Journal of Multidisciplinary Care (JMDC)
doi: 10.34172/jmdc.1406 2024;13(4):x-x http://jmdc.skums.ac.ir

Systematic Review

Prevalence of Depression and Anxiety Among Pregnant Women During the COVID-19 Pandemic: A Systematic Review and Meta-Analysis

Shiva Shemshad[1*], Shakiba Alaienejad[2]

[1]Department of Psychology, School of Psychology, Islamic Azad University, Ilam Branch, Ilam, Iran
[2]Department of Psychology, Ilam University of Medical Sciences, Ilam, Iran

Abstract

Background and aims: Due to the adverse consequences of depression and anxiety during pregnancy for both mothers and fetuses, the present study aimed to investigate the prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic.

Methods: International databases, including Cochrane, PubMed, Scopus, and Web of Science, in addition to Google Scholar, were searched up to November 11, 2022. All studies that investigated the prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic were included. Studies that used non-random sampling methods, case reports, studies that did not provide sufficient data for analysis, low-quality studies, and those that had estimated depression and anxiety after childbirth were eliminated. The Cochrane Q Test and the I^2 index were utilized to determine the heterogeneity of the studies. Data were analyzed using STATA version 14, with statistical significance set at $P<0.05$.

Results: A total of 27 studies conducted on 44573 participants were investigated. The results showed that the pooled prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic was 27% and 25%, respectively. Moreover, the prevalence of mild, moderate, and major depression was 23%, 11%, and 3%, respectively. Finally, the prevalence of mild, moderate, and severe anxiety was 20%, 14%, and 5%, respectively.

Conclusion: Approximately one out of every three pregnant women suffered from depression, and one out of every four suffered from some degree of anxiety during the COVID-19 pandemic.

Keywords: Anxiety, Depression, Pregnant, COVID-19, Prevalence, SARS-CoV-2

***Corresponding Author:**
Shiva Shemshad,
Email: Shivashemshad21@gmail.com

Received: June 1, 2025
Revised: August 30, 2025
Accepted: October 28, 2025
ePublished: Xx x, 2025

Cite this article as: Shemshad S, Alaienejad S. Prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic: a systematic review and meta-analysis. Journal of Multidisciplinary Care. 2024;13(4):x–x. doi: 10.34172/jmdc.1406.

Introduction

The spread of coronavirus disease 2019 (COVID-19) has turned mental crises into a global challenge, particularly among highly vulnerable populations (1, 2). Pregnancy and childbirth are significant life events that can bring about mental disorders in pregnant women (3, 4). Depression has been identified as one of the side effects of the COVID-19 infection on one's mental health (5).

Another adverse effect of the coronavirus pandemic on pregnant women is increased anxiety. Anxiety and depression during pregnancy have been associated with premature birth and undesirable consequences in fetal growth and development (6). Common concerns included challenges of having planned childbearing schedule, limited presence of family members during childbirth, fear of COVID-19 transmission to family members, avoidance of medical visits due to concerns about hospital- acquired infection, and anxiety related to increased exposure to chemicals used for controlling and preventing viral spread (7).

Nevertheless, depression and anxiety are both treatable and preventable conditions. Early identification of mental health disorders in women before or during pregnancy is essential for protecting mothers and infants (8-10).

Over the past few years, several meta-analyses have investigated the prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic. However, a review of published studies indicated that the prevalence of depression and anxiety in pregnant women ranged from 4% to 56% and from 3% to 65%, respectively. These variations may be attributed to differences in assessment tools, ethnic backgrounds of the pregnant women, and the severity levels of depression and anxiety evaluated. Previous meta-analyses did not attempt to present results based on the type of questionnaire, severity of depression and anxiety (mild, moderate, and severe), or ethnicity.

However, the current meta-analysis performed

subgroup analyses based on these three variables to reduce heterogeneity and provide more precise estimates. In addition, this study was more comprehensive and up-to-date than earlier meta-analyses, thereby increasing the generalizability of the results.

Materials and Methods

Study Design

The present study was a systematic review and a meta-analysis conducted to evaluate the prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic. The study used the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines.

Population

The study participants consisted of women who were pregnant during the COVID-19 pandemic. Accordingly, the study did not control for the participants' ethnicity, race, geographical location, or age.

Primary Outcome

The primary outcome of the study was to estimate the prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic.

Secondary Outcome

The secondary outcomes included assessing the severity of depression and anxiety (mild, moderate, and severe) among pregnant women during the COVID-19 pandemic and reporting on the prevalence of depression and anxiety according to the implemented questionnaires.

Search Strategy

Electronic databases, including Cochrane, PubMed, Scopus, and Web of Science, as well as Google Scholar, were searched using the following keywords: *prevalence*, *COVID-19*, *pregnant, depression*, *anxiety*, *SARS-CoV-2*, and their corresponding Medical Subject Headings (*MeSH*) terms. Various combinations of these keywords were searched using Boolean operators (OR and AND). A time restriction from 2019 to 2022 was applied, as the COVID-19 pandemic began in 2019. However, only studies published in English were reviewed, and the search was updated until November 11, 2022. Moreover, reference lists of all preliminary studies considered in the systematic review and meta-analysis process were manually screened to identify further relevant studies. For instance, the search strategy adopted for PubMed was as follows:

((*pregnant women OR pregnancy OR perinatal*) AND (*SARS-CoV-2 OR COVID-19 OR coronavirus*) AND (*psychological OR mental OR anxiety OR depression OR depressive OR psychology*)).

Inclusion Criteria

All studies that investigated the prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic were included, and no restrictions were observed in terms of the type of questionnaire.

Exclusion Criteria

Studies employing non-random sampling techniques, case reports, studies lacking required data for analysis (e.g., missing prevalence estimates or sample size), studies classified as low quality based on the Newcastle Ottawa Scale, and studies assessing depression and anxiety after childbirth were eliminated from the systematic review and meta-analysis.

Qualitative Assessment

Two researchers independently evaluated the quality of the included studies using the Newcastle Ottawa Scale. A star-based scoring system was utilized, with scores ranging from 0 (lowest quality) to 10 (highest quality). Studies with a total score below 4 were labeled as low-quality and excluded. However, none of the included studies received a score below the threshold (11).

Data Extraction

Two reviewers independently extracted the required data from the published studies and entered them into SPSS version 19. In cases of disagreement about specific data, the discrepancies were resolved through consultation, and a single dataset was created. The data extraction checklist included authors' names, publication year, country, prevalence of depression, prevalence of anxiety, study design, age group, sample size, and the type of assessment questionnaires used, among other variables.

Statistical Analysis

The included studies were pooled based on sample size and variance. As the reported data were expressed as percentages, the Cochrane Q test and I^2 index were used to assess between-study heterogeneity. In the present study, a random-effects model was used due to the substantial heterogeneity observed among studies ($I^2 = 99.7\%$ for depression and $I^2 = 99.6\%$ for anxiety). Subgroup analyses were conducted to find out potential sources of heterogeneity. Sensitivity analyses were also performed to assess the impact of individual studies on the overall results. To examine bias, the publication bias diagram and the Egger test were used. Data were organized using SPSS version19, and statistical analyses were performed using STATA version 14, and the statistical significance was set at $P < 0.05$.

Results

Study Selection

A total of 112 articles were identified through searching the international databases mentioned above. Following title screening, 31 duplicate records were removed. The abstracts of the remaining 81 articles were then checked, resulting in the exclusion of 10 articles based on the

information provided in the abstracts. In addition, 44 articles were eliminated after full-text evaluation as they fulfilled the predefined exclusion criteria. Ultimately, after quality assessment, 27 articles were approved and included in the meta-analysis (Figure 1).

The included studies were published between 2020 and November 11, 2022, and investigated pregnant women aged 18-59 years. Various questionnaires were utilized across the studies. The key characteristics of the investigated articles are presented in Table 1.

An evaluation of the 27 articles with a total sample size of 44573 pregnant women showed that the pooled prevalence of depression and anxiety during the COVID-19 pandemic was 27% (95% CI: 20%-34%, $I^2 = 99.7\%$, $P < 0.001$) and 25% (95% CI: 18%-32%, $I^2 = 99.6\%$, $P < 0.001$), respectively. As can be seen, the prevalence of depression was slightly higher than that of anxiety. Almost one in three pregnant women experienced depressive symptoms, while nearly one in four reported some level of anxiety during the pandemic period (Figures 2 and 3).

Subgroups Analysis

The prevalence of mild, moderate, and severe depression among pregnant women during the pandemic was 23% (95% CI: 19 %-27%, $I^2 = 92.5\%$, $P < 0.001$), 11% (95% CI: 8%-13%, $I^2 = 86.6\%$, $P < 0.001$), and 3% (95% CI: 2%-4%, $I^2 = 86.3\%$, $P < 0.001$), respectively (Figures 4-6).

Notably, the prevalence of mild depression in pregnant women was almost twice that of moderate depression and nearly seven times higher than that of severe depression. Similarly, the prevalence of mild, moderate, and severe anxiety was 20% (95% CI: 15%-25%, $I^2 = 97.3\%$, $P < 0.001$), 14% (95% CI: 7%-21%, $I^2 = 99.5\%$, $P < 0.001$), and 5% (95% CI: 3%-6%, $I^2 = 98.6\%$, $P < 0.001$), respectively (Figures 7-9).

The lowest and highest reported prevalence rates of depression were found when using the Diagnostic and statistical manual of mental disorders (DSM-IV, 7%) and Coeliac Disease Assessment Questionnaire (CDA-Q, 42%), respectively. In contrast, the lowest and highest rates of anxiety were found in DSM-IV (13%) and Edinburgh Postpartum Depression Scale (EPDS, 57%), respectively (Table 2).

The lowest and highest prevalence of depression among pregnant women during the COVID-19 pandemic were observed in Nigeria at 9% (95% CI: 0%-18%) and Kuwait at 44% (95% CI: 35%-53%), respectively. Similarly, the lowest prevalence of anxiety was found in Nigeria at 7% (95% CI: 1%-15%), while the highest rate was observed in the Netherlands 63% (95% CI: 60%-66%). Sensitivity analysis indicated that the studies conducted by Sut and Kucukkaya (21) and Luo et al (19) had the greatest influence on the outcome of the current research (Figure 10).

Figure 11 demonstrated that there was no evidence of publication bias in the present study ($P = 0.676$), suggesting that the source search step was comprehensive and completed.

Discussion

As indicated above, the average prevalence rates of depression and anxiety among pregnant women during the pandemic were 27% and 25%, respectively. The

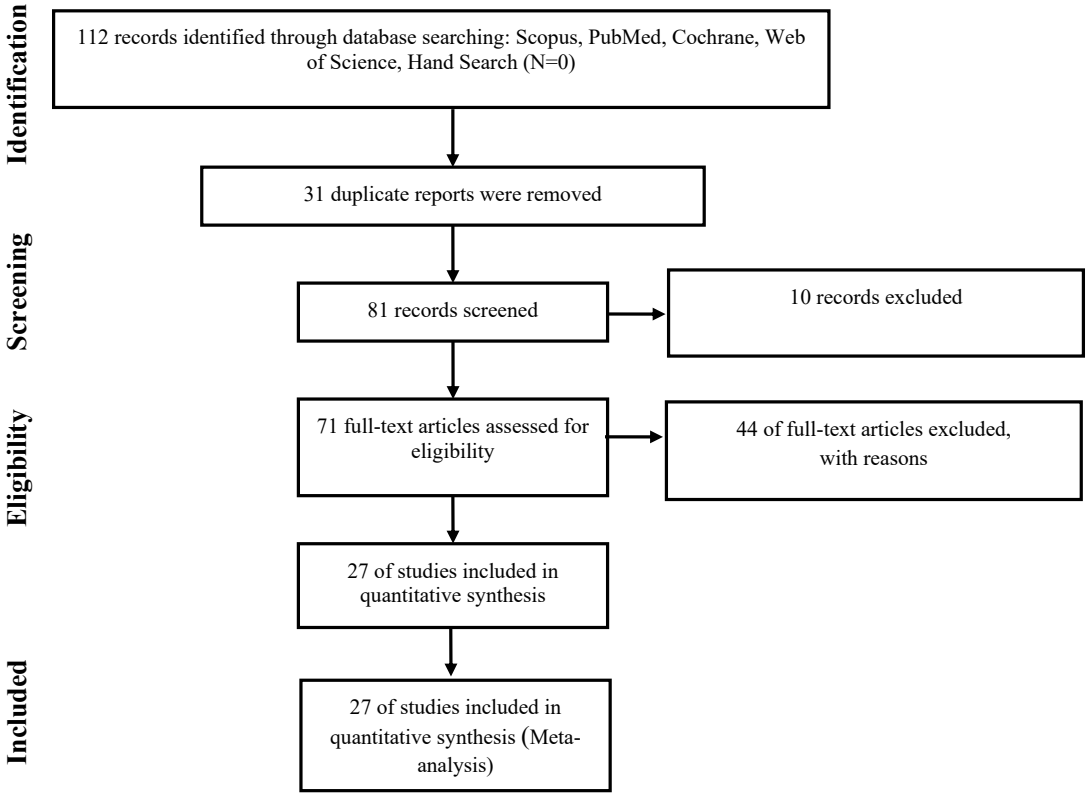

Figure 1. Flowchart of the Study Selection Process for Inclusion in the Meta-analysis

Table 1. Characteristics of Studies Included in the Meta-analysis

Author (Year)	Country	Sample Size	Age (year)	Study Period	Depression Questionnaire	Depression Prevalence	Anxiety Questionnaire	Anxiety Prevalence
Qiu et al , 2020 (1)	China	4124	27-32	January 1, 2020- February 9, 2020	EPDS	29.6	---	---
Wu et al, 2021(12)	China	3434	15-59	September-December 2020	PHQ-9	6.9	GAD-7	9.8
Amare et al, 2022 (13)	Ethiopia	422	28	May 1- June 30, 2021	DASS-21	34.1	---	---
Abdus-Salam et al, 2022 (14)	Nigeria	380	32	August-November 2020	HADS	4.7	HADS	3.2
Khamees et al, 2021 (15)	Kuwait	120	46.5	November 1- December 31, 2020	EPDS	44.2	---	---
Nwafor et al, 2021 (16)	Nigeria	456	27	March 1, 2020-July 31, 2020	DASS-21	13.6	DASS-21	10.9
Liu et al, 2021 (17)	USA	715	18-44	May 6-8, 2020	EPDS	34.6	GAD-7	21.9
Dai et al, 2020 (18)	China	307	>18	February 23, 2020- February 26, 2020	SDS	13.4	SAS	18.6
Luo et al, 2021 (19)	China	2237	19-47	February 28, 2020-April 26, 2020	PHQ-9	3.9	GAD-7	5.8
Wang et al, 2022 (20)	China	684	>18	February 25, 2020-March 7, 2020	PHQ-9	36.1	GAD-7	31.7
Xie et al, 2021 (21)	China	689	29.03	January 1-August 31, 2020	SCL90-R	13.5	SCL90-R	16.2
Lebel et al, 2020 (22)	Canada	1987	32.4	April 5–20, 2020	EPDS	37	EPDS	56.6
Mei et al, 2021 (23)	China	531	30.54	May 30-April 30, 2020	PHQ-9	36.1	GAD-7	26.9
Lin et al, 2021 (24)	China	751	30.51	February 17-March 16, 2020	PHQ-9	35.4	SAS	13.4
Tikka et al, 202 1(25)	India	620	26.36	August-October 2020	---	---	GAD-7	35.8
Uguz et al, 2022 (26)	Turkey	253	28.9	January 15-May 15, 2021	DSM-IV	7.1	DSM-IV	13
Sut and Kucukkaya, 2021 (27)	Turkey	403	>18	June-July 2020	HADS	56.3	HADS	64.5
Dong et al, 2021 (28)	China	156	20-50	February 22-February 27	SDS	50.6	SAS	13
Padez Vieira et al, 2022 (29)	Portugal	1698	31.9	April 25-April 30, 2020	EPDS	26.3	---	---
Hamzehgardeshiet al, 2021 (6)	Iran	318	28.57	April 17-May 31, 2020	CDA-Q	42.1	PRAQ	21
Effati-Daryani et al, 2020 (30)	Iran	205	29.3	March-April	DASS-21	32.7	DASS-21	43.9
Zhou et al, 2020 (31)	China	544	31.1	February 28-March 12, 2020	PHQ-9	5.3	GAD-7	6.8
Ilska et al, 2022 (32)	Poland	1050	30.48	March 1-June 1, 2020	---	---	GAD-7	63
Yang et al, 2021 (33)	China	19515	26-35	February 25-March 10, 2020	PHQ-9	44.6	GAD-7	29.2
Tsakiridis et al, 2020 (34)	Greece	505	---	March–June 2020	EPDS	13.5	STAI	34.1
Chen et al, 2022 (35)	China	1160	---	February 20-April 30, 2020	SDS	31.2	SAS	12.9
Bo et al, 2021 (36)	China	1309	---		PHQ-9	27.4	---	---

Note. EPDS: Edinburgh postpartum depression scale; HADS: Hospital anxiety and depression scale; SAS: Self-rating anxiety scale; STAI: State-trait anxiety inventory; PHQ-9: Patient health questionnaire-9; GAD-7: Generalized anxiety disorder 7-item scale; DASS-21: Depression, anxiety and stress scale-21; SDS: Self-rating depression scale; CDA-Q: Coeliac disease assessment questionnaire; DSM-IV: Diagnostic and statistical manual of mental disorders, Fourth Edition; SCL90-R: Symptom check list; PRAQ: Pregnancy-related anxiety questionnaire.

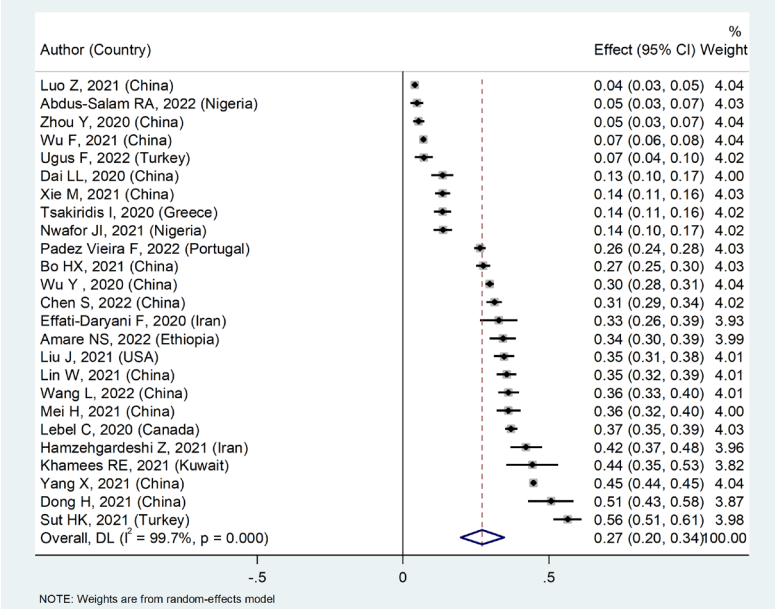

Figure 2. Meta-analysis of Depression in Pregnant Women During the COVID-19 Pandemic
Note. COVID-19: Coronavirus disease 2019; Effect: Effect size; CI: Confidence interval

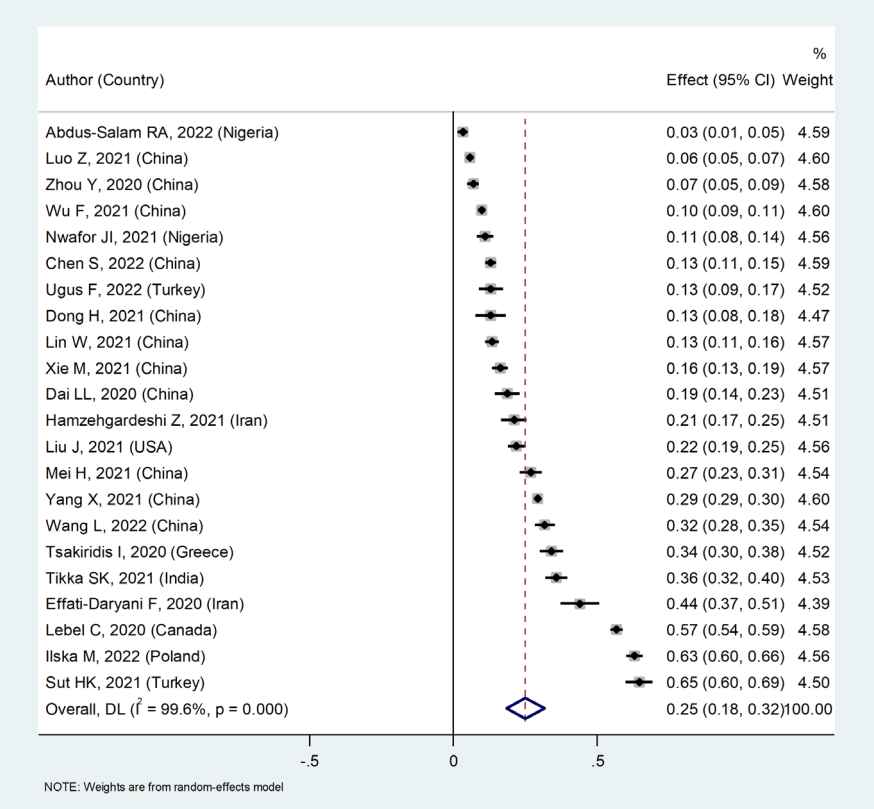

Figure 3. Meta-analysis of Anxiety Among Pregnant Women During the COVID-19 Pandemic
Note. COVID-19: Coronavirus disease 2019

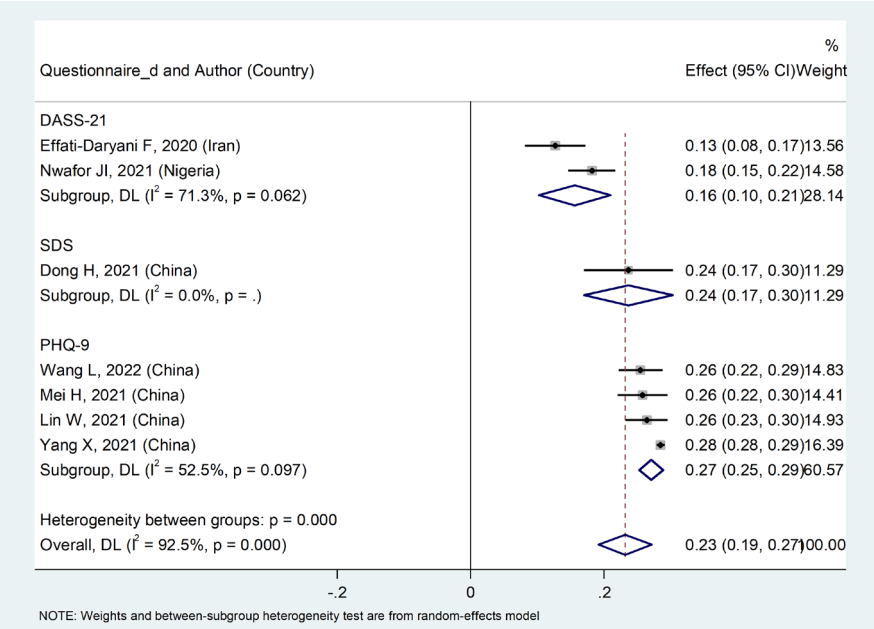

Figure 4. Meta-analysis of Mild Depression in Pregnant Women During the COVID-19 Pandemic by Questionnaire
Note. COVID-19: Coronavirus disease 2019

lowest prevalence rates of depression (9%) and anxiety (7%) during the pandemic were found in Nigeria, while the highest rates of depression and anxiety were found in Kuwait (44%) and the Netherlands (63%), respectively. Identifying the prevalence of depression and anxiety among pregnant women and recognizing high-risk groups during the COVID-19 pandemic enables the development of targeted intervention programs to manage these mental disorders and prevent their further increase. In addition, these findings help health policymakers design pre-pregnancy counseling programs for women to reduce depression and anxiety during pregnancy.

Rahimi et al conducted a meta-analysis of 15 studies published between 2019 and 2020 to investigate the prevalence of mental health disorders among pregnant women during the COVID-19 pandemic. Their results

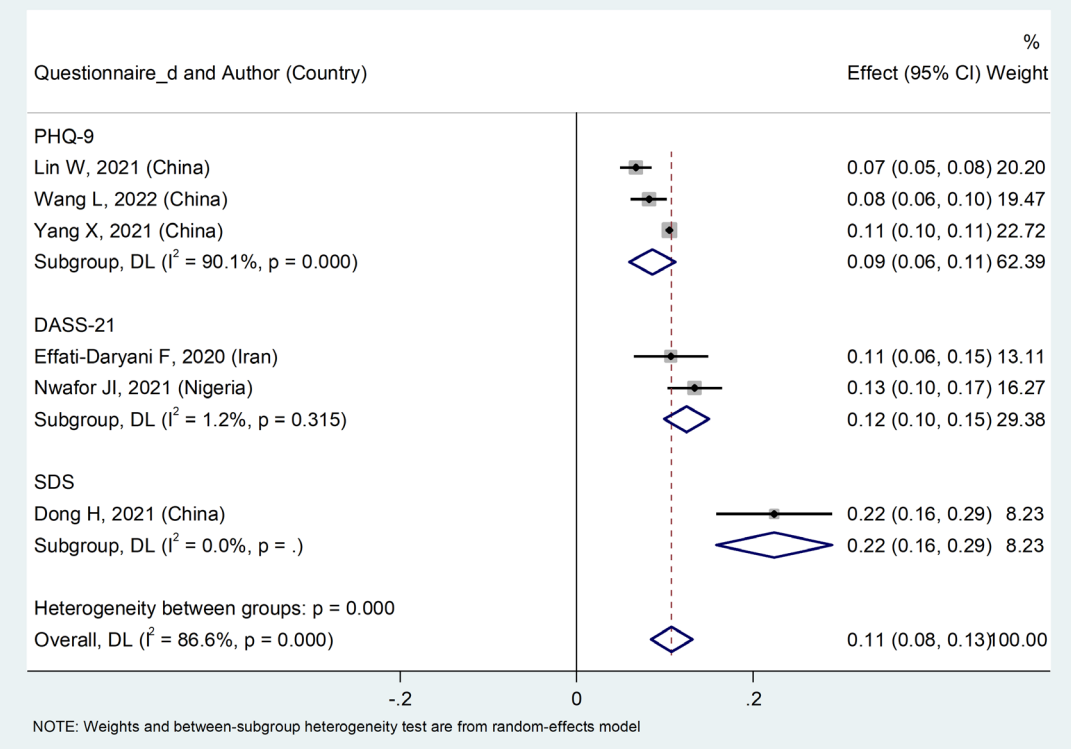

Figure 5. Meta-analysis of Moderate Depression in Pregnant Women During the COVID-19 Pandemic by Questionnaire
Note. COVID-19: Coronavirus disease 2019

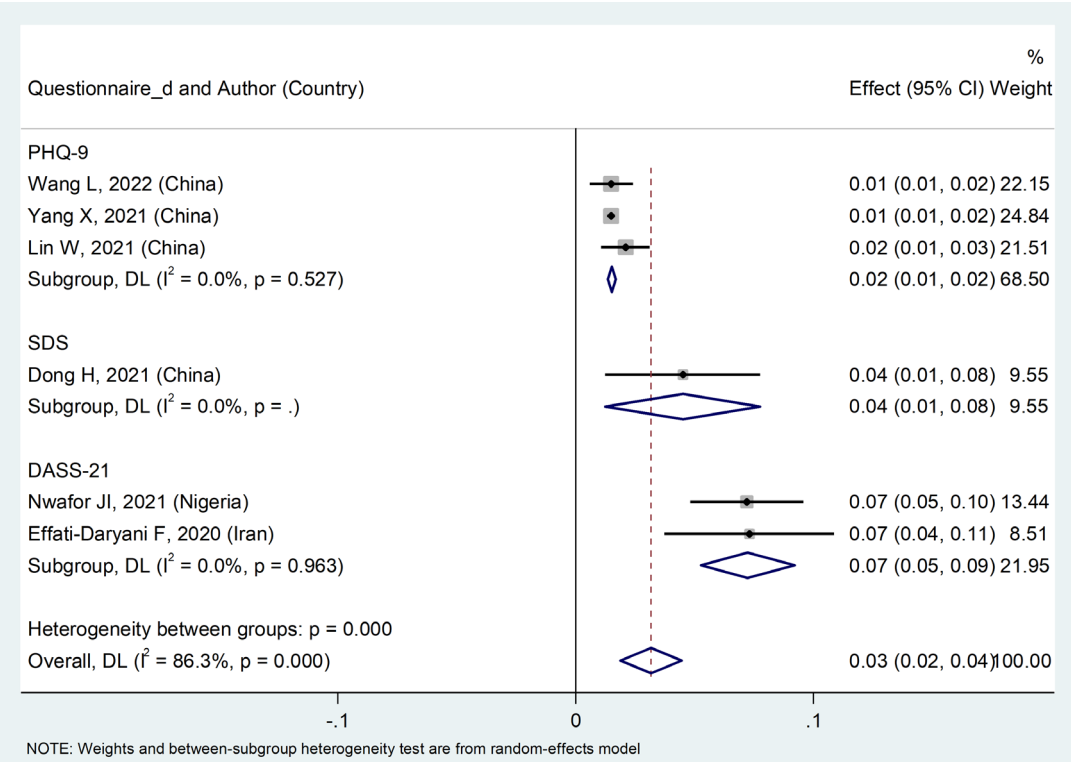

Figure 6. Meta-analysis of Severe Depression in Pregnant Women During the COVID-19 Pandemic by Questionnaire
Note. COVID-19: Coronavirus disease 2019

showed that the prevalence of anxiety ranged from 3.8% to 17.5% in Asian countries, while the rate was 23.9% to 72% in Western countries (37). Nevertheless, the findings of the present study suggested that Nigeria was in a better condition compared to other countries.

Sun et al conducted a meta-analysis of 15 studies involving 11187 participants published between December 2019 and January 31, 2020, to investigate the effects of COVID-19 on anxiety and depression among pregnant women. They reported prevalence rates of 30% for depression and 34% for anxiety (38). Similarly, Zhang et al conducted a meta-analysis including studies

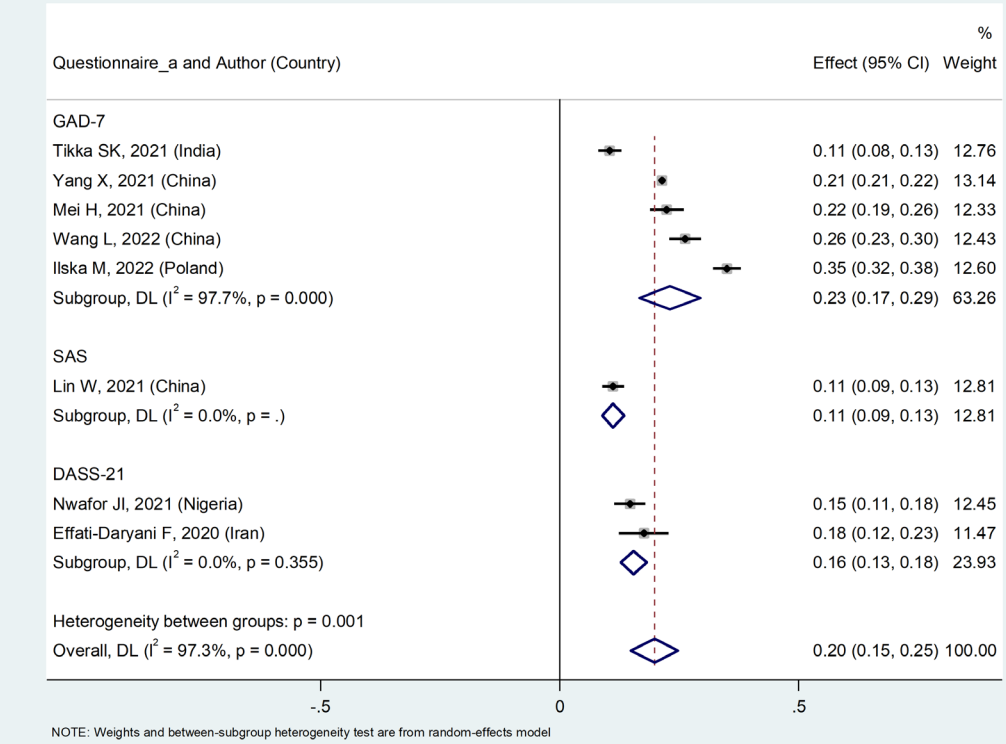

Figure 7. Meta-analysis of Mild Anxiety in Pregnant Women During the COVID-19 Pandemic by Questionnaire
Note. COVID-19: Coronavirus disease 2019

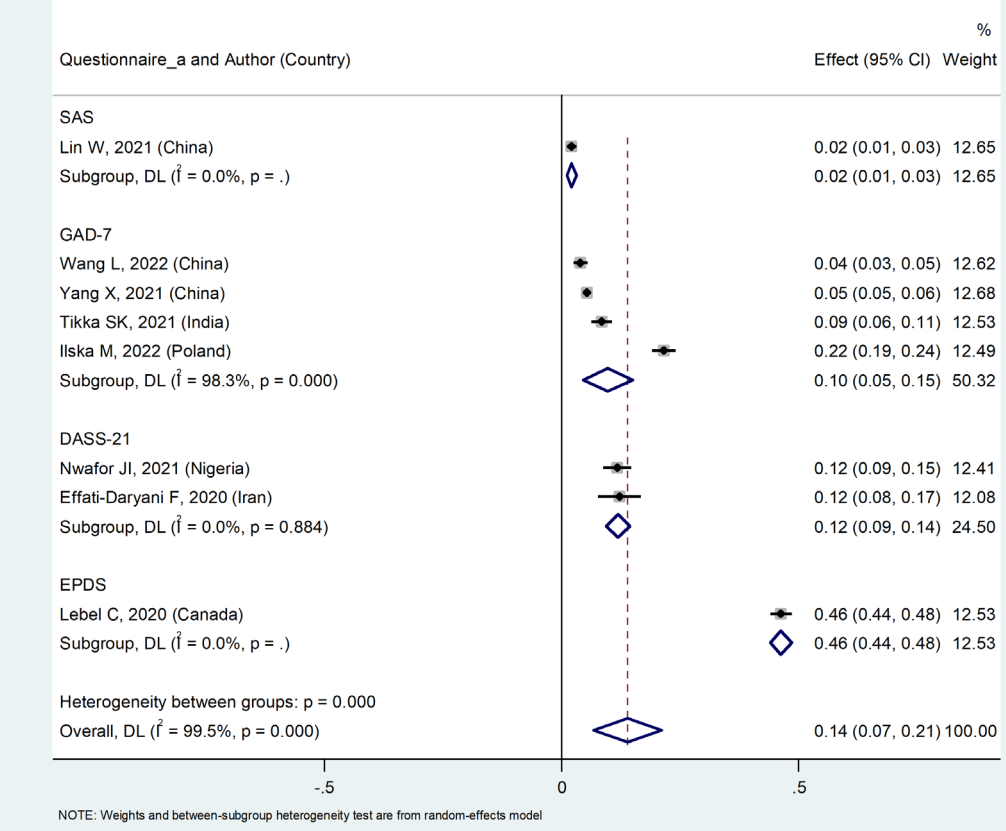

Figure 8. Meta-analysis of Moderate Anxiety in Pregnant Women During the COVID-19 Pandemic by Questionnaire
Note. COVID-19: Coronavirus disease 2019

published up to August 13, 2020, and found that the prevalence of anxiety was 43% in eight studies with 7493 participants, while the prevalence of depression was 32% in seven studies involving 6116 participants (39). Moreover, Fan et al reviewed 19 articles published up to September 2020 to investigate the mental health condition

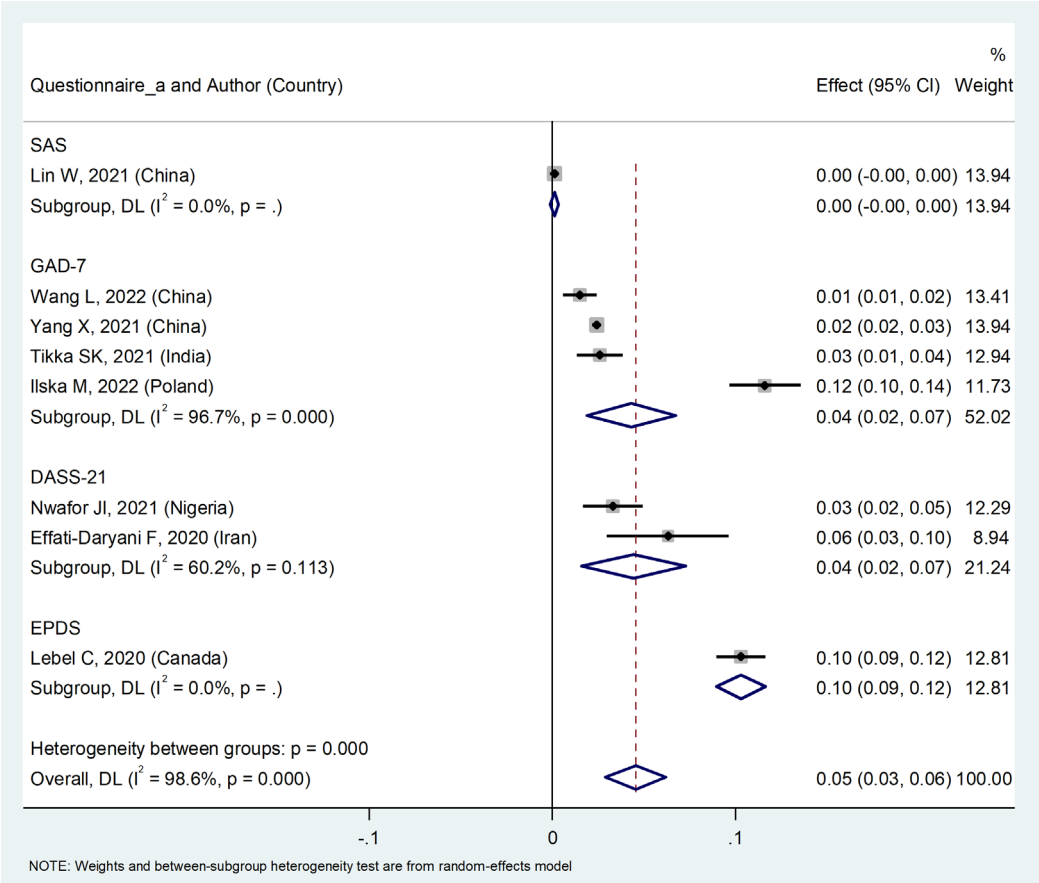

Figure 9. Meta-analysis of Severe Anxiety in Pregnant Women During the COVID-19 Pandemic by Questionnaire
Note. COVID-19: Coronavirus disease 2019

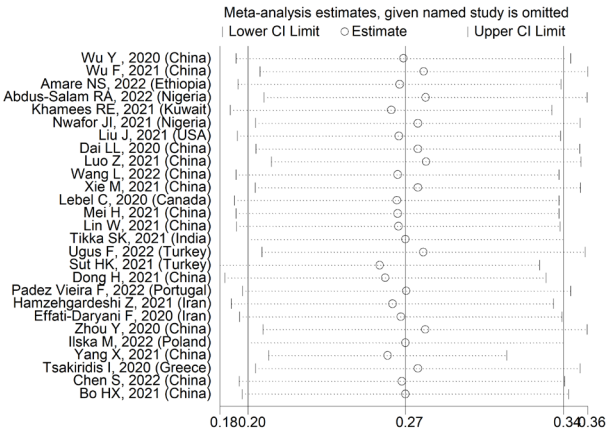

Figure 10. Sensitivity Analysis

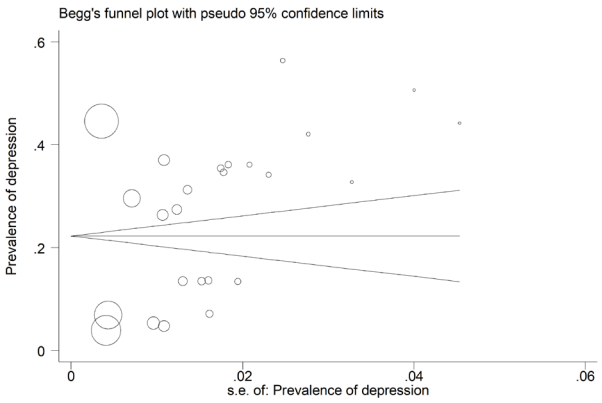

Figure 11. Publication Bias Diagram

of pregnant women during the COVID-19 pandemic. The results showed that the overall prevalence rates of anxiety and depression were 42% and 25%, respectively (40).

While the above-mentioned studies reported that the prevalence of anxiety exceeded that of depression among pregnant women, the present study found the opposite pattern. Furthermore, comparison of the present findings with those of the above studies suggests a declining trend in the prevalence of anxiety among pregnant women. Factors such as widespread vaccination, increased public awareness, decreased virulence of newer coronavirus strains, and reduced disease-related mortality rates were probably the reasons for the observed reduction in anxiety prevalence among pregnant women. Moreover, the prevalence of depression among pregnant women demonstrated a decreasing trend compared with some previous studies (38, 39).

In the meta-analysis conducted by Ghazanfarpour et al, the prevalence of anxiety and depression among pregnant women during the COVID-19 pandemic was reported as 18.7% and 25.1%, respectively (41). These findings were in line with the results of the present study and further confirmed that the prevalence of depression exceeded anxiety among pregnant women during the pandemic.

Cevik et al conducted a meta-analysis of 48 articles published between 2018 and 2021, involving a total

Table 2. Prevalence of Depression and Anxiety in Pregnant Women During the COVID-19 Pandemic According to the Implemented Questionnaire

Subgroups		Prevalence (%)	Lower Limit (%)	Upper Limit (%)	I^2(%)	*P*-value
Prevalence of Depression (Total)	PHQ-9	24	9	40	99.9	<0.001
	HADS	30	20	81	99.7	<0.001
	DSM-IV	7	4	10	0	---
	SDS	31	15	48	97.9	<0.001
	SCL-90	14	11	16	0	---
	EPDS	30	24	37	97.3	<0.001
	DASS-21	27	12	42	96.9	<0.001
	CDA-Q	42	37	48	100	---
Mild Depression	DASS-21	16	10	21	71.3	0.062
	SDS	24	17	30	0	---
	PHQ-9	27	25	29	52.5	0.097
Moderate Depression	DASS-21	12	10	15	1.2	0.315
	SDS	22	16	29	0	---
	PHQ-9	9	6	11	90.1	<0.001
Severe Depression	DASS-21	7	5	9	0	0.963
	SDS	4	1	8	0	---
	PHQ-9	2	1	2	0	0.527
Prevalence of Anxiety (Total)	HADS	34	26	94	99.8	<0.001
	GAD-7	26	16	35	99.7	<0.001
	DASS-21	27	5	60	98.7	<0.001
	SAS	14	12	16	46.9	0.130
	DSM-IV	13	9	17	0	---
	SCL-90	16	13	19	0	---
	PRAQ	21	17	25	0	---
	STAI	34	30	38	0	---
	EPDS	57	54	59	0	---
Mild Anxiety	GAD-7	23	17	29	97.7	<0.001
	SAS	11	9	13	0	---
	DASS-21	16	13	18	0	0.355
Moderate Anxiety	SAS	2	1	3	0	---
	GAD-7	10	5	15	98.3	<0.001
	DASS-21	12	9	14	0	0.884
	EPDS	46	44	48	0	---
Severe Anxiety	GAD-7	4	2	7	96.7	<0.001
	DASS-21	4	2	7	60.2	0.113
	EPDS	10	9	12	0	---

Note. PHQ-9: Patient health questionnaire-9; HADS: Hospital anxiety and depression scale; DSM-IV: Diagnostic and statistical manual of mental disorders, Fourth Edition; SDS: Self-rating depression scale; SCL-90: Symptom checklist-90; EPDS: Edinburgh postnatal depression scale; DASS-21: Depression, anxiety and stress scale-21; CDA-Q: Coeliac disease assessment questionnaire; GAD-7: Generalized anxiety disorder 7-item scale; SAS: Self-rating anxiety scale; PRAQ: Pregnancy-related anxiety questionnaire; STAI: State-trait anxiety inventory.

population of 77,299 participants, to determine the effects of the COVID-19 pandemic on symptoms of insomnia, anxiety, and depression during pregnancy. The results showed that the pandemic had no significant effect on the symptoms of depression and anxiety but increased insomnia (42). Although the studies reviewed above did not specifically address anxiety and depression symptoms, it may be argued that the pandemic had a reverse impact on the prevalence of depression and anxiety in pregnant women.

Limitations

The major limitations of the present study included limited access to the full text of some studies, unequal representation of studies across the investigated countries, and the inability to report the prevalence of depression and anxiety in pregnant women by age groups or mode of delivery (vaginal or cesarean section). Additional limitations included substantial heterogeneity among studies, reliance on self-report questionnaires, and the predominantly cross-sectional design of the

included studies.

Conclusion

The prevalence of depression and anxiety among pregnant women during the COVID-19 pandemic was determined at 27% and 25%, respectively. The findings showed that mild forms of depression and anxiety were the most prevalent during the pandemic. Analyzing the studies according to the country of origin showed that the lowest prevalence rates of both depression and anxiety were recorded in Nigeria. Given the undesirable consequences of these mental health conditions in pregnant women and their high prevalence, the implementation of counseling sessions for pregnant women is strongly recommended to reduce and control pregnancy-related depression and anxiety.

Acknowledgements

None.

Authors' Contribution

Conceptualization: Shiva Shemshad, Shakiba Alaienejad.
Data Curation: Shiva Shemshad, Shakiba Alaienejad.
Formal Analysis: Shiva Shemshad, Shakiba Alaienejad.
Investigation: Shiva Shemshad, Shakiba Alaienejad.
Methodology: Shiva Shemshad, Shakiba Alaienejad.
Project Administration: Shiva Shemshad.
Resources: Shiva Shemshad.
Software: Shiva Shemshad, Shakiba Alaienejad.
Supervision: Shiva Shemshad.
Validation: Shiva Shemshad.
Visualization: Shiva Shemshad, Shakiba Alaienejad.
Writing-original draft: Shiva Shemshad, Shakiba Alaienejad.
Writing-reviewing & editing: Shiva Shemshad, Shakiba Alaienejad.

Competing Interests

None.

Ethical Approval

This study was conducted in accordance with the PRISMA checklist, and all ethical issues, including the prevention of plagiarism, data fabrication, and duplicate publication, were completely observed by the authors.

Funding

None.

References

1. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. Gen Psychiatr. 2020;33(2):e100213. doi: 10.1136/gpsych-2020-100213.
2. Zakeri A, Faraone A, Matin S. Does procalcitonin play a role as a predictor of in-hospital mortality among COVID-19 patients admitted to intensive care unit? J Parathyr Dis. 2022;10(1):e9144. doi: 10.34172/jpd.2022.9144.
3. Gümüşsoy S, Keskin G, Çiçek Ö, Yiğitoğlu S, Kirazlı G, Yıldırım G. Psychological problem areas of pregnant women diagnosed with abortus imminens as a result of assisted reproductive techniques: a comparative study. Perspect Psychiatr Care. 2021;57(1):73-81. doi: 10.1111/ppc.12526.
4. Hong K, Hwang H, Han H, Chae J, Choi J, Jeong Y, et al. Perspectives on antenatal education associated with pregnancy outcomes: systematic review and meta-analysis. Women Birth. 2021;34(3):219-30. doi: 10.1016/j.wombi.2020.04.002.
5. Mazza MG, De Lorenzo R, Conte C, Poletti S, Vai B, Bollettini I, et al. Anxiety and depression in COVID-19 survivors: Role of inflammatory and clinical predictors. Brain Behav Immun. 2020;89:594-600. doi: 10.1016/j.bbi.2020.07.037.
6. Hamzehgardeshi Z, Omidvar S, Asadi Amoli A, Firouzbakht M. Pregnancy-related anxiety and its associated factors during COVID-19 pandemic in Iranian pregnant women: a web-based cross-sectional study. BMC Pregnancy Childbirth. 2021;21(1):208. doi: 10.1186/s12884-021-03694-9.
7. Rashidi Fakari F, Simbar M. Coronavirus pandemic and worries during pregnancy; a letter to editor. Arch Acad Emerg Med. 2020;8(1):e21.
8. Kendig S, Keats JP, Hoffman MC, Kay LB, Miller ES, Moore Simas TA, et al. Consensus bundle on maternal mental health: perinatal depression and anxiety. Obstet Gynecol. 2017;129(3):422-30. doi: 10.1097/aog.0000000000001902.
9. Stein A, Pearson RM, Goodman SH, Rapa E, Rahman A, McCallum M, et al. Effects of perinatal mental disorders on the fetus and child. Lancet. 2014;384(9956):1800-19. doi: 10.1016/s0140-6736(14)61277-0.
10. Silva EH, Lekamwasam S. Confirmatory and supportive laboratory investigations in SARS-CoV-2 infection; a systematic review. J Prev Epidemiol. 2020;5(1):e03. doi: 10.34172/jpe.2020.03.
11. Luchini C, Stubbs B, Solmi M, Veronese N. Assessing the quality of studies in meta-analyses: advantages and limitations of the Newcastle Ottawa Scale. World J Meta Anal. 2017;5(4):80-4.
12. Wu F, Lin W, Liu P, Zhang M, Huang S, Chen C, et al. Prevalence and contributory factors of anxiety and depression among pregnant women in the post-pandemic era of COVID-19 in Shenzhen, China. J Affect Disord. 2021;291:243-51. doi: 10.1016/j.jad.2021.05.014.
13. Amare NS, Gessesse DN, Kinfu YS, Mekuriyaw AM, Tizazu MA, Menalu MM, et al. Prevalence of antenatal depression and associated factors among pregnant women during COVID-19 pandemic in North Shewa zone, Amhara region, Ethiopia. Int J Afr Nurs Sci. 2022;17:100459. doi: 10.1016/j.ijans.2022.100459.
14. Abdus-Salam RA, Balogun RO, Lawal TV, Lawal OO, Lawal RO, Abdulmalik JO, et al. Assessment of anxiety and depression, and coping mechanisms during COVID-19 lockdown among pregnant women. Heliyon. 2022;8(10):e10902. doi: 10.1016/j.heliyon.2022.e10902.
15. Khamees RE, Taha OT, Ali TY. Anxiety and depression during pregnancy in the era of COVID-19. J Perinat Med. 2021;49(6):674-7. doi: 10.1515/jpm-2021-0181.
16. Nwafor JI, Okedo-Alex IN, Ikeotuonye AC. Prevalence and predictors of depression, anxiety, and stress symptoms among pregnant women during COVID-19-related lockdown in Abakaliki, Nigeria. Malawi Med J. 2021;33(1):54-8. doi: 10.4314/mmj.v33i1.8.
17. Liu J, Hung P, Alberg AJ, Hair NL, Whitaker KM, Simon J, et al. Mental health among pregnant women with COVID-19-related stressors and worries in the United States. Birth. 2021;48(4):470-9. doi: 10.1111/birt.12554.
18. Dai LL, Wang X, Jiang TC, Li PF, Wang Y, Wu SJ, et al. Anxiety and depressive symptoms among COVID-19 patients in Jianghan Fangcang Shelter Hospital in Wuhan, China. PLoS One. 2020;15(8):e0238416. doi: 10.1371/journal.pone.0238416.
19. Luo Z, Xue L, Ma L, Liu Z. Comorbid anxiety and depression and related factors among pregnant and postpartum Chinese women during the coronavirus disease 2019 pandemic. Front Psychol. 2021;12:701629. doi: 10.3389/fpsyg.2021.701629.
20. Wang L, Yang N, Zhou H, Mao X, Zhou Y. Pregnant women's anxiety and depression symptoms and influence factors in the COVID-19 pandemic in Changzhou, China. Front Psychol.

2022;13:855545. doi: 10.3389/fpsyg.2022.855545.
21. Xie M, Wang X, Zhang J, Wang Y. Alteration in the psychologic status and family environment of pregnant women before and during the COVID-19 pandemic. Int J Gynaecol Obstet. 2021;153(1):71-5. doi: 10.1002/ijgo.13575.
22. Lebel C, MacKinnon A, Bagshawe M, Tomfohr-Madsen L, Giesbrecht G. Elevated depression and anxiety symptoms among pregnant individuals during the COVID-19 pandemic. J Affect Disord. 2020;277:5-13. doi: 10.1016/j.jad.2020.07.126.
23. Mei H, Li N, Li J, Zhang D, Cao Z, Zhou Y, et al. Depression, anxiety, and stress symptoms in pregnant women before and during the COVID-19 pandemic. J Psychosom Res. 2021;149:110586. doi: 10.1016/j.jpsychores.2021.110586.
24. Lin W, Wu B, Chen B, Lai G, Huang S, Li S, et al. Sleep conditions associate with anxiety and depression symptoms among pregnant women during the epidemic of COVID-19 in Shenzhen. J Affect Disord. 2021;281:567-73. doi: 10.1016/j.jad.2020.11.114.
25. Tikka SK, Parial S, Pattojoshi A, Bagadia A, Prakash C, Lahiri D, et al. Anxiety among pregnant women during the COVID-19 pandemic in India - a multicentric study. Asian J Psychiatr. 2021;66:102880. doi: 10.1016/j.ajp.2021.102880.
26. Uguz F, Kirkas A, Yalvac T, Gundogan KM, Gezginc K. Is there a higher prevalence of mood and anxiety disorders among pregnant women during the COVID-19 pandemic? A comparative study. J Psychosom Res. 2022;155:110725. doi: 10.1016/j.jpsychores.2022.110725.
27. Kahyaoglu Sut H, Kucukkaya B. Anxiety, depression, and related factors in pregnant women during the COVID-19 pandemic in Turkey: a web-based cross-sectional study. Perspect Psychiatr Care. 2021;57(2):860-8. doi: 10.1111/ppc.12627.
28. Dong H, Hu R, Lu C, Huang D, Cui D, Huang G, et al. Investigation on the mental health status of pregnant women in China during the pandemic of COVID-19. Arch Gynecol Obstet. 2021;303(2):463-9. doi: 10.1007/s00404-020-05805-x.
29. Padez Vieira F, Mesquita Reis J, Figueiredo PR, Lopes P, Nascimento MJ, Marques C, et al. Depression among Portuguese pregnant women during COVID-19 lockdown: a cross sectional study. Matern Child Health J. 2022;26(9):1779-89. doi: 10.1007/s10995-022-03466-7.
30. Effati-Daryani F, Zarei S, Mohammadi A, Hemmati E, Ghasemi Yngyknd S, Mirghafourvand M. Depression, stress, anxiety and their predictors in Iranian pregnant women during the outbreak of COVID-19. BMC Psychol. 2020;8(1):99. doi: 10.1186/s40359-020-00464-8.
31. Zhou Y, Shi H, Liu Z, Peng S, Wang R, Qi L, et al. The prevalence of psychiatric symptoms of pregnant and non-pregnant women during the COVID-19 epidemic. Transl Psychiatry. 2020;10(1):319. doi: 10.1038/s41398-020-01006-x.
32. Ilska M, Brandt-Salmeri A, Kołodziej-Zaleska A, Preis H, Rehbein E, Lobel M. Anxiety among pregnant women during the first wave of the COVID-19 pandemic in Poland. Sci Rep. 2022;12(1):8445. doi: 10.1038/s41598-022-12275-5.
33. Yang X, Song B, Wu A, Mo PKH, Di J, Wang Q, et al. Social, cognitive, and eHealth mechanisms of COVID-19-related lockdown and mandatory quarantine that potentially affect the mental health of pregnant women in China: Cross-Sectional Survey Study. J Med Internet Res. 2021;23(1):e24495. doi: 10.2196/24495.
34. Tsakiridis I, Dagklis T, Mamopoulos A, Athanasiadis A, Pearson R, Papazisis G. Antenatal depression and anxiety during the COVID-19 pandemic: a cross-sectional study in pregnant women from routine health care contact in Greece. J Perinat Med. 2021;49(6):656-63. doi: 10.1515/jpm-2020-0473.
35. Chen S, Zhuang J, Chen Q, Li W. Pregnant women: psychology, cognitive and behavioral responses, and solutions towards COVID-19. Psychol Health Med. 2023;28(3):621-8. doi: 10.1080/13548506.2022.2104881.
36. Bo HX, Yang Y, Chen J, Zhang M, Li Y, Zhang DY, et al. Prevalence of depressive symptoms among pregnant and postpartum women in China during the COVID-19 pandemic. Psychosom Med. 2021;83(4):345-50. doi: 10.1097/psy.0000000000000904.
37. Rahimi R, Dolatabadi Z, Moeindarbary S, Behzadfar S, Fakhr Ghasemi N, Tafrishi R, et al. A systematic review of the prevalence of mental health disorders in pregnant women during the COVID-19 pandemic. J Pediatr Perspect. 2020;8(11):12397-407. doi: 10.22038/ijp.2020.52315.4155.
38. Sun F, Zhu J, Tao H, Ma Y, Jin W. A systematic review involving 11,187 participants evaluating the impact of COVID-19 on anxiety and depression in pregnant women. J Psychosom Obstet Gynaecol. 2021;42(2):91-9. doi: 10.1080/0167482x.2020.1857360.
39. Zhang J, Yu H, Gao Y, Xu Q, Yin Y, Zhou R. Prevalence of anxiety and depression among pregnant women during the COVID-19 pandemic: a systematic review and meta-analysis. Res Sq [Preprint]. October 6, 2020. Available from: https://europepmc.org/article/ppr/ppr222327.
40. Fan S, Guan J, Cao L, Wang M, Zhao H, Chen L, et al. Psychological effects caused by COVID-19 pandemic on pregnant women: a systematic review with meta-analysis. Asian J Psychiatr. 2021;56:102533. doi: 10.1016/j.ajp.2020.102533.
41. Ghazanfarpour M, Bahrami F, Rashidi Fakari F, Ashrafinia F, Babakhanian M, Dordeh M, et al. Prevalence of anxiety and depression among pregnant women during the COVID-19 pandemic: a meta-analysis. J Psychosom Obstet Gynaecol. 2022;43(3):315-26. doi: 10.1080/0167482x.2021.1929162.
42. Cevik A, Onat Koroglu C, Karacam Z, Gokyildiz Surucu S, Alan S. Effects of the COVID-19 pandemic on the prevalence of insomnia, anxiety, and depression during pregnancy: a systematic review and meta-analysis. Clin Nurs Res. 2022;31(8):1405-21. doi: 10.1177/10547738221112748.