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Affecting Factors Related To Pregnancy on Mental Health Problems during the COVID-19 Pandemic : A Systematic Review

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Abstract

Background: This study aimed to investigate the effect of pregnancy-related factors on mental health problems during the COVID-19 pandemic.

Materials and Methods: This review was conducted through a systematic search of electronic resources in English, including Medline, Scopus, Web of Science, Cochrane Library, EMBASE, SID, Magiran, CIVILICA, and Google Scholar search engine with no time limit from inception up to February 2021, using the following keywords on their own or in combination: "Factors, Pregnancy, Mental Health, and COVID-19".

Results: Finally, 12 related articles were selected (n=14,776). The results indicated a significant association between the gestational age and anxiety. Women who were in their first and third trimesters after the declaration of the COVID-19 pandemic were at an increased risk of depression and anxiety. The first pregnancy (primigravida) was a parameter significantly correlated (AOR=3.05; 95% CI =1.53–6.08, p=0.001) with general anxiety disorder -7 score. A significant correlation existed between access to antenatal care data through the official social media accounts of hospitals and lower levels of perceived stress, depression, and anxiety. Financial problems and inability to receive informal childcare support independently had a correlation with the Elevated levels of depression symptoms (EPDS score ≥ 13).

Conclusion: Anxiety and depression were prevalent in pregnant women during the COVID-19 pandemic. Education level, primigravida pregnancy, household income, BMI, sleep quality, social and family support, smoking, physical health, ethnicity, and prenatal care of pregnancy were associated with higher anxiety and depression during the COVID-19 pandemic.

Key Words: Covid-19, Mental Health, Systematic Review, Pregnancy.

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1- INTRODUCTION

Pregnant women and their fetuses are at a higher risk in the event of natural disasters, including major epidemics (1). In addition to the prevalence of psychological distress during pregnancy, other stressful conditions like natural disasters and health crises also exacerbate stress in pregnant mothers and leave long-term effects on the child's development. For example, all people around the world were affected by the Coronavirus disease 2019 (COVID-19) epidemic that called into question all medical measures considered and predicted before the outbreak, especially the case of prenatal care (2). The disease caused by coronavirus began in Wuhan, China, and was reported by the World Health Organization (WHO) on December 31, 2019, and announced to be named COVID-19 on February 11, 2020 (3). The clinical manifestations of COVID-19 are similar in pregnant and non-pregnant women, indicating a psychological burden (4). Some pregnant women (10-15%) suffer from various emotional changes during the pandemic, leading to an increased risk of depression and anxiety and a negative impact on pregnant women and their fetuses (4). The reasons for such behavioral changes can be attributed to the enactment of a mandatory social distancing law throughout society (5). The main concern of pregnant women is predominantly related to fetal health, which arises from observing COVID-19 treatment and prevention instructions with uncertain efficacy and side-effects that disrupt routine maternal health services (6). The Edinburgh Postnatal Depression Scale (EPDS) reported that the incidence of depression was significantly higher during the epidemic than before its outbreak (7). Accordingly, it is essential to develop practical guidelines on isolation, communication, and psychological assistance to pregnant women during the epidemic to avoid adverse effects on their mental health. Hence, comprehensive global studies on the factors affecting the mental health of pregnant women and their fetuses during the pandemic are recommended (8). Mental disorders and factors affecting the mental health of pregnant women and their infants during the COVID-19 epidemic should be thoroughly evaluated to improve the mental status of pregnant women. This study aimed to investigate potential factors related to pregnancy that affect mental health problems during the COVID-19 pandemic.

2- MATERIALS AND METHODS

The Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) checklist was used as a template for this review.

2-1. Eligibility criteria

Participants, interventions, comparators, and outcome (PICO) was used to formulate the review objective and inclusion criteria.

2-1-1. Participants: Pregnant women.

2-1-2. Interventions: COVID-19

2-1-3. Comparators: We did not have a comparison group and intervention.

2-1-4. Outcomes: Impact on mental health.

2-2. Included and excluded studies

The search was conducted by screening eligible articles, including all longitudinal, prospective, or cross-sectional studies in English and Persian published up to February 2021, which evaluated the correlation between the factors affecting the mental health of pregnant women and their infants during the COVID-19 epidemic. The preliminary, pilot, and case report studies were excluded because of the small sample size and greater bias risk.

2-3. Information sources

The relevant articles were searched on authentic databases of Scopus, Web of Science, Medline through PubMed, EMBASE-Ovid, and Cochrane using the main keywords (Depression OR Anxiety OR Mental Health Problems) AND (Pregnancy OR Pregnant).

2-4. Extraction process of required data

The research team extracted the required data (Type of study, years of publication, names of authors, country, sampling method, sample sizes, and main results), and recorded in a pre-designed table (**Table 1**). Two independent researchers individually reviewed all screened articles.

2-5. Selection process of screened articles

First, the abstract of the searched articles was reviewed by two independent researchers for eligibility (**Figure 1**). Then, the full text of relevant articles was downloaded, studied, and included in a final list. A third researcher resolved any disagreement.

2-6. Risk of bias in individual articles

Risk of bias assessment was done according to the Cochrane Risk of Bias criteria (9). The assessment was done by two reviewers independently and in duplication and any discrepancies were resolved by the third reviewer (**Table 1**).

2-7. Synthesis of results

Due to the difference in the included studies, study designs, lack of control groups in some studies, sample size, type of intervention used, duration of treatment, and duration of follow-up, meta-analysis was not conducted.

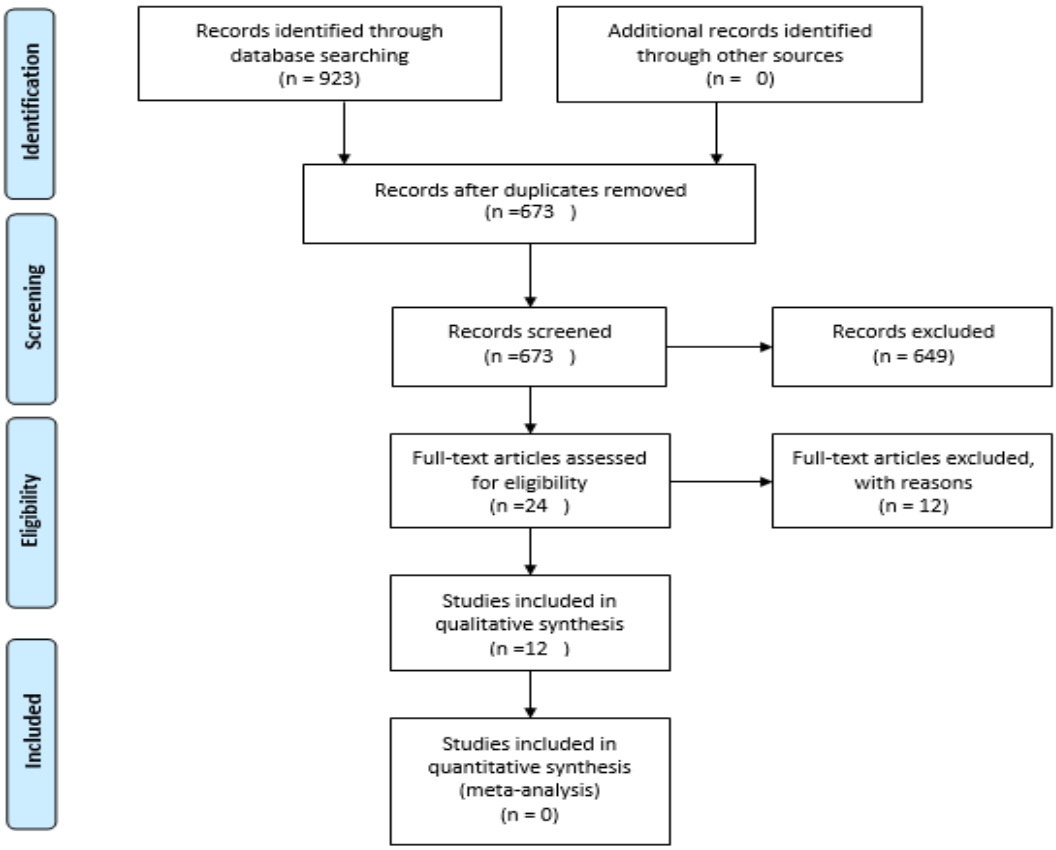

Fig.1: PRISMA flowchart.

Table-1: Baseline characteristics of studied participants (n= 14,776).

Author, Country, Year, (Reference)	Type of study	Number of participant	Sampling method	Results	Strobe score (0-22)
Preis et al., USA, 2020, (10)	Cross-sectional	788	-	Better prenatal health behaviors and older maternal age were protective factors against anxiety.	19
Wu et al., China, 2020, (21)	Cross-sectional	4,124	Convenient sampling	The results showed that the pregnant women assessed after the declaration of COVID-19, during third trimester were at increased risk of depression and anxiety.	20
Saccone et al., Italy, 2020, (20)	Cross-sectional	100	Convenient sampling	Greater mean STAI score>36, and greater mean VAS score≥50 for anxiety related to the vertical transmission of COVID-19.	20
Ng et al., Singapore, 2020, (19)	Cross-sectional	325	Random sample	The anxiety had a significantly greater level in females who correlated COVID-19 with fetal disorders and intrauterine fetal death.	18
Mei et al., China, 2020)., (18)	Cohort	784 and 2,448	Convenient sampling	There was a correlation between vaginal bleeding during pregnancy and the levels of depression or anxiety.	21
Hocaoglu et al., Turkey, 2020, (17)	Cross-sectional	283	Convenient sampling	Spouse employment status (p=0.04), and pregnancy side effects (p=0.01) could predict the state anxiety level.	20
Matsushima et al., Japan, 2020, (16)	Cross-sectional	1,777	Convenient sampling	More financial problems and inability to receive informal child care support) independently had a correlation with the EPDS score of ≥ 13.	18
Jiang et al., China, 2021, (15)	Cross-sectional	1,873	Snowball method	A significant correlation between access to antenatal care data through the official social media accounts of hospitals and the lowered levels of perceived stress, depression and anxiety.	21
Kassaw et al., Ethiopia, 2020, (14)	Cross-sectional	178	Consecutive sampling	The first pregnancy (primigravida) was a parameter significantly correlated (AOR=3.05; 95% CI: 1.53–6.08, p=0.001) with GAD-7.	19
Dagklis et al., Greece, 2020, (11)	Cross-sectional	146	Convenient sampling	There was no difference between the three trimesters of pregnancy in the prevalence rate of anxiety (OR=0.842, 95% CI= 0.351-2.020 for first trimester; OR=0.637, 95% CI: 0.265-1.534 for second trimester, OR=1.000 for third trimester).	21
Beheshti Nasab et al., Iran, 2020, (12)	Descriptive-analytical	200	Convenient sampling	No significant correlation was observed between the gestational age (0.370), and the health anxiety or prenatal distress.	21
Berthelot et al., Canada, 2020, (13)	Cohort	1,750	Convenient sampling	There was no significant correlation (p=0.72) between the gestational age and the anxiety or mood signs based on multivariate regressions.	19

EPDS: Edinburgh postnatal depression scale, GAD-7: General anxiety disorder-7, OR: Odds ratio, 95% CI: 95% Confidence interval, STAI: State-Trait anxiety inventory, VAS: Visual analog scale.

3- RESULTS

Finally, 12 articles were selected (n=14,776, **Figure 1**). In one study, 788 pregnant women were invited via social media to complete an online questionnaire. In the final model (total R^2= 52.28), parameters such as perinatal infection stress, history of abuse, preparedness stress, and high-risk pregnancy could all independently predict the likelihood of moderate to severe anxiety. Better prenatal health behaviors and older maternal age were protective factors against anxiety (10). Dagklis et al. found no difference in the prevalence rate of anxiety between the three trimesters of pregnancy (odds ratio [OR]=0.842, 95% confidence interval [CI]= 0.351-2.020 for the first trimester, OR=0.637, 95% CI=0.265-1.534 for the second trimester; and OR=1.000 for the third trimester) (11).

No significant correlation was observed between the gestational age (0.370) and the health anxiety or prenatal distress in the study of Beheshti Nasab et al. (12). Berthelot et al. also indicated no significant correlation (p=0.72) between the gestational age and the anxiety or mood symptoms based on multivariate regressions (13). In a hospital-based cross-sectional study by Kassaw et al., the participants (n= 178) were selected by the consecutive sampling method from April 6 to May 6, 2020. Their results revealed that the first pregnancy (primigravida) was a parameter significantly correlated (AOR=3.05, 95% CI=1.53–6.08, p= 0.001) with general anxiety disorder -7 (GAD-7) (14).

In a web-based study by Jiang et al., there was a significant correlation between access to antenatal care data through the official social media accounts of hospitals and the lowered levels of perceived stress (adjusted odds ratio [AOR]=0.46, 95% CI=0.30-0.72, p=0.001), depression (AOR=0.73, 95% CI=0.59-0.91, p=0.005), and anxiety (AOR=0.53, 95% CI=0.41-0.68, p<0.001). According to the results, the access to health care data through SMS or hospital hotlines had a significant correlation with a lowered level of anxiety only (AOR=0.77, 95% CI=0.60-0.98, p=0.04) (15). In a study by Matsushima et al., the participants (n=1,777) were pregnant women tested via an online survey applying the Japanese version of the EPDS. They determined the percentage of women with an Edinburgh postnatal depression scale (EPDS) score of ≥13 and factor scores of anhedonia, anxiety, and depression. The perceived risk variables for pregnant women (including COVID-19 infection, more financial problems, and inability to receive informal childcare support) had an independent correlation with the EPDS score of ≥ 13 (OR=1.19, 95% CI=1.10–1.28; OR=1.13, 95% CI=1.02–1.25; OR=1.13; 95% CI=1.03–1.23, respectively). There was a significant correlation (p<0.05) between the level of depression and the elimination of planned informal support (16).

In a cross-sectional study by Hocaoglu et al. on pregnant women (n=283) using multiple regression analysis, spouse employment status (p=0.04), and pregnancy side effects (p=0.01) could predict the state anxiety level (17). In a cohort study, Mei et al. identified a correlation between vaginal bleeding during pregnancy and levels of depression or anxiety (18). In a cross-sectional study by Ng et al., anxiety was significantly more prevalent in females who correlated COVID-19 with fetal disorders and intrauterine fetal death (19). In a cross-sectional study at the University of Naples Federico II (Napoli, Italy), Saccone et al. evaluated the psychological behavior of pregnant women during the COVID-19 outbreak from March 15, 2020, to April 1, 2020. They reported that women in the first trimester of pregnancy had more severe behavior issues during the epidemic. They found a greater mean

State-Trait Anxiety Inventory (STAI) score>36 and greater mean Visual Analogue Scale (VAS) score≥50 for anxiety related to the vertical transmission of COVID-19 (20). A cross-sectional multicenter study (early December 2019) employed the EPDS to recognize the mental health problems among primiparous pregnant women (n=4124) during the third trimester of pregnancy from 25 hospitals in ten provinces of China during the COVID-19 outbreak. The results showed that these pregnant women were at increased risk of depression and anxiety (21).

4- DISCUSSION

Pregnant women have suffered high levels of anxiety, depression, and stress during the outbreak of COVID-19. It is necessary to reinforce the mental healthcare services during these public health emergencies to protect pregnant women. Essential information about pregnant women during disasters, including ways to deal with emergencies, published by healthcare providers through social media can effectively reduce the psychological problems of this group and provide the basis for future preventive and response measures (15). This study aimed to investigate factors related to pregnancy that can affect mental health problems during the COVID-19 pandemic. Pregnancy, as a sensitive period of a woman's life, can be affected by various psychological factors that can negatively affect the mother, fetus, and future baby. Because COVID-19 is a new phenomenon with limited information available, it may have adverse psychological effects on pregnant women. Various variables during pregnancy harm the mental health of pregnant women during the outbreak of COVID-19. These variables can have adverse outcomes on childbirth and also reinforce the occurrence of self-harming thoughts in women (21). Studies have mentioned obesity, the quality of relationship with the spouse, level of education of the spouse, level of education of the mother, pre-existing anxiety disorders, socio-economic inequalities, support of the spouse and family, consumption of alcohol by women and their partners, marital satisfaction, number of pregnancies, social isolation, pregnancy infections, concerns about accessing a gynecologist, low weight before pregnancy, preference for hospital type, care time, prenatal delivery, delivery method, and history of COVID-19 as important factors related to self-concern. Other factors such as the well-being of the fetus, fear of fetal infection during delivery, and how the baby is fed are related to the fetus. These factors increase the risk of depression and anxiety during this period (5, 18, 21-29).

Since, according to various studies, about one-fifth of pregnant women during the COVID-19 pandemic have anxiety (28), health care professionals should develop comprehensive treatment plans for pregnant women in highly vulnerable populations to prevent psychological damage. Initiating a telemedicine program for obstetrics and gynecology may reduce the incidence of mental health problems in pregnant women. On the other hand, it may raise concerns about aspects of care that traditionally require face-to-face monitoring, such as prenatal care, where regular monitoring of blood pressure and fetal evaluation are required. However, the potential of telemedicine has alleviated these concerns by proving home blood pressure monitors and the installation of fetal electrocardiographic sensors. The development of mobile-based pregnancy-related applications has provided an opportunity for higher patient participation. In addition, replacing traditional prenatal, childbirth, or breastfeeding classes with multidisciplinary virtual classes may increase people's access to partnerships

and care and make training methods more consistent. However, the presence of most health care professionals in emergencies, fear of late delivery of services still may worsen conditions for anxiety in people (30). The COVID-19 pandemic has affected pregnant women. They have frequent fluctuations in their peptide and steroid hormone levels and may be more prone to mental health problems during the COVID-19 epidemic (31). A cross-sectional study ofn156 participants in China found that pregnant women's anxiety levels were the same as before the epidemic, while depression rates were significantly higher (32).

Further depression during COVID-19 may be due to sudden lifestyle changes after quarantine policies, as pregnant women had to stay home almost all the time (33). Also, women who had limited relationships with their partners after the corona epidemic are more likely to experience varying degrees of depression than other pregnant women (29). However, another study reported lower rates of depression in pregnant women (34) as they were cared for more by family members, which reduced their depressive symptoms (32). However, problems such as pelvic pain, vaginal bleeding, abdominal pain in early pregnancy, decreased fetal motility, stillbirth, restrictions on prenatal care, especially for people with a history of miscarriage, unwanted pregnancy, smoking, lack of exercise, and sedentary lifestyle remain. Mobility exacerbates these conditions (18, 27-30).

But a study in Wuhan, China, found that women who were in the first trimester of pregnancy and also had pre-pregnancy obesity and a high level of education had lower levels of depression (18) because pregnant women in the third trimester are more concerned about the health and delivery of their baby and are at greater risk for depression (29).

5- CONCLUSION

Anxiety and depression are prevalent in pregnant women during the COVID-19 pandemic, and women are highly concerned about themselves and their infants. Education level, primigravida pregnancy, household income, BMI, sleep quality, social and family support, smoking, physical health, ethnicity, and prenatal care of pregnancy were associated with higher anxiety and depression during the COVID-19 pandemic. They can have adverse effects on the physical and mental health of women and their children in the future. It is recommended to provide adequate support and counseling for pregnant women in health care centers to improve their mental health.

6- AUTHORS' CONTRIBUTIONS

Study conception or design: SMH, BF, and SI; Data analyzing and draft manuscript preparation: BF, MS, ND, SN, and FS; Critical revision of the paper: SMH, and BF; Supervision of the research: SMH and SI; Final approval of the version to be published: SMH, BF, MS, ND, SN, FS, and SI.

7- CONFLICT OF INTEREST: None.

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