

# Health anxiety and related factors among pregnant women during the COVID-19 pandemic: a cross-sectional study from Iran

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## Research article

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# Abstract

**Background:** The pandemic of COVID-19 affected many countries as well as Iran. The aim of this study was to evaluate the health anxiety of the Iranian pregnant women in time of the pandemic of the COVID-19.

**Methods:** In this cross-sectional study 300 pregnant women in different trimesters (n=100 in each trimester) were recruited. A demographic questionnaire and the Health Anxiety questionnaire were used to collect data. Because of quarantine data were collected through social media groups. The chi-square, ANOVA and multiple linear regression were used to analyze data.

**Results:** The total score of anxiety was  $22.3 \pm 9.5$ ,  $24.6 \pm 9.3$  and  $25.4 \pm 10.6$  in the first, second and third trimester of pregnancy. In total, 9%, 13% and 21% of the women had severe anxiety or scores  $\geq 35$  in the first, second and third trimester of pregnancy respectively. Pregnant women in the third trimester significantly had more health anxiety score and higher scores of "total health anxiety" than the first trimester ones ( $p=0.045$ ).

**Conclusion:** At the time of the pandemic of COVID-19, women in the second and third trimester of pregnancy were more worry about consequences of disease, but the total score of health anxiety was significantly more in the women in the third trimester of pregnancy. Health care providers should pay more attention to the mental health of pregnant women in times of crises such as Corona pandemic.

## Background

In March 2020, the first cases of COVID-19 was emerged in Qom city in Iran (1). The World Health Organization, announced the COVID-19 disease as a pandemic on 11 March 2020 (2). At the present time (8 October 2020) the number of affected people in Iran reached around 448,236 and 27,888 cases died from this disease (3). Four weeks passed from the epidemic of COVID-19 in Iran, in 20<sup>th</sup> March 2020, the government announced lockdown in most provinces and all obstetrics and midwifery private offices were officially closed and only a few clinics were open in the cities for pregnant women to visit. Anxiety and fear of COVID-19 disease were spread among people as well as pregnant women. Although before the pandemic of COVID-19, pregnant women may were excited about their pregnancy, it replaced by fear after the pandemic of COVID-19 (4).

Health anxiety define as the extensive worry that people experience about their health situation (4). Health anxiety may manifest in two types: illness anxiety disorder and somatic symptom disorder and the symptoms of anxiety may vary from mild to severe that show clinical signs. The pregnancy-specific anxiety is an autonomous anxiety disorder, that when a woman conceives, may has this type of anxiety because of immediate somatic changes, or either illness anxiety disorder (5).

Stress and anxiety during pregnancy are associated with disorders such as preeclampsia, low birth weight, depression and more nausea and vomiting (6). Women with anxiety during pregnancy may experience symptoms such as worry, stress, having difficulty to stay calm, sleep disturbances, having negative thoughts that may prevent good sleep (7). Anxiety during pregnancy mostly is accompanied with depression (8). In the other hand, disorders such as depression may deteriorate the outcomes of pregnancy (9). Worry during the pandemic of COVID-19 among pregnant women may cause them to avoid attending the clinics for regular prenatal care or undergo unnecessary cesarean section because of fear of mother to neonate disease transmission (10).

Although pregnant women are susceptible to respiratory infection during pregnancy, a recent WHO report suggested that the risk of transmission of Covid-19 in pregnancy is similar to the risk in a non-pregnant population (11). However, other studies have suggested that viral respiratory diseases may cause pneumonia in pregnant women, which may lead to premature rupture of membranes, preterm labor, intrauterine fetal demise, intrauterine growth retardation and even neonatal death (12). Also, SARS-CoV-2 may cause decrease in angiotensin and worsen vasoconstriction, inflammation and coagulopathy that are similar to signs of preeclampsia patients (13). Limited evidence from pregnant women affected with COVID-19 in China and the USA reveal that more than 95% of these women delivered by cesarean section, as the general idea is the maternal respiratory disease will be worsen with normal vaginal delivery (the rate of cesarean section in the USA and China is 32% and 54.5% respectively) (14-16).

The Corona virus is a novel disease and its dimensions are unknown. Therefore, this study designed to investigate the health anxiety among pregnant women in different trimesters in Iran.

## Method

This was a cross-sectional study in which 300 pregnant women in different trimesters (n=100 in each trimester) were recruited. The design of this study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (Ref No: IR.AJUMS.REC.1399.006). This study started on 20 March 2020 and completed on 10 April 2020. The oral and written informed consent was obtained from each participant. Literate pregnant women in any trimester of pregnancy were recruited for this study. Women with stressful events in the past 6 months, women with positive test for COVID-19, and women with known mental disorders were excluded from the study.

### Sample size

The sample size was calculated using the following formula (18):

$$\alpha = 0.05, s=4.48, d=0.15 \times s \approx 0.6$$

$$n > \frac{(z_{1-\alpha/2})^2 \times s^2}{d^2} = \frac{(1.96)^2 \times (4.48)^2}{(0.6)^2} \approx 214$$

$$20\% \text{ non-responding} \approx 43$$

$$n^* > 257$$

We recruited 300 pregnant women (n=100 in each trimester of pregnancy).

## Measurements

A demographic and the Health Anxiety questionnaire were used to collect data. The demographic questionnaire included questions about age, parity, gravidity, number of children, economic situation, job of women and their partner, and the trimester of pregnancy.

The Health Anxiety questionnaire (19) consisted 18 questions about the participants' worry during the pandemic of Corona virus in Iran. Each question had four categories from "I am not worried about my health" to "I spend most of my time worrying about my health". The scores ranging from zero to 3, while zero indicated to "I do not have a problem", and 3 indicated to "I spend most of my time worrying about my health". The total score of this questionnaire is 54. There are three sub-scales for this questionnaire. Worry about getting sick is including questions number 5, 6, 8, 9, 11 and 12. Worry about consequences of disease is including questions number 13, 15, 16, 17 and 18 and general health concerns is including questions number 1-4, 7, 10 and 14. The total score < 27 means low health anxiety, 27-34 mean moderate health anxiety and scores more than 35 means high health anxiety. The validity and reliability of the Persian version of health anxiety questionnaire were assessed and approved in Iran (20). We also included a question asking women if they thought the COVID-19 pandemic had increased their feeling of anxiety during pregnancy?

The phone numbers of pregnant women were obtained from public health centers in Ahvaz. Both questionnaires were sent for eligible pregnant women via social media (WhatsApp or Telegram). The page prior to questionnaires was written informed consent and participants requested to sign this form before response to the questionnaires. The completed questionnaires sent back for one of the researchers via those social media.

## Statistics

All data entered SPSS version 22. The normal distribution of continuous data was assessed using the Shapiro-Wilk test. The ANOVA test was used for comparing the data between three groups (three trimesters) and the chi-square test was used for comparing categorical data. Multiple linear regression models was used for assessing the relationship of different trimesters and health anxiety controlling for the effects of history of infertility and results of anomalies screening.  $P < 0.05$  was considered significant.

## Results

We assessed 500 women according to inclusion/exclusion criteria and 350 of them were eligible. However, only 300 women returned completed questionnaires. Table 1 demonstrates the demographic and maternity characteristics of participants in different trimesters of pregnancy. As evident from this table, the mean age of women was  $25.8 \pm 5.1$ ,  $27.2 \pm 5.7$  and  $26.5 \pm 4.5$  in first, second and third trimester ( $p > 0.05$ ). Women did not show any significant difference regarding job, education, economic situation and education of spouse.

As evident from table 1. 95% of women in the second trimester of pregnancy had a normal anomaly screening and 32% of women in the first trimester did not perform these tests or had test with suspicious results. Women in three trimesters showed a significant difference regarding anomaly screening ( $p < 0.0001$ ). Three groups showed a significant difference regarding history of infertility ( $p = 0.02$ ). In the first, second and third trimester, respectively 25%, 19% and 35% of women reported concerns during their pregnancy. These concerns included bleeding in the first trimester, nausea and vomiting, gestational diabetes, and hypertension ( $p = 0.097$ ). A total number of 73.6% of women were reported that COVID-19 pandemic increased their anxiety, which the most women worried in the third trimester of pregnancy (78%)

Table 2 shows the level of anxiety among women in three trimesters. Women in the third trimester were more worried about to get sick, consequences of the disease and concerns about disease. The total score of anxiety was  $22.3 \pm 9.5$ ,  $24.6 \pm 9.3$  and  $25.4 \pm 10.6$  in the first, second and third trimester of pregnancy. Totally 9%, 13% and

21% of the women had severe anxiety or scores  $\geq 35$  in the first, second and third trimester of pregnancy respectively.

Using multiple linear regression, significant association was found between trimester and “being worried about consequences of disease” score, after controlling for the effects of history of infertility and results of anomaly screening. Pregnant women in the second and third trimesters had significantly higher scores of “being worried about consequences of disease”, compared to that of first trimester ( $p=0.010$  and  $p=0.009$ ; respectively). Also, pregnant women in the third trimester reported significantly higher health anxiety scores than women in the first trimester. Pregnant women in the third trimester had significantly higher scores of “total health anxiety”, in comparison with that of first trimester ( $p=0.045$ ). However, no significant difference was found in “total health anxiety” between the second and the first trimester (Table 3).

## Discussion

This study was designed to evaluate the health anxiety of pregnant women and its relating factors in the pandemic of COVID-19 in Iran. The results of this study showed that women in the third trimester compared with those in the first or second trimester were more worried about to get sick, consequences of the disease and concerns about disease. Also the total score of anxiety was higher among women in the third trimester of pregnancy. Anxiety during the pandemic of COVID-19 disease in pregnant women may be due to the fact that these women do not access to their health providers, woman may be reluctant to access health providers due to their perceptions of hospitals being unsafe environments in relation to COVID-19 infection (21).

The death rate of pregnant women from SARS disease was reported to be 25% (22), but limited studies in China showed that the death rate of pregnant women from the new COVID-19 was near to the general population and also the outcomes of pregnancy for both mothers and neonates were good (23). But Centers for Disease Control (CDC) in a study found that pregnant women who affected with COVID-19, were 50% more likely to admit in the intensive care unit and were 70% more likely to be intubated than non-pregnant women (24). Overall, lack of high quality, evidence-based accessible information for woman and families may contribute to women's anxiety.

The results of the present study showed that women in the third trimester of pregnancy were more prone to be worry and also had significantly more health anxiety compared to women in second and the first trimesters of pregnancy. Other studies showed that pregnant women are more worry about different problems in the second and third trimesters of pregnancy (25). In the present study we controlled some confounding factors. One of the confounding factors was anomaly screening tests. According to the national guidelines in Iran, women should do the anomaly screening tests including Nuchal translucency, and PAPP-A between 11 and 13<sup>th</sup> week of gestation. If there is any abnormality in these tests, then women encouraged to do some other tests including measuring total hCG, uE3, AFP and Inhibin A around 15<sup>th</sup> week of gestation. We found that 34% of women in the first trimester did not perform anomaly test or their test results was suspicious. This may cause anxiety in pregnant women.

A study by Corbett et al (26) showed that most pregnant women (83.1%) did not worry about their health status before the pandemic of COVID-19, but during the pandemic, 50.7% were worried about their health status most of the time. Concerns of pregnant women may be related to the matter that they do not have access to their relatives if they needed. Furthermore, many pregnant women may have concerns about lack of family and social support due to distancing measures (26). In the first days of COVID-19 pandemic in Iran, one hospital in Ahvaz, where a large number of middle- or lower-class women receive intrapartum care, were designated as a center for patients

with the COVID-19 disease. Although another hospital was redeveloped to care for pregnant women, the change in location of care may have contributed to women's symptoms of anxiety.

## Limitations Of The Study

Because of the pandemic of COVID-19, women answered the health anxiety questionnaire via telephone or social media, the answers of the participants may have been affected by recall bias. Furthermore, women recruited non-randomly in this study, which may limit the generalizability of this study. Also, the past history of depression, anxiety, and the level of social support did not assess in the present study and all of them have potential to make health anxiety.

## Conclusion

At the time of the coronavirus pandemic, women in the second and third trimester of pregnancy were more worried about the consequences of disease, but the total score of health anxiety was significantly higher in the third trimester of pregnancy. Health care providers should pay more attention to the mental health and provide more psychological support of pregnant women in times of crises such as COVID-19 pandemic. Also, further researches about specific causes of women's anxiety and identifying supportive mechanisms during COVID-19 are needed.

## Abbreviations

**ANOVA:** Analysis of Variance

**COVID-19:** Corona Virus Disease 2019

**WHO:** World Health Organization

**SARS:** Severe acute respiratory syndrome

**hCG:** Human Chorionic Gonadotropin

**uE3:** unconjugated estriol

**AFP:** Alpha-foetoprotein

## Declarations

**Ethics approval and consent to participate:** This study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (Ref No: IR.AJUMS.REC.1399.006). The oral and written informed consent was obtained from each participant.

**Consent for publication:** NA

**Availability of data and materials:** Data will be available upon the request from corresponding author.

**Competing interests:** Authors declare that they do not have any conflict of interest.

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**Authors' contributions:** NS, PA, PDA, MB and HB were involved in designing of this research. MB collected the data. EM analyzed the data. PA and EM were involved in the data interpretation. PA was responsible for writing and finalizing the manuscript. All authors have read and approved the manuscript.

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## Tables

Table 1: Socio-demographic and maternity characteristics of participants by trimester of pregnancy

Variables	First trimester n=100	Second trimester n=100	Third trimester n=100	All trimesters N=300	P value
Age (y) mean $\pm$ SD	25.8 $\pm$ 5.1	27.2 $\pm$ 5.7	26.5 $\pm$ 4.5	26.54 $\pm$ 5.17	0.17
Gravida	1.72 $\pm$ 1	1.83 $\pm$ 1.1	1.91 $\pm$ 1.1	1.82 $\pm$ 1.09	0.47
Para	0.63 $\pm$ 0.9	0.69 $\pm$ 0.92	0.74 $\pm$ 0.94	0.69 $\pm$ 0.92	0.70
Living child	0.59 $\pm$ 0.86	0.66 $\pm$ 0.92	0.73 $\pm$ 0.93	0.66 $\pm$ 0.90	0.55
	N (%)				
<b>Job</b>					
Housewife	80(80)	80(80)	86(86)	246(82)	0.32
Employee	20(20)	20(20)	14(14)	54(18)	
<b>Education</b>					
Primary	5(5)	12(12)	7(7)	24(8)	0.65
Secondary	12(12)	9(9)	8(8)	29(9.7)	
Diploma	44(44)	42(42)	44(44)	130(43.3)	
University	39(39)	37(37)	41(41)	117(39)	
<b>Economic situation</b>					
Weak	21(21)	21(21)	17(17)	59(19.7)	0.67
Moderate	72(72)	67(67)	71(71)	210(70)	
Good	7(7)	12(12)	12(12)	31(10.3)	
<b>Education of spouse</b>					
Illiterate	1(1)	7(7)	1(1)	9(3)	0.11
Primary	6(6)	4(4)	6(6)	16(5.3)	
Secondary	15(15)	16(16)	11(11)	42(14)	
Diploma	44(44)	31(31)	42(42)	117(39)	
University	34(34)	42(42)	40(40)	116(38.6)	
<b>Results of anomaly screening</b>					
Normal	66(66)	95(95)	93(93)	254(84.7)	<0.0001
Suspicious or did not perform	34 (34)	5 (5)	7 (7)	46(15.3)	
<b>History of infertility</b>	8(8)	4(4)	15(15)	27(9)	0.023
<b>Problems in the current pregnancy</b>					
Yes	25 (25)	19(19)	35(35)	79(26.3)	0.097
No	75(75)	81(81)	65(65)	221(73.6)	
<b>If COVID-19 pandemic increased women's anxiety</b>					
No	34(34)	23(23)	22(22)	79(26.3)	0.102
Yes	66(66)	77(77)	78(78)	221(73.6)	

Table 2: The level of anxiety by trimester of pregnancy

Variable	First trimester n=100	Second trimester n=100	Third trimester n=100	Total N=300
<b>Health anxiety</b>				
More worried about to get sick	7.8±3.6	8.5±3.5	8.7±4.2	8.39±3.82
More worried about consequences of the disease	5.5±3.2	6.9±3.1	6.8±3.4	6.43±3.28
Reported more concerns about disease	8.9±4.1	9.2±4.07	9.7±4.4	9.32±4.20
Total score anxiety	22.3±9.5	24.6±9.3	25.4±10.6	24.15±9.93
<b>Total score of health anxiety category</b>				
<27	60 (60)	48(48)	40(40)	148 (49.3)
95% CI	(50.0 - 69.0)	(38.0 - 58.0)	(31.0 - 49.0)	(44.0 - 55.0)
27-34	31(31)	39(39)	39(39)	109 (36.3)
95% CI	(22.0 - 39.0)	(30.0 - 48.0)	(29.0 - 48.0)	(30.7 - 41.7)
≥35	9(9)	13(13)	21(21)	43 (14.3)
95% CI	(4.0 - 15.0)	(6.0 - 20.0)	(13.0 - 29.0)	(10.7 - 18.3)

Table 3. Results of multiple linear regression analyses to determine parameters most predictive interested outcomes.

Outcomes	Worry to get sick			Being worry about consequences of disease			Concerns about disease			Total health anxiety		
	Beta	95% CI for Beta	P	Beta	95% CI for Beta	P	Beta	95% CI for Beta	P	Beta	95% CI for Beta	P
<b>Results of anomaly screening.</b>												
Unknown or suspicious	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Normal	0.04	(-1.26,1.35)	0.950	0.33	(-0.77,1.45)	0.548	0.05	(-1.39,1.49)	0.941	0.43	(-2.95,3.82)	0.801
<b>History of infertility</b>												
Negative	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Positive	-0.75	(-2.3,0.80)	0.341	-0.46	(-1.78,0.85)	0.488	0.23	(-1.47,1.95)	0.783	-0.97	(-5.00,3.04)	0.633
<b>Trimester</b>												
First trimester	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Second trimester	0.62	(-0.50,1.76)	0.277	1.26	(0.30,2.22)	0.010	0.25	(-0.99,1.50)	0.690	2.14	(-0.79,5.08)	0.152
Third trimester	0.97	(-0.15,2.09)	0.089	1.27	(0.31,2.22)	0.009	0.73	(-0.49,1.97)	0.241	2.98	(0.07,5.88)	0.045

Note: The results from multiple linear regression models including each parameter controlling for the effects of history of infertility and results of anomalies screening.

## Supplementary Files

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