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Anxiety states and knowledge of COVID-19 among pregnant women during the pandemic in Turkey – a cross-sectional study

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ABSTRACT

Introduction. Infectious outbreaks have negative effects not only on the physical health of the society but also on the mental health.

Aim. To evaluate the anxiety states and knowledge of COVID-19 during the pandemic in pregnant women.

Material and methods. Cross-sectional study conducted in a university hospital in Turkey. A total of 199 pregnant women were included in the study. The State-Trait Anxiety Inventory (STAI), two questionnaires to evaluate the knowledge about COVID-19, and COVID-19-related anxiety were applied to all the women.

Results. The highest level of COVID-19-related anxieties were about their spouses or newborns contracting COVID-19, effects of drugs on fetus and contracting COVID-19 during delivery. There was a negative correlation between gestational week and the questionnaire of COVID-19-related anxieties (r=-0.152, p=0.037). STAI total score was 76.48±14.11, and STAI-T scores (42.39±7.66) were higher than STAI-S scores (34.09±8.77). Although their general knowledge about the disease was relatively good, their level of knowledge on issues that pertained specifically to pregnancy was low.

Conclusion. These findings indicated more than four months had passed since the pandemic came to the country but, pregnant women were very worried and did not have enough information about the disease.

Keywords. anxiety, knowledge, pandemic, pregnancy

Introduction

Coronavirus disease (COVID-19) first appeared in Wuhan, China's Hubei province in December 2019.[1] In a cluster of patients followed up for pneumonia of unknown cause, a novel coronavirus detected which was different from severe acute respiratory failure syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV).[2,3] The coronavirus disease started to spread around the world from China and was defined as an international emergency threat in

January 2020 and was declared as a pandemic in March 2020 by the World Health Organization (WHO).[1]

While infectious outbreaks threaten the health of the whole society; the diseases can be more severe in people with some medical and physiological conditions such as chronic disease, advanced age, and obesity.[4] Pregnancy is also one of the risky conditions for viral diseases.[5] Studies conducted during past outbreaks had shown that pregnant women had more hospitalization, the outbreaks were more common cause of death in pregnant women and caused negative fetal outcomes such as stillbirth, prematurity and congenital malformations.[6-8] Additionally, there are also data indicating that drugs used in the treatment of infections have teratogenic effects.[9] The current knowledge of the effects of COVID-19 infection in pregnancy are limited. However, preliminary data showed that pregnant women have a similar clinical presentation and severity to non-pregnant adults.[10]

Infectious outbreaks have negative effects not only on the physical health of the society but also on the mental health.[11] The studies evaluating the effect of the epidemic/pandemic diseases on the mental state of pregnant women are limited.[12,13] During the 2003 SARS epidemic in Hong Kong, pregnant women worried about themselves, their spouses, and newborns getting infected with SARS and the negative effects of antiviral agents on the fetus.[12] The same study showed an increase level of general anxiety in pregnant women.[12] Another study during the SARS outbreak in the pregnant population found that about a quarter of pregnant women had high anxiety levels.[13] Similar findings were found in the COVID-19 pandemic.[14-18] Two separate studies were done in Canada and Turkey found increased anxiety levels in pregnant women compared to the pre-pandemic period.[14-15] Pregnant women reported they were concerned about the negative consequences of COVID-19 on their own, baby's and family's health and pregnancy.[16-18] However, our knowledge about the impact of the pandemic on mental health of pregnant women is still limited.

The outbreaks have caused fear and panic in the general population. This panic and fear can cause the public to have inappropriate attitudes and behaviors regarding the disease. What we learned from the past epidemic diseases showed us that education about the disease was necessary to implement preventive measures and reduce the negative psychological reactions of the public.[19] Previous studies showed that knowledge of the disease was important in the adoption of preventive measures, the risk perception of the disease, and the level of anxiety.[20,21] There are a limited number of studies on the level of knowledge of pregnant women about COVID-19. Lee et al. stated the rate of correct answers to questions about COVID-19 was 76.4% in their study with Chinese pregnant women.[17] A cross-sectional survey from Nigeria reported pregnant women had adequate knowledge about COVID-19.[22] However, a study conducted with a Turkish sample found majority of pregnant women was not knowledgeable about the effect of COVID-19 related to the birth.[23]

Anxiety and stress during pregnancy might cause negative outcomes like preeclampsia, preterm birth, low birth weight, low APGAR scores, increased nausea, and vomiting.[24] Prenatal anxiety, depression and stress could be associated with cognitive, behavioral, and emotional problems in children.[25] In this context, determining anxiety levels and factors related to anxiety levels in pregnant women during pandemics may be important in terms of decreasing the negative results related to the mothers and their babies.

Aim

This study aimed to evaluate the general anxiety levels, COVID-19 related anxiety, and level of knowledge of the COVID-19 of the pregnant women during the COVID-19 pandemic.

Material and methods

This cross-sectional survey study was carried out in 1-31 July 2020. The study sample consisted of the pregnant women who visited the Department of Obstetrics and Gynecology (O&G) of Giresun University for their antenatal consultation and agreed to participate in the study after informing about the study. All pregnant women (n=250) who visited for antenatal consultation were offered to participate in the study. One hundred ninety-nine pregnant women participated in the study by completing the study questionnaires. The questionnaires were filled out by the participants before the examination. The routine pregnancy USG was performed in all cases at least once before the visit they participated in the study. We excluded the pregnant with confirmed infection of COVID-19. The participants completed two questionnaires about COVID-19 which one evaluating their knowledge of the disease and the other evaluating their anxiety related to the disease. And they also fulfilled The State-Trait Anxiety Inventory (STAI) to assess their anxiety levels. All participants gave written and verbal approval to be enrolled into the study.

A power analysis was conducted to determine the sample size, through calculations using the publicly available statistical software Open Epi, version 3 (http://www.openepi.com). This analysis was done using a significance level of 5%, an effect size of 21% and an ability to represent the population of 80% (power). It was shown that the sample size needed to be at least 98.

The Sociodemographic form designed by authors to provide demographic information like the participants' age, educational levels, household income, their pregnancy such as parity, gestational age of fetus.

We designed two questionnaires to evaluate the knowledge about COVID-19, and COVID-19 related anxiety in pregnant women. These questionnaires were designed by authors based on the questionnaires used in previous studies during outbreaks.[12,13] The questionnaire of COVID-19 related anxiety was a 4-point Likert-type scale (not at all, slightly, moderately, very much) consisted of 10 questions which evaluate anxiety about herself, her family, baby and pregnancy related to the outbreak. Cronbach's alpha and Spearman Brown coefficients were calculated to evaluate reliability of the questionnaire. Cronbach's alpha coefficient was calculated as 0.911, so we could say our questionnaire has very good internal consistency and Spearman-Brown coefficient was calculated as 0.949. The questionnaire of knowledge about the COVID-19 had questions regarding sign and symptoms, transmission routes, prevention and COVID-19 in pregnancy.

STAI is a self-report rating scale developed by Spielberger et al.[26] consisting of 40 Likert- type questions. The first 20 questions evaluate the state anxiety and the other 20 questions the continuous anxiety. Each item is scored between 1-4 points, and there are 17 reverse items. The scale indicates the level of anxiety rather than makes a diagnose and higher scores representing higher anxiety levels. Turkish translation and adaptation of the scale was done by Oner and Le Compte.[27]

Approval for the study was granted by a local internal review board (ethical committee) (date: 03.07.2020, n°: 2020/30).

Statistical Analysis

All analyses were performed on SPSS v21 (SPSS Inc., Chicago, IL, USA). Histograms and Q-Q plots were used to determine whether variables are normally distributed. Data are given as mean ± standard deviation (minimum - maximum) for continuous variables and as frequency (percentage) for categorical variables. Pearson or Spearman correlation coefficients were calculated to evaluate relationships between variables depending normality of distribution. Two-tailed p-values of less than 0.05 were considered statistically significant.

Results

We included 199 pregnant women into our study. The mean age of the participants was 28.30±4.67. The mean number of pregnancy was 2.09±1.11, more than half of the pregnant women (68.58%) had their first or second pregnancy. The mean gestational week was found as 30.76±8.46. The educational level and family income of participants were presented at Table 1. STAI mean total score was 76.48±14.11 and STAI-State scores (34.09±8.77) were higher than STAI-Trait scores (42.39±7.66) (Table 1).

Table 1. Summary of sociodemographic attributes and State-Trait Anxiety Inventory scores

Age	28.30±4.67 (18-42)
Education status	n (%)
Primary school	14 (7.11)
Secondary school	49 (24.87)
High school	50 (25.38)
University	84 (42.64)
Monthly income*	n (%)
< 1500	39 (20.42)
1500 - 3000	80 (41.88)
3000 - 5000	41 (21.47)
> 5000	31 (16.23)
Number of pregnancy	2.09±1.11 (1-6)
	n (%)
1	71 (37.17)
2	60 (31.41)
3	39 (20.42)
≥ 4	21 (10.99)
Gestational week	30.76±8.46 (7-41)
State-Trait Anxiety Inventory	
State score	34.09±8.77 (20-56)
Trait score	42.39±7.66 (24-62)
Total score	76.48±14.11 (44-117)

Data are given as mean ± standard deviation (minimum - maximum) for continuous variables and as frequency (percentage) for categorical variables

More than half of women worried moderately or very much about their spouses or newborns contracting COVID-19, while they were less worried about themselves (52.76% vs 51.26% vs 38.69, respectively). Forty-six (23.12%) pregnant women were very worried with regards to their babies would have disability if they would receive drugs for COVID-19. Approximately one-third of participants (33.17%) were worried moderately or very much about having an abortion due to COVID-19 while 73 (36.69%) about having a preterm delivery. More than a quarter of women (27.14%) were very worried about contracting COVID-19 during delivery. About 35 percent of pregnant women were moderately or very worried about going out, but less worried at home. More than one-fifth of women (21.61%) were very worried about going to the hospital because of COVID-19 (Table 2).

We graded questions zero (not at all) to three (very much) points so the minimum possible total score was zero and the maximum possible total score was 30. The mean total score of the questionnaire was calculated as 14.39±7.11. Five (2.51%) women had the maximum point and four (2.01%) women had the minimum point (Table 2).

Table 2. The questionnaire of COVID-19 related anxiety of pregnant women

Question (Q)	Not worried n (%)	Slightly worried n (%)	Moderately worried n (%)	Very worried n (%)	Mean	Standard deviation
1. Contracting COVID-19-herself	21 (10.55)	101 (50.75)	44 (22.11)	33 (16.58)	1.45	0.89
2. Contracting COVID-19-spouse	12 (6.03)	85 (42.71)	48 (24.12)	54 (27.14)	1.72	0.93
3. Contracting COVID-19-baby	18 (9.05)	76 (38.19)	53 (26.63)	52 (26.13)	1.70	0.96
4. Fetal malformation if drugs are needed for treatment	30 (15.08)	65 (32.66)	58 (29.15)	46 (23.12)	1.60	1.00
5. COVID-19 leading to miscarriage	63 (31.66)	70 (35.18)	40 (20.10)	26 (13.07)	1.15	1.01
6. COVID-19 leading to preterm birth	49 (24.62)	77 (38.69)	38 (19.10)	35 (17.59)	1.30	1.03
7. Contracting COVID-19 during birth	20 (10.05)	77 (38.69)	48 (24.12)	54 (27.14)	1.68	0.98
8. Worry even at home	79 (39.70)	86 (43.22)	19 (9.55)	15 (7.54)	0.85	0.88
9. Going out of the home	35 (17.59)	93 (46.73)	43 (21.61)	28 (14.07)	1.32	0.93
10. Going to hospital	18 (9.05)	82 (41.21)	56 (28.14)	43 (21.61)	1.62	0.92
Total Score					14.39	7.11

Data are given as mean ± standard deviation (minimum - maximum) for continuous variables and as frequency (percentage) for categorical variables

Fever (91.21%), dyspnea (78.02%) and cough (76.37%) were the most common answers about COVID-19 symptoms. 73 women had knowledge of major mode of transmission (droplet spread). While the ideal hand wash time was known by three-fourths of the participants (75.88%), the quarantine period was known by almost all of them (94.47%). More than half of women (64.82%) believed that they had more risk to contracting COVID-19 than the others. One hundred and sixteen women (58.59%) thought that COVID-19 could be transmitted to baby from mother. More than half of the participants did not know that what would happen to a 28-week pregnant woman if she contracts COVID-19 (57.07%) or whether mother with COVID-19 could breastfeed her baby (52.76%) (Table 3).

When we evaluated relationships between variables, we found that the questionnaire of COVID-19 related anxiety total scores had a low positive correlation with STAI state scores (r=0.219, p=0.002), trait scores (r=0.281, p<0.001) and total scores (r=0.298, p<0.001). In addition, we found a low negative correlation between education status and STAI trait scores (r=-0.144, p=0.044), also low negative correlation between gestational week and questionnaire scores (r=-0.152, p=0.037) (Table 4).

Discussion

In this study, we evaluated the anxiety states and knowledge regarding COVID 19 in pregnant women who applied to a University Hospital during the outbreak. We found a significant proportion of pregnant women were worried about contracting COVID-19, impact of COVID-19 on pregnancy outcomes, the negative effects of drugs to treat COVID-19 on the fetus, and going to the hospital. We also found that although their general knowledge about the disease was relatively

good, their level of knowledge on issues that pertained specifically to pregnancy was low.

Thirty-nine percent of pregnant women were moderately or very much worried about contracting COVID-19. Similarly, Lee et al. found that 37.7 % of prenatal and postnatal women were worried about contracting COVID-19.[17] We also found they worried about their spouse and children more than themselves. Likewise, Rivaldi et al. reported pregnant women were less worried about their own health than the health of others.[16] They explained this situation as the instinct of women to protect their offspring, which was potentially present in them, could be exacerbated by the pandemic, and caused them to act protective among people around them.[16] A similar explanation may apply to our findings. More than half of the pregnant women stated that they were worried about miscarriage or premature birth. Approximately half of pregnant women were worried much or very much about effects of drugs on fetus. Similar to our finding Nanjundaswamy et al. reported about half of the pregnant women were concerned about the effects of COVID-19 on pregnancy outcomes.[18] Mappa et al. stated 46.6% of pregnant women were afraid of COVID-19 related fetal structural anomalies, and more than half of pregnant women were afraid of fetal growth restriction (65.2%) and preterm birth (51.1%).[28] During the SARS pandemic, it was found 68.8% of pregnant women were concerned that antiviral drugs could cause fetal malformation.[12] It was also reported COVID-19 causes fetal complications such as miscarriage, intrauterine growth restriction, and preterm birth.[29] The effects of antiviral drugs on the fetus vary. While ribavirin therapy has a teratogenic effect, remdesivir and lopinavir-ritonavir appear to be safe in pregnancy.[30-32] It is recommended to decide on the choice to use the drug by taking into account benefits and possible side effects in

Table 3. Knowledge of COVID-19 of the pregnant women

		n (%)		
Symptoms	Fever	166 (91.21)		
	Cough	139 (76.37)		
	Dyspnea	142 (78.02)		
	Fatigue	112 (61.54)		
	Myalgia	50 (27.47)		
	Diarrhea	47 (25.82)		
	Headache	55 (30.22)		
	Skin eruption	10 (5.49)		
Mode of transmission	Droplet spread	142 (73.20)		
	Body secretions	91 (46.91)		
	Stools	4 (2.06)		
	Blood	25 (12.89)		
	Don't know	20 (10.31)		
Ideal hand wash time	5 seconds	0 (0.00)		
	10 seconds	24 (12.06)		
	20 seconds	151 (75.88)		
	1 minute	21 (10.55)		
	Unknown	3 (1.51)		
Quarantine period for suspicious persons	7 days	0 (0.00)		
	10 days	11 (5.53)		
	14 days	188 (94.47)		
	1 month	0 (0.00)		
	Unknown	0 (0.00)		
Probability of catch the disease in pregnants	Same with others	45 (22.61)		
	More than others	129 (64.82)		
	Less than others	8 (4.02)		
	Unknown	17 (8.54)		
Intervention to a 28 week pregnant with COVID-19	Caesarean	34 (17.17)		
	No intervention	51 (25.76)		
	Unknown	113 (57.07)		
		Yes	No	Unknown
Transmission of disease from mother to baby		116 (58.59)	32 (16.16)	50 (25.25)
Mother with COVID-19 can breastfeed her baby		27 (13.57)	67 (33.67)	105 (52.76)

Data are given as frequency (percentage)

each single case.[32] Taking into account all of these data, the concerns of pregnant women on this issue could be understood.

Quarantine and social isolation are important methods to prevent the spread of infections. Physical isolation methods such as staying at home, not going to crowded places are common practices towards the outbreaks.[33] Studies showed pregnant women were anxious when went out of the home during the outbreaks.[12] Similarly, in our study, it was found that pregnant women were less anxious at home and were anxious about going out. Hospi-

tals are considered risky areas during the outbreaks and people would stay away from hospitals to avoid contracting infections.[33] An American study showed 56.2% of the pregnant women in the third trimester changed their birth plans due to the anxiety related to COVID-19.[34] A study from Israel stated 66.7% of pregnant women had much or very much anxiety about going to the hospital.[35] Similarly, a study in Italy reported that 75% of pregnant women had fears associated with going to the hospital.[28] In another study, pregnant women and postpartum women in India showed 72.65% of the participants were concerned about going to hospital visits.[18] In our study, the rate of having moderately or very much anxiety about going to the hospital was 49.75%. The fact that conducting the study in the normalization process of the country regarding the pandemic and in the hospital which was not a pandemic hospital might have been effective in the relatively low rate.

In previous studies, increased anxiety levels in pregnant women during the pandemic were reported.[14,15] In the current study the level of trait anxiety according to STAI was similar to a study in Turkey, but the level of state anxiety was lower.[15] In contrast to the two studies that found STAI-S score higher than STAI-T scores, the STAI-T score was higher than the STAI-S score in our study.[28,36] Considering the concerns of pregnant women about going to hospital, it could be expected that the state anxiety levels were higher in the hospital environment where the questionnaires were filled. However, pregnant women might feel safer due to being in the hospital with the doctor. We did not know the anxiety levels of women in the pre-pandemic period. This situation may make it difficult to interpret our findings on the effect of the epidemic on the general anxiety levels of pregnant women. It was observed that the relationship between state and trait anxiety levels and levels of anxiety about the disease was significant. It could be expected that people who were generally concerned would be more concerned about the COVID-19. Consistent with this finding Lebel et al. showed that COVID-19-related anxieties are associated with depression and anxiety in pregnant women.[14]

Although socioeconomic status and the history of pregnancy could have an effect on anxiety, our study did not find a significant relationship between these variables and total anxiety, and COVID-19-related anxiety.[14,37] Nanjundaswamy et al. reported more COVID-19 related anxiety to pregnant women in the first trimester. Conversely we found a negative correlation between gestational age and COVID-19 related anxiety.[28] The effects of COVID-19 such as miscarriage and the increase in the probability of the baby's survival as gestational age increases might be effective in this finding.[29,38]

Another issue we examined in our study was the level of knowledge of the COVID-19 of the pregnant women. While fever, cough, fatigue are more common in COVID-19, symptoms such as headache, rash are less

Table 4. Correlations between State-Trait Anxiety Inventory, questionnaire scores and pregnants attributes

		State-Trait Anxiety Inventory scores			Questionnaire
		State	Trait	Total	
Questionnaire	r	0.219*	0.281*	0.298*	-
	p	0.002	<0.001	<0.001	-
Age	r	0.087	0.014	0.050	-0.073
	p	0.225	0.844	0.486	0.314
Education status	r	0.000	-0.144*	-0.078	0.048
	p	0.997	0.044	0.275	0.505
Monthly income	r	0.061	-0.132	-0.030	0.101
	P	0.401	0.069	0.682	0.166
Numberof pregnancy	r	0.015	0.011	0.022	-0.012
	p	0.838	0.883	0.763	0.873
Gestational week	r	0.060	0.004	0.042	-0.152*
	p	0.417	0.954	0.566	0.037

R: Correlation coefficient, * Correlation is significant at the 0.05 level (2-tailed).
Questionnaire: The questionnaire of COVID-19 related anxiety of pregnant women

common symptoms.[39] Although common symptoms in COVID were mostly known there were significant knowledge gaps in terms of symptoms of COVID-19. Similar to our findings, Aniwke et al. reported that the most common symptoms known by pregnant women were fever and cough.[22] More emphasis on common symptoms may have been effective in this situation. Approximately three-fourths of the women were aware of the main route of transmission. Considering the time elapsed since the beginning of the epidemic, the rate was low. Droplet transmission is a medical term in the transmission method questions in our survey. The fact that the participants did not understand this term may have been effective in this result. The level of knowledge about the quarantine period and importance of hand washing were very high in studies.[17,40] In our study, a satisfactory correct rate of knowledge about quarantine period and hand washing time was also obtained. Since the virus originates from abroad, it was recommended that people coming from abroad should stay in quarantine for 14 days at the beginning of the outbreak.[41] Turkish Ministry of Health established The 14-Day Rule for returns from abroad.[42] These rules included the quarantine period and the isolation and hygiene recommendations and were conveyed to the public through printed and visual media. Efforts to inform the public about the 14-Day Rule may have been effective in this regard.

Most of the pregnant women believed the probability of getting the disease themselves was higher than the general population. Similarly, Lee et al. reported in their study that most pregnant women thought they were more susceptible to COVID-19 than the general population.[17] However, there is not enough evidence to support that the risk of contracting COVID-19 for pregnant women is higher than the general population.[10,43]

In addition, a multi-center study found maternal mortality due to COVID-19 was lower than the non-pregnant population.[44] Pregnant women would think it will be risky about going to hospital. And as a result, they could not benefit from health services sufficiently. It was reported that women who experienced a decrease in fetal movements were reluctant to contact the hospital for help due to the risk of COVID-19 exposure in hospital.[45] Women did not have enough information about how the course of pregnancy would be if they caught COVID-19. Studies showed pregnancy could be continue even if the pregnant had COVID-19. The decision to delivery or the mode of delivery is made according to obstetric factors and clinical situation. And vaginal delivery is not contraindicated since vertical transition is not proven.[43,44] Although it is still not known clearly whether there is a vertical transition or not, no viruses were found in amniotic fluid and placenta.[43] The multi-center study found only one infant born from a pregnant woman with COVID-19 was found positive to COVID-19 and the authors stated the vertical transition was negligible in COVID-19.[45] Current evidence suggests that the virus is not transmitted in breast milk and breastfeeding could continue.[46] Uncertainty is a situation that triggers anxiety and stress in people. Having accurate information can reduce their anxiety.

With the rapid spread of COVID-19 from China to the whole world, countries started to take measures to prevent the spread of the disease. In this context, Turkey banned travel abroad and people returning abroad were being quarantined for 14 days. However, despite all the measures first case was detected in Turkey in Istanbul on 11 March 2020, and the number of cases started to increase.[47] The Turkish Minister of Health publishes daily update on TV, including number of tests performed and

confirmed patients. The government has imposed travel bans and lockdown of several cities.[48] Considering the country's advances in fighting the COVID-19, the normalization process had started in Turkey in the month of June as the government decided to ease restrictions related to COVID-19. Our study was conducted after the normalization process has started. Despite entering the normalization process, most of the pregnant women were found to be anxious about the pandemic in our study. These findings indicated more than 4 months had passed since the pandemic came to the country but, pregnant women did not have enough information about the disease.

Limitations

This study has a number of limitations. First is small sample size and single-center study design. Our participants were not representative of the Turkish population of pregnant women because data were collected only one city. Another limitation is related to the questionnaires used in this study. The instruments could be developed to evaluate both knowledge and anxiety levels more comprehensively.

Conclusion

These findings showed us that pregnant women have high anxiety levels related to the pandemic and that they have lack of information about COVID-19. Considering the negative effects of anxiety and stress on pregnancy and fetus, it may be important to provide psychological support to pregnant women during the pandemic period and to expand their knowledge about the disease.

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