period?	
Yes	81 (54)
No	69 (46)
3-Do you suffer from the following chronic diseases?	
Yes	55 (36.7)
No	95 (63.3)
3-Do you suffer from the following chronic diseases?	
Anemia	18 (12)
DM	4 (2.7)
DM	5 (3.3)
Irritable colon	15 (10)
Respiratory	2 (1.3)
Psycho	3 (2)
Renal	1 (0.7)
Tumor	1 (0.7)
Others	6 (4)
No	95 (63.3)
4-Have you been diagnosed with depression by a doctor?	
Yes	19 (12.7)
No	131 (87.3)
5-How was the state of depression overcome?	
Anti-depression TTT	5 (26.3)
Consult psychiatric	9 (47.4)
Herbal medicine	5 (26.3)
6-How does the pandemic affect depression?	
Increased	15 (78.9)
No change	4 (21.1)
7-What are the factors that affected your health the most during the pandemic?	
Anxiety from infection	52 (34.7)
Anxiety about transmitting the infection to the child	35 (23.3)
Stay home	30 (20)
Loss of support from family and friends	20 (13.3)
Anxiety about delays receiving health care crisis	13 (8.7)

**Continued**


---

8-Did you suffer from health problems during pregnancy?	
Yes	43 (28.7)
No	107 (71.3)
9-Did you take medicine regularly during the quarantine period?	
Yes	31 (72.1)
No	12 (27.9)
10-Is your husband cooperating with the offspring?	
Yes	122 (81.3)
No	28 (18.7)
11-Are there family problems?	
Yes	13 (8.7)
No	137 (91.3)
So the answer is yes, its type	
Multiple marriage	7 (53.8)
Divorce	6 (46.2)
12-Is there a history of depression before pregnancy?	
Yes	19 (12.7)
No	131 (87.3)
If yes, did he require treatment?	
Yes	10 (52.6)
No	9 (47.4)
13-Did, you find symptoms of depression during pregnancy?	
Yes	39 (26)
No	111 (74)
14-Is there a family history of mental illness or depression?	
Yes	24 (16)
No	126 (84)
15-The type of the current born	
Male	69 (46)
Female	81 (54)
16-The type of the previous born	
Male	70 (67.3)
Female	34 (32.7)
17-Is your husband satisfied with the current pregnancy?	
Yes	136 (90.7)
No	14 (9.3)

---

**Continued**

18-Did you have a desire for this pregnancy?	
Yes	118 (78.7)
No	32 (21.3)
19-Were you satisfied with the sex?	
Yes	128 (85.3)
No	5 (3.3)
Don't care	17 (11.3)
20-How was the birth	
Vaginal	94 (62.7)
CS	56 (37.3)
21-Did you suffer from difficulties during childbirth?	
Yes	62 (41.3)
No	88 (58.7)
22-Did you find it difficult to reach the hospital during childbirth during the quarantine period?	
Yes	15 (10)
No	135 (90)
23-Has breastfeeding started?	
Yes	98 (65.3)
No	52 (34.7)
24-Have you been diagnosed with Corona disease?	
Yes	14 (9.3)
No	136 (90.7)
25-Compared to before the pandemic, how do you evaluate health care?	
Better	43 (28.7)
Same	89 (59.3)
Worse	18 (12)

answers of females are shown in **Table 2**. 113 (75.3%) reported visiting the doctor to monitor their pregnancy during the quarantine period. More than half of participants, 81 (54%), reported finding difficulties in visiting the doctor during the quarantine period. There were 55 (36.7%) reported suffering from chronic diseases, and the most reported chronic diseases included; anemia 18 (12%), and irritable colon syndrome 15 (10%). There were 19 (12.7%) reported being diagnosed with depression; the most common action to overcome the depression was consulting psychiatric 9 (47.4%). Most of the females reported that the COVID-19 pandemic increased their depression 15 (78.9%). The most-reported factors affected their health during the pandemic included; anxiety from the infection 52 (34.7%), anxiety about the transmission of the infection to the child 35

(23.3%), staying at home 30 (20%), and anxiety about delays receiving health care crisis 13 (8.7%). Only 43 (28.7%) reported suffering health problems during pregnancy. There were 31 (72.1%) reported administrating the medicine regularly during the quarantine period. The large majority reported husband cooperation 122 (81.3%); there was 13 (8.7%) reported the presence of family problems, and the most reported problem was multiple marriages 7 (53.8%). The majority of females reported no history of depression before pregnancy 131 (87.3%), whereas 19 (12.7%) reported the presence of such history, and 10 (52.6%) reported that this previous depression required treatment. Only 39 (26%) of females reported having symptoms of depression during pregnancy; there was 69 (46%) reported that the gender of the current born was male, whereas 81 (54%) reported the gender was female. There were 70 (67.3%) reported the gender of the previous born was male, and 34 (32.7%) reported females. A few numbers of participated females 24 (16%) reported having a family history of mental illness and depression. The large majority of our participants reported that their husbands are satisfied with their current pregnancy 136 (90.7%), 118 (78.7%) of women reported that they have a desire for this pregnancy, and 128 (85.3%) were satisfied with the gender of the baby. More than half of females delivered via vaginal route 94 (62.7%), and there was 62 (41.3%) reported suffering from difficulties during childbirth. There was only 15 (10%) reported having difficulties reaching the hospital during childbirth during the quarantine period. More than half of women reported starting breastfeeding 98 (65.3%). There was only 14 (9.3%) reported that they were diagnosed with the coronavirus. By comparing the healthcare before the pandemic, there were 43 (28.7%) reported it was better, 89 (59.3%) reported it is the same, and 18 (12%) was worse.

The factors associated with depression during the COVID-19 period were investigated, and they are shown in **Table 3**. The level of depression was significantly affected by the education level ( $P = 0.021$ ), difficulties during quarantine to visit the doctor ( $P = 0.049$ ), the diagnosis with depression by a doctor ( $P = 0.006$ ), the impact of the pandemic on the depression ( $P = 0.035$ ), the experience of symptoms of depression during pregnancy ( $P = 0.005$ ), the family history of mental illness or depression ( $P = 0.043$ ), and suffering from difficulties during childbirth during the quarantine period ( $P = 0.03$ ).

#### 4. Discussion

This is the first Saudi study to investigate the postpartum depression during the COVID-19 pandemic period. We found that 60.7% of 150 females experienced PPD during the COVID-19 period. A study from China reported the prevalence of PPD during the COVID-19 period as 30% [11], which was much lower than our findings, although we used the same scale used to assess the PPD as the Chinese study used. These variations may return to other factors related to the demographics of participants, factors related to the application of quarantine, or the availability of providing health care. A study from Turkey showed that among



**Table 3.** Comparison of all factors regarding depression total score.

	Total Score		P value*
	≥10 (n = 91)	<10 (n = 59)	
<b>age</b>			
<25	15 (16.5)	8 (13.6)	0.539
25 - 34	47 (51.6)	27 (45.8)	
35 or more	29 (31.9)	24 (40.7)	
<b>Nationality</b>			
Saudi	81 (89)	54 (91.5)	0.616
Non-Saudi	10 (11)	5 (8.5)	
<b>Marital status</b>			
Married	87 (95.6)	56 (94.9)	1.000
Divorced/widow	4 (4.4)	3 (5.1)	
<b>Scientific level</b>			
Less than university	21 (23.1)	5 (8.5)	<b>0.021</b>
University	70 (76.9)	54 (91.5)	
<b>Job</b>			
Student	11 (12.1)	5 (8.5)	0.234
Employee	42 (46.2)	21 (35.6)	
Housewife	38 (41.8)	33 (55.9)	
<b>Monthly income</b>			
<5 K	39 (42.9)	27 (45.8)	0.300
5 - 10 K	22 (24.2)	19 (32.2)	
>10 K	30 (33)	13 (22)	
<b>The number of pregnancies</b>			
Primigravida	32 (35.2)	14 (23.7)	0.156
2 - 4 times	41 (45.1)	36 (61)	
>4 times	18 (19.8)	9 (15.3)	
<b>Did you visit your doctor to monitor your pregnancy during the quarantine period?</b>			
Yes	66 (72.5)	47 (79.7)	0.322
No	25 (27.5)	12 (20.3)	
<b>Did you find it difficult to visit your doctor during the quarantine period?</b>			
Yes	55 (60.4)	26 (44.1)	<b>0.049</b>
No	36 (39.6)	33 (55.9)	
<b>Do you suffer from the following chronic diseases?</b>			
Yes	37 (40.7)	18 (30.5)	0.208
No	54 (59.3)	41 (69.5)	

## Continued

<b>Have you been diagnosed with depression by a doctor?</b>			
Yes	17 (18.7)	2 (3.4)	<b>0.006</b>
No	74 (81.3)	57 (96.6)	
<b>How was the state of depression overcome?</b>			
Anti-depression TTT	4 (23.5)	1 (50)	0.586
Consult psychiatric	8 (47.1)	1 (50)	
Herbal medicine	5 (29.4)	0 (0)	
<b>How does pandemic affect depression?</b>			
Increased	15 (88.2)	0 (0)	<b>0.035</b>
No change	2 (11.8)	2 (100)	
<b>What are the factors that affected your health the most during the pandemic?</b>			
Anxiety from infection	26 (28.6)	26 (44.1)	0.425
Anxiety about transmitting the infection to the child	23 (25.3)	12 (20.3)	
Stay home	20 (22)	10 (16.9)	
Loss of support from family and friends	13 (14.3)	7 (11.9)	
Anxiety about delays receiving health care crisis	9 (9.9)	4 (6.8)	
<b>Did you suffer from health problems during pregnancy?</b>			
Yes	28 (30.8)	15 (25.4)	0.479
No	63 (69.2)	44 (74.6)	
<b>Did you take medicine regularly during the quarantine period?</b>			
Yes	19 (67.9)	12 (80)	0.492
No	9 (32.1)	3 (20)	
<b>Is the husband cooperating with the offspring?</b>			
Yes	72 (79.1)	50 (84.7)	0.388
No	19 (20.9)	9 (15.3)	
<b>Are there family problems</b>			
Yes	10 (11)	3 (5.1)	0.209
No	81 (89)	56 (94.9)	
<b>The answer is yes, its type.</b>			
Multiple marriages	7 (70)	0 (0)	0.070
Divorce	3 (30)	3 (100)	
<b>Is there a history of depression before pregnancy?</b>			
Yes	14 (15.4)	5 (8.5)	0.214
No	77 (84.6)	54 (91.5)	
<b>If yes, did he require treatment?</b>			
Yes	9 (64.3)	1 (20)	0.141
No	5 (35.7)	4 (80)	

## Continued

<b>Did you find symptoms of depression during pregnancy?</b>			
Yes	31 (34.1)	8 (13.6)	<b>0.005</b>
No	60 (65.9)	51 (86.4)	
<b>Is there a family history of mental illness or depression?</b>			
Yes	19 (20.9)	5 (8.5)	<b>0.043</b>
No	72 (79.1)	54 (91.5)	
<b>How was the birth</b>			
Vaginal	53 (58.2)	41 (69.5)	0.164
CS	38 (41.8)	18 (30.5)	
<b>Did you suffer from difficulties during childbirth?</b>			
Yes	44 (48.4)	18 (30.5)	<b>0.030</b>
No	47 (51.6)	41 (69.5)	
<b>Did you find it difficult to reach the hospital during childbirth during the quarantine period?</b>			
Yes	11 (12.1)	4 (6.8)	0.290
No	80 (87.9)	55 (93.2)	
<b>Have you been diagnosed with Corona disease?</b>			
Yes	6 (6.6)	8 (13.6)	0.152
No	85 (93.4)	51 (86.4)	
<b>Compared to before the pandemic, how do you evaluate health care?</b>			
Better	27 (29.7)	16 (27.1)	0.077
Same	49 (53.8)	40 (67.8)	
Worse	15 (16.5)	3 (5.1)	

\*Chi-square test.

126 females, there was 12% only having the risk for PPD [14]. The Turkish study also used the EDP scale as we used; however, the prevalence rate in our study still higher among the studies conducted in other countries.

The prevalence of PPD in Saudi Arabia, as reported in several studies before the pandemic, ranged from 17.8% to 38.5% [9] [15]. Our findings showed a high elevation in the prevalence rate of PPD in Saudi Arabia. These findings were in agreement with the Canadian study that reported that there was a significant elevation in depression and anxiety symptoms compared to similar pre-pandemic among pregnant women, with 37% showed depression symptoms, and 57% showed anxiety symptoms [16].

This study did not examine the prevalence rate of PPD before COVID-19 pandemic and thus we cannot conclude that COVID-19 actually increased the incidence of PPD. However, previous data on the incidence of PPD in Saudi Arabia was much lower than that obtained here. Thus, we believe that the

present prevalence rate of PPD was much higher than that of before-COVID-19”.

The current study investigated the impact of the COVID-19 pandemic on the women and the depression they suffered. The quarantine was obligated during the COVID-19 period to reduce the transmission of the virus. Varied percents of our participants reported that they didn't visit the doctor during the quarantine, there were difficulties in visiting the doctor during the quarantine period, the COVID-19 pandemic increased the depression of participants, anxiety affected the health of participants during the pandemic, and the presence of difficulties to reach the hospital during childbirth during the quarantine. These findings indicated the negative impact of the COVID-19 pandemic period and quarantine on the women.

It was reported that the difficulty in accessing professional medical care might be a source of anxiety for pregnant women [17].

By investigating the factors associated with PPD during the COVID-19 pandemic period, this study showed that university education was associated with experiencing PPD. Another factor was that the doctor didn't diagnose depression, no experience of depression symptoms during pregnancy, no family history of depression or mental illness; these factors related to the demographic and characteristics of participants. Other factors associated with PPD and related to the COVID-19 period, including; finding difficulties in visiting the doctor during the quarantine period, increases of the depression during the pandemic, and suffering difficulties during childbirth.

Other factors associated with PPD during the pandemic period were reported from a study from China, and they included immigrant women, persistent fever, poor social support, concerns about contracting COVID-19, and certain precautionary measures [11]. A study from Turkey reported low income, higher education levels, previous psychiatric illness, and having newborn needs NICUS were associated significantly with PPD [14]. In agreement with our study, the high level of education was associated with PPD.

Demographic factors associated with PPD didn't change before and after the pandemic and seemed to have the same impact enhancing the occurrence of PPD, where it was reported to form a study from Central Nepal that the education level was associated with the prevalence of PPD. This study from Central Nepal was conducted from 2017 to 2018 and published in 2019 before the pandemic [18].

## 5. Conclusion

There was a high prevalence of PPD among women during the COVID-19 period. Compared with the period before the COVID-19 pandemic, the prevalence during the COVID-19 was higher than before the pandemic. The factors associated with the prevalence of PPD included demographic factors such as education, family history. However, the pandemic COVID-19 increased the prevalence of PPD by some factors, including the quarantine due to the pandemic and

increased depression resulting in the pandemic as reported by the participants. Additionally, strategies have to be developed by health care authorities to design recommendations and actions to prevent occurrence of post-partum depression during the pandemic.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- [1] Giri, R.K., Khatri, R.B., Mishra, S.R., Khanal, V., Sharma, V.D. and Gartoula, R.P. (2015) Prevalence and Factors Associated with Depressive Symptoms among Post-Partum Mothers in Nepal. *BMC Research Notes*, **8**, Article No. 111. <https://doi.org/10.1186/s13104-015-1074-3>
- [2] Vigod, S.N., Villegas, L., Dennis, C.L. and Ross, L.E. (2010) Prevalence and Risk Factors for Postpartum Depression among Women with Preterm and Low-Birth-Weight Infants: A Systematic Review. *BJOG*, **117**, 540-550. <https://doi.org/10.1111/j.1471-0528.2009.02493.x>
- [3] Alharbi, A. and Abdulghani, H.M. (2014) Risk Factors Associated with Postpartum Depression in the Saudi Population. *Neuropsychiatric Disease and Treatment*, **10**, 311-316. <https://doi.org/10.2147/NDT.S57556>
- [4] Villegas, L., McKay, K., Dennis, C.L. and Ross, L.E. (2011) Postpartum Depression among Rural Women from Developed and Developing Countries: A Systematic Review. *The Journal of Rural Health*, **27**, 278-288. <https://doi.org/10.1111/j.1748-0361.2010.00339.x>
- [5] Turkcapar, A.F., Kadioğlu, N., Aslan, E., Tunc, S., Zayıfoğlu, M. and Mollamahmutoğlu, L. (2015) Sociodemographic and Clinical Features of Postpartum Depression among Turkish Women: A Prospective Study. *BMC Pregnancy Childbirth*, **15**, 108. <https://doi.org/10.1186/s12884-015-0532-1>
- [6] Gavin, N.I., Gaynes, B.N., Lohr, K.N., Meltzer-Brody, S., Gartlehner, G. and Swinson, T. (2005) Perinatal Depression: A Systematic Review of Prevalence and Incidence. *Obstetrics & Gynecology*, **106**, 1071-1083. <https://doi.org/10.1097/01.AOG.0000183597.31630.db>
- [7] Al Nasr, R.S., Altharwi, K., Derbah, M.S., Gharibo, S.O., Fallatah, S.A., Alotaibi, S.G., Almutairi, K.A. and Asdaq, S.M. (2020) Prevalence and Predictors of Postpartum Depression in Riyadh, Saudi Arabia: A Cross Sectional Study. *PLoS ONE*, **15**, e0228666. <https://doi.org/10.1371/journal.pone.0228666>
- [8] Alamoudi, D.H., Almrstani, A.M.S., Bukhari, A., Alamoudi, L.H., Alsubaie, A.M., Alrasheed, R.K., et al. (2017) Prevalence and Factors Associated with Depressive Symptoms among Post-Partum Mothers in Jeddah. *International Journal of Advanced Research*, **5**, 1542-1550. <https://doi.org/10.21474/IJAR01/3314>
- [9] Suhitharan, T., Pham, T.P., Chen, H., Assam, P.N., Sultana, R., Han, N.L., Tan, E.C. and Sng, B.L. (2016) Investigating Analgesic and Psychological Factors Associated with Risk of Postpartum Depression Development: A Case-Control Study. *Neuropsychiatric Disease and Treatment*, **12**, 1333-1339. <https://doi.org/10.2147/NDT.S105918>
- [10] Mahase, E. (2020) China Coronavirus: WHO Declares International Emergency as Death Toll Exceeds 200. *BMJ*, **368**, m408. <https://doi.org/10.1136/bmj.m408>

- [11] Xiong, R., Liu, Y., Liang, P., Wang, Y. and Shi, S. (2020) Prevalence and Factors Associated with Postpartum Depression during the Covid-19 Pandemic among Women in Guangzhou, China: A Cross-Sectional Study.
- [12] Yezli, S. and Khan, A. (2020) COVID-19 Social Distancing in the Kingdom of Saudi Arabia: Bold Measures in the Face of Political, Economic, Social and Religious Challenges. *Travel Medicine and Infectious Disease*, **37**, Article ID: 101692. <https://doi.org/10.1016/j.tmaid.2020.101692>
- [13] Algaissi, A.A., Alharbi, N.K., Hassanain, M. and Hashem, A.M. (2020) Preparedness and Response to COVID-19 in Saudi Arabia: Building on MERS Experience. *Journal of Infection and Public Health*, **13**, 834-838. <https://doi.org/10.20944/preprints202004.0018.v1>
- [14] Koyuncu, K., Alan, Y., Sakin, Ö., Aktaş, H.A. and Angın, A.D. (2020) Conditions Affecting Postpartum Depression in the Covid-19 Pandemic. *Medical Science and Discovery*, **7**, 611-616. <https://doi.org/10.36472/msd.v7i8.413>
- [15] Alasoom, L.I. and Koura, M.R. (2014) Predictors of Postpartum Depression in the Eastern Province Capital of Saudi Arabia. *Journal of Family Medicine and Primary Care*, **3**, 146. <https://doi.org/10.4103/2249-4863.137654>
- [16] Lebel, C., MacKinnon, A., Bagshawe, M., Tomfohr-Madsen, L. and Giesbrecht, G. (2020) Elevated Depression and Anxiety among Pregnant Individuals during the COVID-19 Pandemic. *Journal of Affective Disorders*, **277**, 5-13. <https://doi.org/10.1016/j.jad.2020.07.126>
- [17] Simó, S., Z\_uñiga, L., Izquierdo, M.T., et al. (2019) Effects of Ultrasound on Anxiety and Psychosocial Adaptation to Pregnancy. *Archives of Women's Mental Health*, **22**, 511-518. <https://doi.org/10.1007/s00737-018-0918-y>
- [18] Dawadi, P., Bhatta, A.S. and Shakya, J. (2020) Factors Associated with Postpartum Depressive Symptoms in Community of Central Nepal. *Psychiatry Journal*, **2020**, Article ID: 8305304. <https://doi.org/10.1155/2020/8305304>