The Effect of Covid-19 Infection During Pregnancy on Maternal Psychological Health

Original Article

Waleed Kafafy[1#], Kareem Mohamed Labib[2], Bassem Aly Islam[3], Mohamed Elfakhrany[4]

Departments of Obstetrics & Gynecology, [1,4]Armed Forces College of Medicine, [2,3]Ain Shams University, Cairo, Egypt.

ABSTRACT

Background: The COVID-19 pandemic has brought about higher levels of psychological distress, anxiety, and stress all over the world, especially among pregnant women who worry about their health and the safety of their fetus. The mental and physical changes that take place during the transitional stage of pregnancy may cause pregnant women, in particular, to have a lower quality of life. Given the ubiquity of the virus and the damage it causes to people's minds, it is crucial to assess how the COVID-19 pandemic impacts the mental health of pregnant women.

Patients and Methods: This cross-sectional study was conducted at Masr El Gedida Military Hospital and Ain Shams Maternity Hospital on 824 pregnant women with a previous COVID-19 infection from March 2020 to December 2021 during the second wave of COVID-19 in Egypt. A report form was used by the researcher to collect basic clinical data. Each participant was asked to complete the Arabic version of the Impact of Event Scale-Revised questionnaire.

Results: The mean age of the participants was 25.67 years. Only 13.5% of participants had a normal level of psychological impact, whereas the highest percentage had a light psychological impact (51.9%). The total score of the Impact of Event Scale-Revised questionnaire negatively correlated with both age and parity, as the correlation was statistically significant (r = - 0.236, $p < 0.001$ and r = - 0.421, $p < 0.001$, respectively).

Conclusion: Women who were infected with COVID-19 at any point during their pregnancies had an unfavorable psychological impact that should be addressed further.

Key Words: COVID-19, IES-R, pregnant, psychological impact.

INTRODUCTION

There have been unexpected psychological and social difficulties experienced by everyone in the world since the 2019 coronavirus disease (COVID-19) pandemic started. The pandemic has had a substantial effect on maternal quality of life and pregnancy outcomes since it affects maternal health both directly and indirectly. The behaviors and decisions made by the pregnant woman have a significant effect on both the health and development of the mother and the unborn child[1]. People frequently experience the same psychopathological symptoms during a pandemic. Women experienced a disproportionately high number of mental health issues during this pandemic and had a lower quality of life globally. The mental and physical changes that take place during the transitional stage of pregnancy may cause pregnant women, in particular, to have a lower quality of life. They are extremely susceptible to mental health issues[2]. Because of their physiological condition, pregnant women are more susceptible to viral infections. Because of the continuing coronavirus pandemic, there are worries about the potential impact on maternal and infant outcomes; hence, pregnant women are a dependent group that requires much care[3]. Low birth weight, early delivery, delayed cognitive development between the ages of 18 and 24 months, and a variety of motor abnormalities are only a few of the detrimental effects on the fetus that are directly related to maternal stress[4,5]. Although feeling uncomfortable in the face of difficulty is normal, the unexpected widespread emergence of the COVID-19 epidemic has left many people scared and uneasy. The current epidemic makes pregnancy a source of predicted worry and unpleasant emotions. For a number of reasons, including their own health and the risk that the virus would result in structural problems in the unborn child and cause preterm birth, pregnant women dread COVID-19[2]. Given the ubiquity of the virus and the damage it causes to people's minds, it is crucial to assess how the COVID-19 pandemic impacts pregnant women's psychological health[6].

PATIENTS AND METHODS:

Research design and setting:

This cross-sectional observational study was conducted between March 2020 and December 2021 at the Obstetrics and Gynecology department of Masr El Gedida Military Hospital and Ain Shams Maternity Hospital, with the main outcome of determining the psychological impact of COVID-19 in pregnant women using the scores of the Impact of Event Scale-Revised (IES-R) questionnaire[7]. The study was conducted during the second wave of COVID-19 in Egypt. Egypt.

Participants:

Pregnant women with confirmed COVID-19 at Masr El Gdida Military Hospital and Ain Shams Maternity Hospital in the period between March 2020 and December 2021. The inclusion criteria were adult pregnant women aged 18 to 35 who got infected with COVID-19 during pregnancy and had full medical records. Exclusion criteria were: pregnant women with any other pre-existing co-morbidity with COVID-19 in pregnancy, such as hypertension, diabetes mellitus, and cardiac disease. Also, pregnant women with a history of a psychiatric disorder or a history of thrombophilia were excluded, as were women who received the COVID-19 vaccine. Accordingly, a convenient sample of 824 pregnant women were eligible for the study.

Data Collection

Basic clinical and socio-demographic data of the participants were retrieved from the patients' records and entered into report forms that included gestational age, parity, and if they were infected with COVID-19. In addition, an IES-R questionnaire (Arabic version)[8] was included in the form. The questionnaire consisted of 22 questions that examined the psychological effects of a specific event, in this case, the COVID-19 pandemic during pregnancy. On a severity scale from 0 to 4, a score was assigned to each item. The total score was an arithmetic sum of the classifications of all 22 items, which ranged from 0 to 88. The overall score of the IES-R was split into four sub-categories: normal (0:23), mild psychological impact (24:32), moderate psychological impact (33:36), and severe psychological impact (>37). Patients who did not complete the questionnaire to a minimum of 80% were not included. A face-to-face interview technique was adopted, along with keeping at least one meter as physical distance and wearing personal protective materials such as face masks.

Statistical analysis

Data were entered into a Microsoft Excel spreadsheet for Windows and analysed with SPSS version 26 (**IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp**). Categorical variables were presented as frequency (n) and percentage (%), whereas quantitative variables were presented as mean, standard deviation (SD), median, and interquartile range (IQR). Correlations were analyzed using the Pearson correlation. A level of significance of 5% was set for all statistical analyses ($\alpha = 0.05$).

Ethical considerations

The study proposal was approved by the Armed Forces College of Medicine Ethical Review Committee (IRB: 37; meeting: September 25, 2021; serial number: 39). Verbal informed consent was obtained from patients in the study. The study was conducted in accordance with the Revised Helsinki Declaration on Biomedical Ethics. The data confidentiality policy was properly adhered to.

RESULTS:

This cross-sectional study was done on 824 pregnant women who went to Misr Elgedida Military Hospital and Ain Shams Maternity Hospital's Obstetrics and Gynecology departments. These women had a history of confirmed COVID-19 infection.

The mean age of the participants was 25.67 ± 4.55 years. 75% of women were 20-30 years old; 16% were older than 30 years, and only 8.4% were younger than 20 years old. Concerning comorbidities, none of the studied women reported a history of chronic diseases such as diabetes mellitus, hypertension, cardiovascular disease, ischemic heart disease, or psychiatric disorders. Moreover, none of the studied women received the COVID-19 vaccination. In terms of parity, 24 (27.2%) women were nullipara, 30.1% of them were para 1, 22.6% were para 2 and 20.1% were para 3. (Table 1).

Table 1: Clinical characteristics of pregnant women (N = 824).

Parameters		Studied women (No.=824)	
		No.	%
Age groups	Less than 20 years	69	8.4%
	20 -30 years	621	75.4%
	More than 30 years	134	16.3%
Any comorbidity (HTN, DM, IHD, and CVD)	No	824	100.0%
	Yes	0	0.0%

Psychiatric disorders	No	824	100.0%
	Yes	0	0.0%
COVID-19 vaccination	No	824	100.0%
	Yes	0	0.0%
Parity	Nulliparous	224	27.2%
	Para 1	248	30.1%
	Para 2	186	22.6%
	≥Para 3	166	20.1%
	Mean ± SD	1.49 ± 1.34	
	Median	1.0	
	Range	0.0 - 5.0	
Age (years)	Mean ± SD	25.67 ± 4.55	
	Median	25.0	
	Range	18.0 - 35.0	

HTN: hypertension, **DM:** diabetes mellitus, **IHD:** ischemic heart disease, **CVD:** cardiovascular disease, **SD:** standard deviation

Analysis of the IES-R questionnaire after the COVID-19 infection among pregnant women revealed that the highest mean score was found in item 1 (1.54 ± 0.76) and the lowest mean score was in item 22 (1.22 ± 0.64). All median scores were equal to one (a little bit), except for the first item, "Any reminder brought back feelings about it," with a median score of 2 denoting "moderately." (Table 2).

Table 2: Scores of the (IES-R) questionnaire among the participants

IES-R items after the COVID-19 infection	Number	Studied women (N = 824)						
		Mean	SD	Median	IQR		Range	
Any reminder brought back feelings about it	1	1.54	.76	2.0	1.0	2.0	.0	4.0
I had trouble staying asleep	2	1.48	.76	1.0	1.0	2.0	.0	4.0
Other things kept making me think about it	3	1.50	.77	1.0	1.0	2.0	.0	4.0
I felt irritable and angry	4	1.47	.75	1.0	1.0	2.0	.0	4.0
I avoided letting myself get upset when I thought about it or was reminded of it	5	1.46	.75	1.0	1.0	2.0	.0	4.0
I thought about it when I didn't mean to	6	1.44	.75	1.0	1.0	2.0	.0	4.0
I felt as if it hadn't happened or wasn't real	7	1.44	.75	1.0	1.0	2.0	.0	4.0
I stayed away from reminders about it	8	1.46	.76	1.0	1.0	2.0	.0	4.0
Pictures about it popped into my mind	9	1.46	.77	1.0	1.0	2.0	.00	4.0
I was jumpy and easily startled	10	1.47	.77	1.0	1.0	2.0	.0	4.0
I tried not to think about it	11	1.48	.76	1.0	1.0	2.0	.0	4.0
I was aware that I still had a lot of feelings about it, but I didn't deal with them	12	1.47	.78	1.0	1.0	2.0	.0	4.0
My feelings about it were kind of numb	13	1.46	.76	1.0	1.0	2.0	.0	4.0
I found myself acting or feeling as though I was back at that time	14	1.46	.78	1.0	1.0	2.0	.0	4.0
I had trouble falling asleep	15	1.48	.78	1.0	1.0	2.0	.0	4.0
I had waves of strong feelings about it	16	1.44	.76	1.0	1.0	2.0	.0	4.0
I tried to remove it from my memory	17	1.38	.76	1.0	1.0	2.0	.0	4.0
I had trouble concentrating	18	1.35	.70	1.0	1.0	2.0	.0	4.0
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart	19	1.29	.68	1.0	1.0	2.0	.0	4.0
I had dreams about it	20	1.27	.68	1.0	1.0	2.0	.0	4.0
I felt watchful or on-guard	21	1.25	.65	1.0	1.0	2.0	.0	4.0
I tried not to talk about it	22	1.22	.64	1.0	1.0	1.0	.0	4.0

SD: standard deviation, **IQR:** interquartile range

Following the COVID-19 infection, subscales of the IES-R questionnaire were developed to assess the psychological effects of COVID-19 on expectant mothers. The mean hyperarousal subscale was 8.31 ± 2.84 and the mean avoidance subscale was 11.38 ± 3.9, all of which ranged from 0 to 32. The mean intrusion subscale was 11.6 ± 4.08 and the mean avoidance subscale was 11.38 ± 3.9. (Table 3)

Table 3: Subscales of the IES-R questionnaire after COVID-19 infection among participants

IES-R Subscales	Studied women (No.=824)						
	Mean	SD	median	IQR		Range	
Intrusion subscale	11.60	4.08	11.0	9.0	13.0	.0	32.0
Avoidance subscale	11.38	3.90	11.0	9.0	13.0	.0	32.0
Hyperarousal subscale	8.31	2.84	8.0	7.0	9.0	.0	24.0

SD: standard deviation, **IQR:** Interquartile range

The distribution of the level of psychological impact among participants reveals that only 13.5% of participants had a normal level of psychological impact, whereas the highest percentage had a light psychological impact (51.9%). Nearly 19.4% of participants had a severe psychological impact, while only 15.2% had a moderate impact. (Table 4)

Table 4: Level of psychological impact among participants according to the IES-R questionnaire

Parameters		Studied women (No.=824)	
		No.	%
Total IES-R score	Normal	111	13.5%
	Mild	428	51.9%
	Moderate	125	15.2%
	Severe	160	19.4%
Total IES-R score	Mean ± SD	31.29 ± 10.18	
	Median	30.0	
	Range	0.0- 88.0	

Table 5 demonstrates the correlation between the total score of the IES-R questionnaire and age and parity. There was a statistically significant negative inverse correlation between the total score of the IES-R and age (r = -0.236, $p < 0.001$) among participants. (Figure 1). Similarly, there was a statistically significant inverse correlation between the total score of the IES-R questionnaire and parity (r = -0.421, $p < 0.001$) among participants. (Figure 2)

Table 5: Correlation between total score of IES-R questionnaire with age and parity among participants

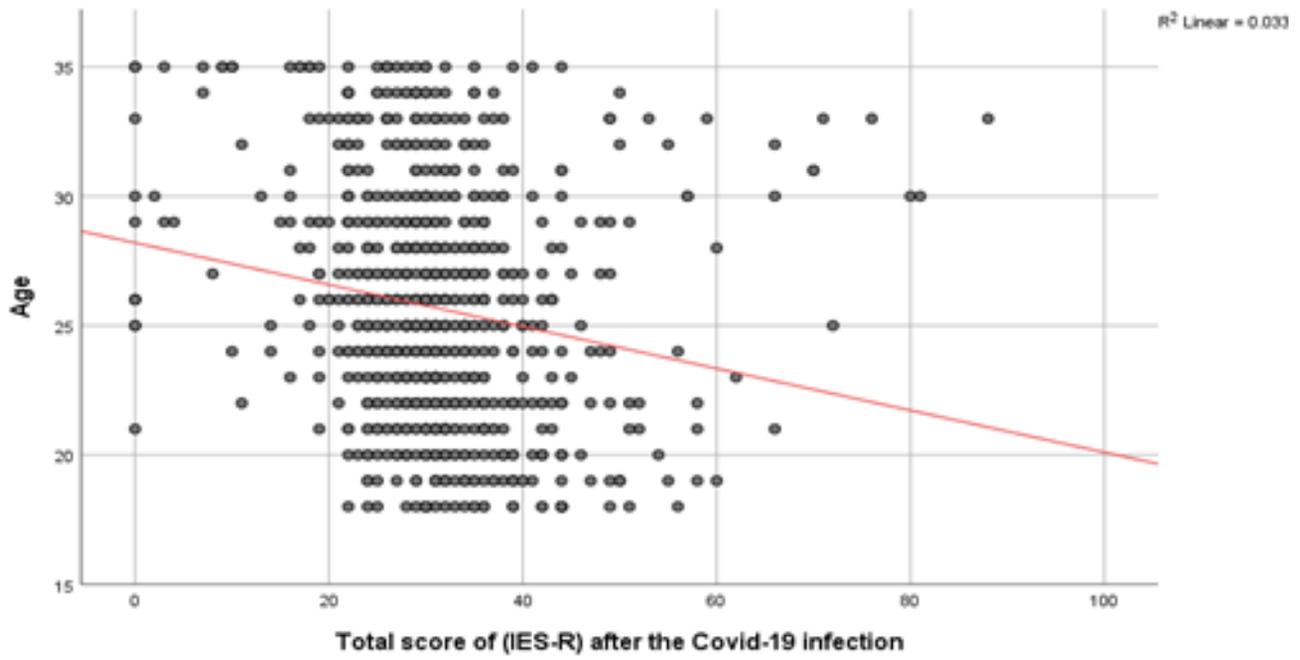|	IES-R after COVID	
	r	*p-value*
Age (years)	-0.236	*<0.001*
Parity	-0.421	*<0.001*

Fig. 1: Scatter plot of total score of the IES-R questionnaire and age among participants.
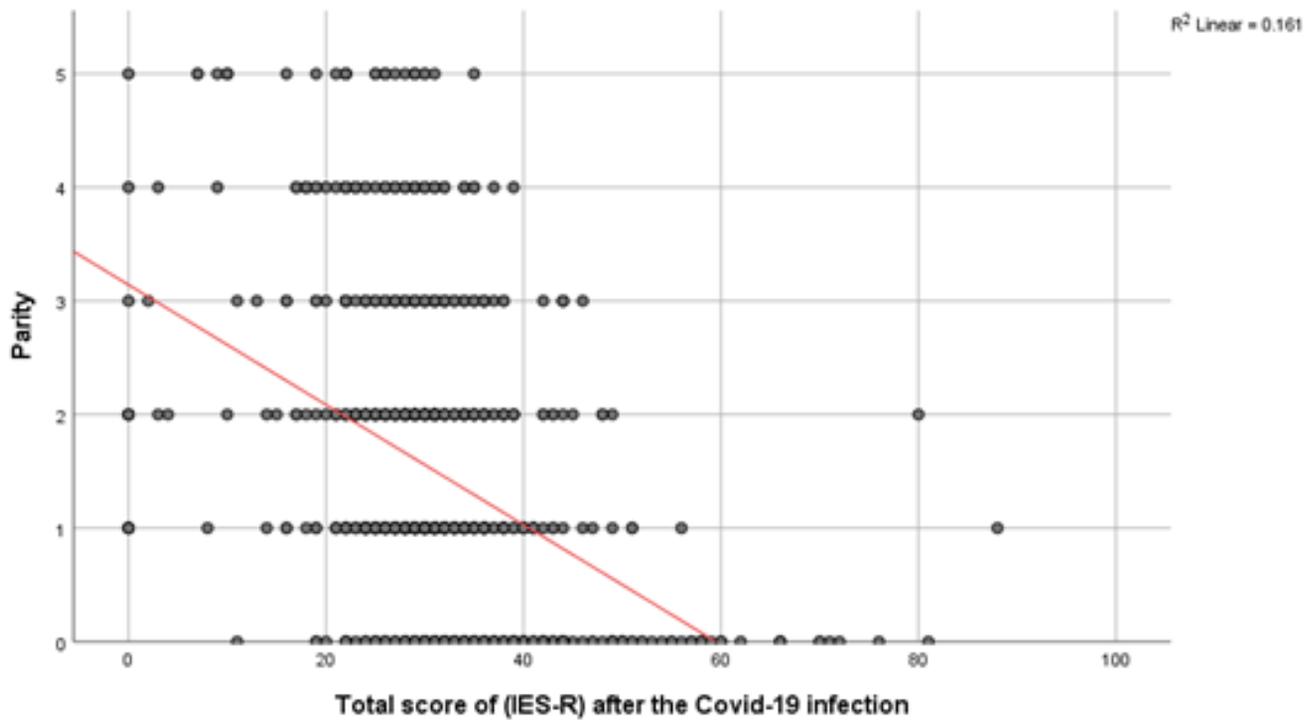

Fig. 2: Scatter plot of total score of the IES-R questionnaire and parity among participants.

DISCUSSION

The effects of COVID-19 on the health of pregnant mothers and their babies are still unclear. There was a strong association between severe COVID-19 and adverse maternal and infant outcomes[9]. Considerable alterations to the physical and mental states of a woman take place in her body and mind throughout pregnancy and the postpartum period[10].

In our study, 824 participants with a mean age of 25.67 years were recruited. Only 13.5% of participants had a normal level of psychological impact, whereas the highest percentage had a light psychological impact (51.9%). The mean hyperarousal subscale was 8.31 ± 2.84 and the mean avoidance subscale was 11.38 ± 3.9, all of which ranged from 0 to 32. The mean intrusion subscale was 11.6 ± 4.08, and the mean avoidance subscale was 11.38 ± 3.9. According to the findings of a similar study released in 2020, the Italian translation of the (IES-R) questionnaire was used in order to measure the psychological impact that was induced by COVID-19. The incursion subscale had a range that went from 0 to 18, with a mean score of 4.66 and a standard deviation of 2.68. The avoidance subscale had a similar range of 0 to 18 points, with a mean score of 4.76 and a standard deviation of 2.62. The hyperarousal subscale had a range that went from 0 to 15, with 0 being the lowest score and 15 being the highest. The average score on this scale was 3.61.99. While the range for the hyperarousal subscale went from 0 to 24, the range for the avoidance subscale went from 0 to 32. The mean for avoidance was 11.38 ± 3.9, while the range for hyperarousal was from 8.31 to 2.84. These findings came about as a consequence of the COVID-19 infection. The mean score on the incursion subscale was 11.64.08, and its possible values were anywhere from 0 to 32[11].

In 2020, Hocaoglu and his colleagues found that the mean score on the IES-R was 36.60. A total of 215 people were included in the sample, and 75.9% of them were able to achieve a score of 24 or higher on the IES-R. There were 283 expectant mothers, and 58 of them, or 20.5%, had an IES-R score between 24 and 32, which represents a mild psychological effect; 25 of them, or 8.8%, had a score between 33 and 36, which represents a moderate psychological impact; and 132 of them, or 46.6%, had a score of > 37, which represents a severe psychological effect (severe psychological impact)[12].

In 2020, Wang and his colleagues reported that there were 296 people who had a mild psychological effect, with a score of 23, 262 people who had a moderate psychological impact, with scores 24-32, and 651 people who had a severe psychological impact, with a score of 33 or higher. The average score was 23. There was a wide range in the proportion of respondents who reported a low psychological influence, from 24.5% to 53.8%[13].

In a study aimed at determining the significance of the individual contributions made by each component of the IES-R, the avoidance reactions were accountable for the greatest number of high values. After this came the intrusion reactions, and then eventually the hyperarousal reactions. While the median response to the avoidance questions was "moderately," the average response on the hyperarousal scale was "rarely," with a substantially positive distribution, which means that the majority of participants had low scores. This indicates that the majority of respondents had low scores[14].

In our study, the total score of (IES-R) questionnaire negatively correlated with both; age and parity as the correlation was statistically significant ($r = -0.236$, $p < 0.001$ and $r = -0.421$, $p < 0.001$, respectively). Similar to our finding, a study published in 2021 by Dule and his colleagues revealed that the total IES-R scores showed a negative association with age ($r=-0.198$, *P-value < 0.001*)[2]. However, an earlier study carried out in 2020 found no correlation between the subscale scores on the IES-R and age, or the number of children[13].

Limitations of the study

The research design was limited to cross sectional approach with only post COVID-19 assessment that was attributed to precautions against the COVID-19 pandemic and minimizing contact with patients for safety of the participant and researcher alike. More research is required to further assess the underlying factors predicting the psychological impact.

CONCLUSION

Women who were infected with COVID-19 at any point during their pregnancies had an unfavorable psychological impact that should be addressed further.

ABBREVIATIONS

COVID-19: coronavirus disease of 2019

IES-R: Impact of Event Scale-Revised

CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Arzamani N, Soraya S, Hadi F, Nooraeen S, Saeidi M (2022) The COVID-19 pandemic and mental health in pregnant women: A review article. Front Psychiatry 13:949239. https://doi.org/10.3389/fpsyt.2022.949239

2. Dule A, Hajure M, Mohammedhussein M, Abdu Z (2021) Health-related quality of life among Ethiopian pregnant women during COVID-19 pandemic. Brain Behav 11(4):e02045. https://doi.org/10.1002/brb3.2045

3. Wastnedge EAN, Reynolds RM, van Boeckel SR, Stock SJ, Denison FC, Maybin JA, Critchley HOD (2021) Pregnancy and COVID-19. Physiological Reviews 101(1):303–318. https://doi.org/10.1152/physrev.00024.2020

4. Mousa A, Naqash A, Lim S (2019) Macronutrient and Micronutrient Intake during Pregnancy: An Overview of Recent Evidence. Nutrients 11(2):443. https://doi.org/10.3390/nu11020443

5. Schwartz DA, Graham AL (2020) Potential Maternal and Infant Outcomes from (Wuhan) Coronavirus 2019-nCoV Infecting Pregnant Women: Lessons from SARS, MERS, and Other Human Coronavirus Infections. Viruses 12(2):194. https://doi.org/10.3390/v12020194

6. Mirzaei N, Jahanian Sadatmahalleh S, Bahri Khomami M, Moini A, Kazemnejad A (2021) Sexual function, mental health, and quality of life under strain of COVID-19 pandemic in Iranian pregnant and lactating women: a comparative cross-sectional study. Health and Quality of Life Outcomes 19(1):66. https://doi.org/10.1186/s12955-021-01720-0

7. Weiss DS (2007) The Impact of Event Scale: Revised. In: Cross-cultural assessment of psychological trauma and PTSD. Springer Science + Business Media, New York, NY, US, pp 219–238

8. Grassi M, Pellizzoni S, Vuch M, Apuzzo GM, Agostini T, Murgia M (2021) Psychometric Properties of the Syrian Arabic Version of the Impact of Event Scale–Revised in the Context of the Syrian Refugee Crisis. Journal of Traumatic Stress 34(4):880–888. https://doi.org/10.1002/jts.22667

9. Wei SQ, Bilodeau-Bertrand M, Liu S, Auger N (2021) The impact of COVID-19 on pregnancy outcomes: a systematic review and meta-analysis. CMAJ 193(16):E540–E548. https://doi.org/10.1503/cmaj.202604

10. Ahmad M, Vismara L (2021) The Psychological Impact of COVID-19 Pandemic on Women's Mental Health during Pregnancy: A Rapid Evidence Review. Int J Environ Res Public Health 18(13):7112. https://doi.org/10.3390/ijerph18137112

11. Saccone G, Florio A, Aiello F, Venturella R, De Angelis MC, Locci M, Bifulco G, Zullo F, Di Spiezio Sardo A (2020) Psychological impact of coronavirus disease 2019 in pregnant women. Am J Obstet Gynecol 223(2):293–295. https://doi.org/10.1016/j.ajog.2020.05.003

12. Hocaoglu M, Ayaz R, Gunay T, Akin E, Turgut A, Karateke A (2020) Anxiety and Post-Traumatic Stress Disorder Symptoms in Pregnant Women during the COVID-19 Pandemic's Delay Phase. Psychiatr Danub 32(3–4):521–526. https://doi.org/10.24869/psyd.2020.521

13. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, Ho RC (2020) Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. Int J Environ Res Public Health 17(5):1729. https://doi.org/10.3390/ijerph17051729

14. Tutnjević S, Lakić S (2020) Psychological impact of the COVID-19 pandemic on pregnant women in Bosnia and Herzegovina and Serbia