Research Article/Özgün Araştırma

An investigation COVID-19 related knowledge, attitude, depression, anxiety, and stress levels of pregnant women

Gebelerin COVID-19’a yönelik bilgi durumları, tutumları ile depresyon, anksiyete ve stres düzeylerinin incelenmesi

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Abstract

Aim: The aim of the study was to examine pregnant women’s COVID-19-related knowledge and attitudes, and their levels of depression, anxiety, and stress.

Materials and Methods: This is a descriptive study. Data were collected online between May 28, 2020 and June 20, 2020 from 348 pregnant women using the Questionnaire Form and the Depression Stress and Anxiety Scale Turkish Short Form.

Results: The median age of pregnant women was 26 (18-43) years. The median COVID-19 knowledge score of pregnant women was 84 (52-96). In the study, 83.9% of the pregnant women worried that “COVID-19 infection would transmit to their baby”. While 19% of the pregnant women have “depression” 29.6% of the pregnant women have “anxiety” and 19.8% of the pregnant women have “stress”.

Conclusion: COVID-19-related knowledge level of pregnant women was “good”. The frequency of depression, anxiety, and stress of pregnant women during the pandemic period was similar to pre-pandemic data.

Keywords: Attitude; COVID-19; Depression; Knowledge; Nurse; Pregnancy.

Öz

Amaç: Çalışmanın amacı, gebe kadınların COVID-19 ile ilgili bilgi ve tutumları ile depresyon, anksiyete ve stres düzeylerini inclemektir.

Gereç ve Yöntem: Tanımlayıcı bir çalışmadır. Veriler 28 Mayıs 2020 ile 20 Haziran 2020 tarihleri arasında 348 gebeden Anket Formu ile Depresyon Stres ve Anksiyete Ölçüğü Türkçe Kısa Formu kullanılarak çevrimiçi toplanmıştır.

Bulgular: Gebe kadınların ortanca yaşısı 26 (18-43)'idir. Gebe kadınların COVID-19 bilgi puanı ortanca 84 (52-96)'idir. Çalışmada gebe kadınların %83,9'unda “COVID-19 enfeksiyonunun bebeğine geçeceğinden” endişelenirken, gebe kadınların %19'unda “depressyon”, %29,6'sında “anksiyete” ve %19,8'inde "stres" varlığı saptanmıştır.

Sonuç: Gebeerinlerin COVID-19 ile ilgili bilgi düzeyi “iyi” idi. Pandemi döneminde gebe kadınların depresyon, anksiyete ve stres sıklığı, pandemi öncesi verilerle benzerdi.

Anahtar Kelimeler: Tutum; COVID-19; Depresyon; Bilgi; Hemşire; Gebelik.
Introduction

Coronavirus disease 2019 (COVID-19), which first appeared in Wuhan, China in mid-December 2019, has spread in around 170 countries, affecting the whole world in a very short time, like 4 months. In Turkey, the first case was seen on March 10, the first death was seen on March 17, the number of the total cases was over 1.5 million, and the total number of deaths was close to 16000, based on the most recent reports. While the number of cases in the world exceeds 65 million according to current data, the reported number of deaths related to COVID-19 is more than one million. In addition, COVID-19 negatively affects the lives of the individuals all over the world, from the economy to psychology. 

Pregnancy, which is one of the most special periods of the woman's life, is considered as a period in which the disease and health get closer to each other due to physical, physiological, social, and psychological changes in the female body. According to the latest data, there is insufficient information on whether pregnancy increases the rate of COVID-19 infection. However, due to the physiological changes, pregnancy is considered a risky period as it may increase the rate of infection. In addition, infections during pregnancy may cause negative effects on the mother and the fetus. Due to infections, complications such as maternal deaths, abortion, and intrauterine fetal death may occur often. For this reason, it is very important to protect pregnant women from COVID-19 infection as well as all kinds of infections.

Expectant mothers are usually in a period of vital crisis in which the changes in biopsychosocial balance, changes in roles in the family and the workplace, and parenting relationship between mother and baby are established, and the global COVID-19 pandemic risk during pregnancy has been an additional burden. During this period, fears experienced by expectant mothers about pregnancy and childbirth and physical, psychosocial, and neuroendocrine changes may cause anxiety, depression, and stress. In the literature, both antenatal and postnatal depression have been reported as 7%-20%, antenatal anxiety as 16%, and perceived stress as 84%.

Anxiety, stress, and depression developing during pregnancy have negative health consequences for both the mother and the fetus. Depression, anxiety, and stress during pregnancy may cause low birth weight, preterm birth, placental abruption, suicide, postpartum depression, and behavioral disorders. Therefore, coping with psychological problems during pregnancy is important for obstetricians, women health nurses, and midwives, especially during the COVID-19 pandemic period because excessive stress and emergency situations (disasters such as war, floods, and pandemics) can increase the risk of perinatal mental health morbidity. Therefore, pregnant women are likely to experience mental health problems during the COVID-19 pandemic, and it should be noted that pregnant women may be adversely affected in the pandemic period more than the others. Social distance restrictions place a strain on individuals, families, communities, and countries during the pandemic period. Many aspects of daily life are affected, resulting in stress, anxiety, and depression. In this period, prospective mothers cannot be socially active due to infection risk, and they cannot get out of their homes too much. In addition, the mothers who have concomitant pregnancy with the pandemic period, they will be stressed in the postpartum period because in mothers who are COVID-19 positive, isolation from the baby and limiting breastfeeding to prevent contamination to the newborn may pose a risk in terms of depression, anxiety, and stress in the postpartum period. In recent studies, depression, anxiety, and stress levels of pregnant women have been reported to be increased during the pandemic. The lack of knowledge about the short- and long-term psychological health of the mother and the baby in the postnatal period following the prenatal care experiences during the COVID-19 pandemic period is a serious gap in the literature. Such studies are important to prevent negative mental health consequences of the pandemic and to plan appropriate
treatment and care for psychological disorders.

COVID-19 infection is a recent global pandemic. There are limited studies in the literature evaluating women’s knowledge of and attitudes towards COVID-19 and psychological diseases during pregnancy. The aim of the study was to examine pregnant women’s COVID-19-related knowledge and attitudes, and their levels of depression, anxiety, and stress.

**Research questions**

1. What is the COVID-19-related knowledge level of pregnant women?
2. What is the attitude of pregnant women towards COVID-19?
3. What are the pregnant women’s levels of depression, anxiety, and stress during the pandemic period?
4. Is there a relationship between pregnant women’s COVID-19-related knowledge level and their depression, stress, and anxiety levels?
5. Is there a relationship between pregnant women’s attitude towards COVID-19 and their depression, stress, and anxiety levels?

**Materials and Methods**

**Type of research**

This is a descriptive study.

**The population and the sample of the study**

The sample size of the study was calculated using the G*Power program as 327 pregnant women with 0.20 (medium) effect size, 95% statistical power, and 0.05 α error probability level. Data collection was completed with 348 pregnant women. The researcher reached out to pregnant women through her social media accounts, with a messaging app, colleagues, family, and relatives, and sent the link of the online questionnaire survey and scales via phone or social media accounts. They were also asked to forward the online link to other pregnant women from their social circles. Inclusion criteria of the study were literate pregnant women, with no chronic disease, who were accessible (no mental disability, no visual/hearing impairment) and healthy from all trimesters comprised the study group.

**Data collection tools**

Data were collected between May 28, 2020 and June 20, 2020 from pregnant women. The data were collected via an online survey, whose link was sent to the pregnant women via a text message. They were asked to click the link (https://docs.google.com/forms/d/1ctAB_2L1tjAgN9CVgqPiCzF0VRxeGIEPL5ICLGhwOik/edit?gxids=7628), open the online survey, answer all questions, and record the answers with the submit button. It was explained to the pregnant women that the data in the online survey will be collected anonymously, and that after clicking the "accept to participate in the study" button, they can proceed to answer the questions. A missing answers reminder was added to ensure the integrity of the data, and incomplete questionnaires were not submitted to the system. The answers from the pregnant women have accumulated in the e-mail address of the researcher with no mark identifying the participant. The data were collected using the "Online survey" and the Depression Stress and Anxiety Scale (DASS 21) Turkish Short Form. Fill out time of the online questionnaire is 15-20 minutes.

**Online survey**

The online survey consists of three parts. In the first part of the survey, there are 13 items evaluating the socio-demographic and obstetric characteristics of the pregnant women (age, education level, gestational week, etc.). In the second part of the survey, there are 25 statements assessing the COVID-19-related knowledge status of the pregnant women, for example: “The most common symptoms of COVID-19 infection are fever, cough, and difficulty breathing.”, “It is sufficient to be half a meter apart from infected people.” These statements were prepared in accordance with the World Health Organization and Republic of Turkey Ministry of Health COVID-19 guidelines." The pregnant women were asked to mark the "True" or "False" box for each of these statements. For each correct answer, 4 points
were assigned, and for each wrong answer, 0 point was assigned, and the possible highest knowledge score was calculated 100 for 25 items. The third part of the survey consists of a total of 21 statements measuring the attitudes of the pregnant women towards COVID-19. For example, "I believe that I can be protected from COVID-19 infection if I stay home during my pregnancy and pay attention to social distance.", "I am afraid to go to doctor controls during pregnancy due to COVID-19 infection outbreak." Pregnant women were asked to tick one of the boxes for these statements: "I agree", "I am indecisive", and "I disagree". All parts of the survey were prepared by the researcher.

Depression stress and anxiety scale (DASS 21) Turkish short form

The 42-item long form of the scale was developed by Lovibond and Lovibond in 1995, and adapted into Turkish by Akin and Cetin in 2007. Validity and reliability study of the short form of the scale was performed in 2017 by Yilmaz et al. Each subscale of the short form, anxiety (items 1-7), depression (items 8-14), and stress (items 15-21), consists of 7 items. The short form is a 4-point Likert type scale: 0=Did not apply to me at all, 1=Applied to me to some degree, or some of the time2=Applied to me to a considerable degree or a good part of time, 3=Applied to me very much or most of the time. The scale does not contain any reverse items. High scores obtained from each subscale indicate that the individual has the relevant problem. The minimum score that can be obtained from each sub-dimension of the short form of the scale is 0, the maximum score is 21. Also, for the depression sub-dimension: 0-4 points indicate “normal”, 5-6 points “mild”, 7-10 points “moderate”, 11-13 points “severe,” and 14 and above indicate “extremely severe” level of depression. For anxiety subscale, 0-3 points indicate “normal”, 4-5 points “mild”, 6-7 points “moderate”, 8-9 points “severe,” and 10 or more points indicate “extremely severe” level of anxiety. For the stress sub-scale, 0-7 points indicate “normal”, 8-9 points “mild”, 10-12 points “moderate”, 13-16 points “severe,” and 17 points and more indicate “extremely severe” level of stress. According to the results of the analysis, it is seen that the factor loads of the scale varies between .41 and .81. The reliability coefficients of the scale data are between .75 and .82. In this study, Cronbach alpha coefficients of depression, anxiety, and stress dimensions were calculated as 0.88, 0.77, and 0.88, respectively.

Data analysis

To analyze the data, Statistical Package for the Social Sciences for Windows, version 20.0 (SPSS) was used. The normality of the study was tested by the Kolmogorov Simirnov test and nonparametric tests were performed because the significance value was p<0.05. Descriptive statistics (number, percentage, median, minimum and maximum values) were used to analyze the data. The association between independent variables (socio-demographic characteristics of the pregnant women, obstetric characteristics of the pregnant women, COVID-19-related knowledge status of the pregnant women, and the attitudes of the pregnant women towards COVID-19) and their depression, anxiety, and stress scores were analyzed using the bivariate tests, such as Spearman correlation analysis and Mann Whitney U test. In bivariate analyses, variables that were significant with depression, anxiety and stress were included in the Linear and Multivariate regression analysis. In the study, two-tailed tests were used, and significance was accepted as p<0.05.

Ethical aspect of the research

The research has been prepared in accordance with the Declaration of Helsinki Principles. Ethics committee approval was obtained from the Faculty of Health Sciences Ethics Committee of the relevant university (Date: 27.05.2020 and Number: 2020/599). In addition, the pregnant women were sent an "Informed Consent Form" by a text message before the online form and they were asked to click the "accept" button if they volunteered to be included in the study.

Results

Description of the sample
In the study, the median age of the pregnant women was 26 (18-43) years and the median of the gestational week was 35 (5-41). The education level of 54% of the pregnant women was high school and above, 91.1% of them wanted the last pregnancy, and 82.5% of them received at least 4 or more prenatal care (Table 1).

Table 1. Socio-demographic and obstetric characteristics of the sample (n=348).

|                                | Median (Minimum-Maximum) |
|--------------------------------|--------------------------|
| Age                            | 26 (18-43)               |
| Partner's/husband's age        | 29 (20-54)               |
| Gestational week               | 35 (5-41)                |
|                                | % (n)                    |
| Education status               |                          |
| Literate/primary school        | 46 (160)                 |
| High school and above          | 54 (188)                 |
| Location where resided longest |                          |
| City                           | 69.3 (241)               |
| District/village               | 30.7 (107)               |
| Family type                    |                          |
| Nuclear family                 | 72.1 (251)               |
| Extended family                | 27.9 (97)                |
| Employment status              |                          |
| Yes                            | 42 (12.1)                |
| No                             | 87.9 (306)               |
| Spouse’s employment status?    |                          |
| Yes                            | 297 (85.3)               |
| No                             | 51 (14.7)                |
| Perceived income               |                          |
| Poor                           | 114 (32.8)               |
| Moderate                       | 195 (56)                 |
| Good                           | 39 (11.2)                |
| Wanted pregnancy               |                          |
| Yes                            | 91.1 (317)               |
| No                             | 8.9 (31)                 |
| Receiving regular prenatal care (4 and over) |     |
| Yes                            | 82.5 (287)               |
| No                             | 17.5 (61)                |

COVID-19-related knowledge status of the pregnant women

In the study, 7 out of 10 pregnant women agreed with the statement that "If you have complaints such as fever, cough, and difficulty breathing, you should go to a health facility immediately" and 3 out of 10 pregnant women ticked the "correct" box for the expression "Washing the throat or nasal mucosa with liquids such as garlic water, alcohol, salt water, or antiseptic mouthwashes is protective against COVID-19" (Table 2). The median COVID-19 knowledge score of the pregnant women was 84 (52-96).

The attitudes of the pregnant women towards COVID-19

In the study, 83.9% of the pregnant women worried that “COVID-19 infection would transmit to their baby", and 56.3% of them were "afraid to go for antenatal follow-up during pregnancy due to the COVID-19 pandemic." It was found that 6 out of every 10 pregnant women replied "I agree" to the statement "I could not go to antenatal monitoring due to COVID-19 and I could not have my tests done during pregnancy (such as double, triple screening tests)". Furthermore, 81.3% of the pregnant women believed that the pandemic will end if the COVID-19 infection pandemic is fought well (Table 3).
Table 2. Distribution of responses of the pregnant women to “True/False” statements about COVID-19 (n=348).

| Items                                                                 | True | False |
|-----------------------------------------------------------------------|------|-------|
| K1. COVID-19 is transmitted by the droplets produced by infected individuals through coughing and sneezing, and the other people’s contact with their hands to these droplets, and taking their hands to their mouth, nose, or eyes (T). | 340  | 8     |
| K2. The average time for symptoms to appear after a person is infected with the coronavirus causing COVID-19 is 14 days (T). | 334  | 14    |
| K3. The most common symptoms of COVID-19 infection are fever, cough, and difficulty breathing (T). | 345  | 3     |
| K4. It is sufficient to keep half a meter distance with the infected people (F). | 56   | 292   |
| K5. We should keep a distance of at least 1.5-2 meters from other people (T). | 339  | 9     |
| K6. After contact with infected people/environment, it is sufficient to clean our hands with a wet wipe (F). | 29   | 319   |
| K7. Hands should be washed with soap and water for at least 20 seconds after contact with infected people/environment (T). | 343  | 5     |
| K8. There is no need to wear a mask when going out (F). | 6    | 342   |
| K9. Touching the eyes, mouth, and nose outside with hands should be avoided (T). | 343  | 5     |
| K10. Avoid crowded places (T). | 342  | 6     |
| K11. If you have complaints such as fever, cough, and difficulty breathing, you should go to a health facility immediately (F). | 248  | 100   |
| K12. If you have complaints such as fever, cough, difficulty breathing, ALO 184 should be called before going to a health facility (T). | 272  | 76    |
| K13. A Three-layer surgical mask should be worn when going out (T). | 273  | 75    |
| K14. Covering our mouth with a cloth like scarf, shawl, or neckwear when going out protects us from COVID-19 (F). | 68   | 280   |
| K15. Washing the throat or nasal mucosa with liquids such as garlic water, alcohol, salt water, or antiseptic mouthwashes is protective against COVID-19 (F). | 101  | 247   |
| K16. Good nutrition, good sleep, and good rest, avoiding cigarettes and tobacco products, and excessive alcohol strengthens your immune system, protecting you against COVID-19 (T). | 324  | 24    |
| K17. Taking a shower with very hot water kills the coronavirus on my body (F). | 59   | 289   |
| K18. Cleaning the entire body with alcohol or chlorine kills the coronavirus (F). | 44   | 304   |
| K19. Coronavirus is transmitted only to individuals over 65 years of age (F). | 22   | 326   |
| K20. Live cells are absolutely necessary for viruses to survive. The possibility of contamination with various products received via cargo is very weak, even impossible (T). | 110  | 238   |
| K21. COVID-19 can live on plastic, steel, and cardboard for a short time, and keeping products that come with grocery shopping for 1-2 hours outside home is enough to eliminate the possibility of contamination (T). | 193  | 155   |
| K22. The idea that the mask protects me completely is wrong. The best method of protection is to maximize social distance by staying at home (T). | 340  | 8     |
| K23. Being alarmed and experiencing unnecessary stress weakens your immune system (T). | 301  | 47    |
| K24. For protection against COVID-19, medication and food supplements should never be taken without consulting a doctor (T). | 326  | 22    |
| K25. There is no evidence showing that pets and stray animals transmit the coronavirus (T). | 256  | 92    |

*Report line for COVID-19 suspect diagnosis, K = Knowledge. T = True item, F = False item.
Table 3. Distribution of responses of pregnant women to attitude expressions towards COVID-19 (n=348).

| Items                                                                 | Agree | Not sure/Not agree |
|-----------------------------------------------------------------------|-------|--------------------|
| A1. I have no fear of COVID-19 disease.                                | 63    | 18.1               | 285 | 81.9 |
| A2. I am very afraid to get infected with COVID-19.                    | 199   | 57.2               | 149 | 42.8 |
| A3. I am worried about whether COVID-19 infection gets to my baby.     | 292   | 83.9               | 56  | 16.1 |
| A4. I am not interested in COVID-19 infection at all.                  | 30    | 8.6                | 318 | 91.4 |
| A5. I feel unlucky as my pregnancy coincides with the COVID-19 pandemic.| 201   | 57.8               | 147 | 42.2 |
| A6. I think that COVID-19 pandemic will negatively affect my pregnancy physically and psychologically. | 151   | 43.4               | 197 | 56.6 |
| A7. I believe that if I stay home during my pregnancy and pay attention to social distance, I can be protected from COVID-19. | 289   | 83                 | 59  | 17   |
| A8. I think I will get mad if someone comes home during my pregnancy or if my husband asks me to go out with him. | 128   | 36.8               | 220 | 63.2 |
| A9. I am not at risk of COVID-19 infection because I am young and I find it unnecessary to be protected from COVID-19. | 19    | 5.5                | 329 | 94.5 |
| A10. I am afraid to go to antenatal follow-up during pregnancy due to COVID-19 pandemic. | 96    | 56.3               | 152 | 43.7 |
| A11. I could not go to antenatal follow-up due to COVID-19 and I could not have my tests (such as double, triple screening test) done during pregnancy. | 213   | 61.2               | 135 | 38.8 |
| A12. I feel tired of staying home because of the COVID-19 pandemic.    | 117   | 33.6               | 231 | 66.4 |
| A13. I consider the global COVID-19 pandemic as a punishment from God. | 251   | 72.1               | 97  | 27.9 |
| A14. I consider the COVID-19 pandemic as a warning from God.           | 82    | 23.6               | 266 | 76.4 |
| A15. I feel helpless in the face of COVID-19 infection.                | 87    | 25                 | 261 | 75   |
| A16. I think that no one can avoid COVID-19 infection and that everyone will definitely get this infection. | 235   | 67.5               | 113 | 32.5 |
| A17. I am concerned that the COVID-19 pandemic will continue in the postpartum period. | 61    | 17.5               | 287 | 82.5 |
| A18. I think that the COVID-19 pandemic will never end.                | 281   | 80.7               | 67  | 19.3 |
| A19. I believe the pandemic will end if it is fought well.             | 283   | 81.3               | 65  | 18.7 |
| A20. I believe that good days will come after COVID-19 pandemic.       | 286   | 82.2               | 62  | 17.8 |
| A21. I hope that COVID-19 pandemic will end soon.                      | 93    | 26.7               | 255 | 73.3 |

A = Attitude.

Comparison of socio-demographic and obstetric features of the pregnant women and their COVID-19 knowledge score, and their response to some attitude expressions with depression, anxiety, and stress levels

The median of depression, anxiety, and stress scores of the pregnant women were 1 (0-21), 2 (0-19) and 2 (0-21), respectively. While 81% of the pregnant women did not have "depression" according to DASS-21, 5.2% had "mild", 8.3% "moderate", and 5.5% "severe-extremely severe" depression. While 70.4% of the pregnant women were not found to have "anxiety" according to DASS-21, their "anxiety" level was detected as 7.8% "mild", 13.2% "moderate," and 8.6% "severely extremely severe". While 80.2% of the pregnant women did not show "stress" according to DASS-21, "stress" was found in 5.2% as "mild", 4.6% as "moderate," and 10.1% as "severely extremely severe".

In terms of the socio-demographic characteristics of the pregnant women, there was a statistically significant difference only between the family type variable and anxiety ($p=0.022$) and stress ($p=0.003$) levels. No statistically significant difference was found between other socio-demographic and obstetric features and depression, anxiety, and stress median scores ($p>0.05$). No statistically significant relationship was found between the COVID-19 knowledge scores and the mean scores of depression ($p=0.848$), anxiety ($p=0.188$), and stress ($p=0.747$). When the attitudes of pregnant women towards COVID-19 and depression, anxiety, and stress levels were compared, there is a statistically significant difference between the attitude 3 and the median of depression ($p=0.032$) and stress ($p=0.017$). Similarly, there is a statistically significant difference between the attitude 4 and the median of depression.
COVID-19, Depression, Anxiety, Stress and Pregnant Women.

Table 4. Comparison of the pregnant women’s socio-demographic and obstetric characteristics, COVID-19 knowledge scores, and their responses to some attitude expressions with depression, anxiety, and stress levels (n=348).

| Variables                          | Depression* | Anxiety* | Stress* |
|-----------------------------------|-------------|----------|---------|
|                                   | Median (Min-max) | Analysis | Median (Min-max) | Analysis | Median (Min-max) | Analysis |
| Age                               | -0.028 (0.603) | r= -0.024 | -0.056 (0.296) | r= 0.001 | -0.041 (0.111) | p=0.017 |
| Partner’s/husband’s age            | -0.015 (0.0778) | r= -0.030 | -0.50 (0.349) | r= 0.001 | -0.057 (0.573) | p=0.001 |
| Gestational week                   | 0.091 (0.092) | r= 0.024 | 0.070 (0.192) | r= 0.017 | 0.066 (0.662) | p=0.001 |
| COVID-19 knowledge scores          | -0.010 (0.848) | r= -0.017 | -0.071 (0.188) | r= 0.017 | -0.074 (0.747) | p=0.001 |
| Education status                   |             |          |         |         |             |         |
| Literate/primary school            | 1 (0-20) | z= -0.168 | 2 (0-16) | z= -0.613 | 3 (0-21) | z= -0.938 |
| High school and above              | 1 (0-21) | p= 0.867 | 1 (0-19) | p= 0.540 | 2 (0-21) | p= 0.348 |
| Location where resided longest     |             |          |         |         |             |         |
| City                               | 1 (0-21) | z= -0.134 | 2 (0-19) | z= -0.041 | 2 (0-21) | z= -0.077 |
| District/village                   | 1 (0-20) | p= 0.893 | 1 (0-19) | p= 0.241 | 1 (0-21) | p= 0.938 |
| Family type                        |             |          |         |         |             |         |
| Nuclear family                     | 1 (0-21) | z= -1.949 | 1 (0-19) | z= -2.293 | 2 (0-21) | z= -2.979 |
| Extended family                    | 2 (0-14) | p= 0.051 | 2 (0-15) | p= 0.022 | 4 (0-21) | p= 0.003 |
| Employment status                  |             |          |         |         |             |         |
| Yes                                | 1 (0-10) | z= -0.810 | 1 (0-10) | z= -1.183 | 3 (0-18) | z= -0.183 |
| No                                 | 1 (0-21) | p= 0.418 | 2 (0-19) | p= 0.237 | 2 (0-21) | p= 0.855 |
| Husband’s employment status?       |             |          |         |         |             |         |
| Yes                                | 1 (0-21) | z= -0.076 | 1 (0-19) | z= -1.355 | 3 (0-21) | z= -0.197 |
| No                                 | 1 (0-20) | p= 0.940 | 2 (0-16) | p= 0.175 | 2 (0-21) | p= 0.844 |
| Perceived income                   |             |          |         |         |             |         |
| Poor                               | 1 (0-20) | KW= 1.893 | 2 (0-16) | KW= 3.451 | 2 (0-17) | KW= 1.120 |
| Moderate                           | 1 (0-21) | p= 0.388 | 2 (0-19) | p= 0.178 | 3 (0-21) | p= 0.571 |
| Good                               | 1 (0-7)  | 2 (0-17) | 2 (0-15) |             |         |         |
| Willing pregnancy                  |             |          |         |         |             |         |
| Yes                                | 1 (0-21) | z= -0.070 | 2 (0-19) | z= -0.101 | 2 (0-21) | z= -0.092 |
| No                                 | 1 (0-8)  | p= 0.944 | 2 (0-9)  | p= 0.919 | 3 (0-16) | p= 0.927 |
Table 5. Analysis of some socio-demographic and attitude expressions related to depression, anxiety and stress levels according to the regression analysis.

| Depression | Predictors          | B    | Std. Error | Beta | t    | p    | 95% Confidence Interval for B |
|------------|---------------------|------|------------|------|------|------|-------------------------------|
|            | (Constant)          | 4.222| 0.795      | 5.314| < 0.001 | 2.659 | 5.785 |
|            | Attitude #3 (agree) | -1.140| 0.573      | -0.108| -1.989 | 0.047 | -2.268 | -0.013 |
|            | Attitude #4 (not agree) | 0.743| 0.751      | 0.054| 0.990 | 0.323 | -2.219 | 0.733 |
|            | R²=0.016 | Adjusted R²=0.011 |
| Anxiety   | (Constant)          | 2.538| 0.204      | 12.428| < 0.001 | 2.136 | 2.939 |
|           | Family type (extended) | 0.565| 0.387      | 0.078| 1.461 | 0.145 | -0.195 | 1.326 |
| R²=0.006 | Adjusted R²=0.003 |
| Stress    | (Constant)          | 7.055| 0.997      | 7.078| < 0.001 | 5.094 | 9.015 |
|           | Family type (extended) | 1.397| 0.565      | 0.130| -1.844 | 0.066 | -2.656 | 0.086 |
|           | Attitude #3 (agree) | -1.285| 0.697      | -0.098| -2.654 | 0.008 | -4.218 | -0.627 |
|           | Attitude #4 (not agree) | -2.423| 0.913      | -0.141| 2.475 | 0.014 | 0.287 | 2.508 |
| R²=0.238 | Adjusted R²=0.056 | Adjusted R²=0.048 |

*Multivariate regression analysis.  
*Linear regression analysis.
Discussion

Discussion of COVID-19-related knowledge status of the pregnant women

The knowledge of the community on COVID-19, which is a very recent pandemic for the whole world, is limited to the information provided by the healthcare professionals through the media and the news circulating on the social media. Every day, new information about symptoms, treatment and care periods of COVID-19 appear in the literature, but research is still limited. In the literature, there is no study that examines the COVID-19-related knowledge status of pregnant women in detail. In just one study, pregnant women were asked, "How many points between 1 and 10 do you give to your COVID-19-related knowledge status?" Therefore, this study is considered to make an important contribution to the COVID-19 literature. In this study, COVID-19 knowledge score (median=84) of the pregnant women was found to be “good”. The accuracy rate of the answers given by the pregnant women to the information form containing true-false information about COVID-19 was found high (Table 2). According to the present study results, in Turkey, the dissemination of informative content by the Republic of Turkey Ministry of Health and health professionals through the media appears to be at a very good level. However, 71% of the pregnant women think that “in case of any complaints, one should directly go to a health institution”, which may lead to unnecessary accumulation of pregnant women in health institutions and an increased risk of getting COVID-19 infection. In antenatal follow-ups, physicians, nurses, and midwives should explain that when pregnant women have a symptom, they should first call ALO 184, the line exclusive for the diagnosis of COVID-19 suspect. In the study, one fifth of the pregnant women think that "wrapping a piece of cloth like scarf, shawl, and neckwear around the mouth protects from COVID-19”. In this sense, health professionals should always remind pregnant women about the use of masks before going out. One third of the pregnant women believe that the use of liquids such as garlic water, alcohol, salt water, and various antiseptic mouthwashes in the oral cavity and on nasal mucosa is protective against COVID-19. It should also be explained to pregnant women that the best measure against COVID-19 is social distance, mask, and hand hygiene.

Discussion of the pregnant women 'attitudes towards COVID-19

In this study, a large majority of the pregnant women (83.9%) were concerned about “COVID-19 infection transmission to their baby” (Table 3). In a limited number of studies, no vertical transition from mother to fetus has been detected during pregnancy. For this reason, during antenatal follow-ups, nurses and midwives should inform the pregnant women and resolve their concerns because anxiety and stress in pregnant women have negative effects on maternal and fetal health.

Since more than half of the pregnant women in this study were afraid of getting COVID-19, they stated that “they could not go to antenatal follow-ups and did not perform the screening tests recommended during pregnancy”. The opinions of the experts in the COVID-19 pandemic period are that the antenatal appointment program should be developed according to the pandemic propagation stage. In the early stage of the pandemic, antenatal visits are recommended to be maintained as long as possible in the routine program for all women providing that the number of hospitals and staff allows. The frequency of routine antenatal monitoring recommended by the Republic of Turkey Ministry of Health at least once in the first 14 weeks, 2nd follow-up in weeks 18-24, 3rd follow-up in weeks 28-3, and 4th follow-up in weeks 36-38. The rate of pregnant women in Turkey receiving prenatal care from an expert/qualified person was reported to be 96%, pre-pandemic. According to the results of the present study, it was found that there was a significant decrease in the rate of pregnant women going to antenatal follow-ups due to the concerns of getting COVID-19 during the pandemic period. Healthcare professionals should inform the pregnant women about attending the antenatal follow-ups by making an
appointment and following the safety measures, such as wearing a mask and social distancing, and they should also explain the importance of having the screening tests recommended by the physician in appropriate gestational weeks to evaluate fetal health.

Discussion of the relationship of socio-demographic and obstetric features of pregnant women and their COVID-19 knowledge score and their responses to some attitude expressions with depression, anxiety, and stress levels

According to the DASS-21, the median of depression (median = 1), anxiety (median = 2), and stress (median = 2) of the pregnant women were found to be quite low, but in 19% of the women mild to severe levels of depression, in 29.6%, mild to severe levels of anxiety, and in 19.8%, mild to severe levels of stress were detected. This study results were in line with the results from the pre-pandemic literature regarding the frequencies of depression,9,39,40 anxiety,10,40-42 and stress41 in pregnancy. COVID-19 pandemic, which emerged suddenly for the whole world and changed the lifestyle of virtually everybody, also negatively affected the mental health of the people. Preliminary evidence estimates that symptoms of anxiety and depression (16%-28%), perceived stress (8%), and sleep disturbance are common psychological reactions to the COVID-19 pandemic.43 In a study conducted in Turkey, depression was seen in 35% of the women during the COVID-19 pandemic period.23 In another study, an increase in the frequency of depression and anxiety of the pregnant women was reported during the pandemic period compared to the pre-pandemic period.26 Pregnancy is a unique period that concerns the health status of both the mother and the fetus. For this reason, this group should not be neglected during the pandemic period. Their mental health conditions should be evaluated during antenatal follow-ups and concerns about COVID-19 should be eliminated.

In this study, the reason why there was no significant difference between the COVID-19 knowledge score and the depression, anxiety, and stress levels of the pregnant women, maybe the "good" knowledge scores of pregnant women. Durankus and Akus also reported that there was no significant relationship between COVID-19 knowledge and presence of depression in pregnant women.23 The two study findings were similar. In this study, there was a significant difference between depression and stress and attitudes #3 (I am concerned about whether COVID-19 infection is transmitted to my baby) and attitude #4 (I am not interested in COVID-19 infection at all) (Table 4). According to the regression analysis, attitude #3 was identified as a risk factor for the presence of depression and attitudes #3 and #4 for the presence of stress (Table 5). The question "Did the COVID-19 pandemic affect your psychology negatively?" was asked to a group of pregnant women in a previous study, and they were instructed to answer this question between 1 and 10, and a significant relationship was found between the effects of COVID-19 on psychology and the presence of depression in pregnant women.23 Anxiety and fears of pregnant women about COVID-19 may affect their mental health. In antenatal follow-ups, nurses and midwives should encourage pregnant women to express their concerns and fears about COVID-19 and evaluate their mental health status. In addition, new studies evaluating pregnant women’s COVID-19-related fear and anxiety during the pandemic period will also contribute to the literature of the field.

Strengths and limitations

This is the first and only study in Turkey evaluating pregnant women’s knowledge of and attitudes towards COVID-19 pandemic in detail. It will also make an important contribution to the COVID-19 literature in terms of examining the relationship between pregnant women’s knowledge of and attitudes towards COVID-19 and their levels of depression, anxiety, and stress. The study provided a unique opportunity to compare the prevalence of depression, anxiety, and stress in pregnant women during- and pre-pandemic period. Although the present study possesses much strength, the fact that hospitals and family health centers do not accept researchers from outside the institution
forced us to carry out an online study. Another limitation was that the evaluation of symptoms of depression, anxiety, and stress was based on a self-report measure.

Clinical implications

In this study, pregnant women’s COVID-19-related knowledge and attitudes were assessed with an online questionnaire, and the points on which they had insufficient information and false knowledge were revealed. In addition, attitude expressions directed to the pregnant women also provided an opportunity for them to express their feelings towards COVID-19. This study will guide healthcare professionals’ care practices for pregnant women. In this study, the evaluation of depression, stress, and anxiety levels of the pregnant women during the pandemic period will encourage health professionals to be aware of psychological changes in care practices for pregnant women during pandemic. Perinatal depression, anxiety, and stress screening can be recommended internationally in the pandemic period and should be one of the areas to be evaluated primarily during an international public health crisis. Under population-based social isolation and quarantine conditions, psychological helplines and online counseling can be a safe and feasible method to protect and manage perinatal mental illness.

Conclusion

This study examined the knowledge status, attitudes, and mental health of the pregnant women during the COVID-19 outbreak. According to the results of the study, COVID-19-related knowledge level of the pregnant women was “good”, but there was a lack of data about the use of masks. While most of the pregnant women were worried that COVID-19 infection might transmit to their baby, more than half of them did not go to antenatal follow-ups because they were afraid of COVID-19 infection. According to the literature, the frequency of depression, anxiety, and stress of the pregnant women during the pandemic period was similar to pre-pandemic data.

Ethics Committee Approval

The research has been prepared in accordance with the Declaration of Helsinki Principles. Ethics committee approval was obtained from the Faculty of Health Sciences Ethics Committee of the relevant university (Date: 27.05.2020 and Number: 2020/599). In addition, approval was obtained from the Republic of Turkey Ministry of Health for this research. The pregnant women were sent an "Informed Consent Form" by a text message before the online form and they were asked to click the "accept" button if they volunteered to be included in the study.

Informed Consent

It was explained to the pregnant women that the data on the online form would be collected anonymously and that after clicking the "accept to participate in the study" button, they could proceed to answer the questions. The pregnant women’s answers accumulated in the e-mail address of the researcher without the name and phone number of the participants.

Author Contributions

The idea of the research, data collection process, analysis and interpretation, literature review, article writing were made by H.A.D.

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Conflict of Interest

I declare that I have no conflicts of interest.

Financial Disclosure

I was given no financial support, fund or grants from other institutions.

Statements

I declare that the study has been sent to no other journals or instruments to be published. I read carefully the final version of the study and approved it to be sent to your journal.

Peer-review

Externally peer-reviewed.

References

1. Republic of Turkey Ministry of Health. COVID-19 Number of Cases in Turkey. 2020.
Alan Dikmen H.

https://COVID19bilgi.saglik.gov.tr/tr/gelis-vaka.html. Accessed June 30, 2020.

2. Worldometer. COVID-19 Coronavirus Pandemic. 2020. https://www.worldometers.info/coronavirus/. Accessed June 30, 2020.

3. Ankaralı H, Ankaralı S, Erarslan N. COVID-19, SARS-CoV2, Infection: Current Epidemiological Analysis and Modeling of Disease. Anlat Med Cerr 2020;25(1):1-22.

4. Duan L, Zhang G. Psychological interventions for people affected by the COVID-19 epidemic. Lancet Psychiatry 2020;7:330-320.

5. Taskin L. Maternity and Women’s Health Nursing. Ankara: Akademisyen Kitabevi; 2020.

6. Topaloglu A, Thomson G, Downe S. COVID-19 and maternal mental health: Are we getting the balance right? MedSci. 2020; 1-7. 10.11101/2020.03.30.047969.

7. Turkish Perinatology Association. Turkish Perinatology Association Opinion on “New Coronavirus Infection 2019” (COVID-19) During Pregnancy, Delivery and Postpartum Period. 2020. http://www.perinatolog.org.tr/gebelik-dogum-ve-lohusalik-doneminde-yeni-koronavirus-enfeksiyonu-2019-COVID-19-hakkinda-turk-perinataloji-dernegi-gorusu. Accessed May 05, 2020.

8. Alipour Z, Lamyan M, Hajiadeh E, Vafaee MA. The association between antioxidant anxiety and fear of childbirth in nulliparous women: a prospective study. JINMR 2011;16: 169-173.

9. Gavín NI, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. Perinatal depression: a systematic review of prevalence and incidence. Obstet Gynecol 2005;106:1071-1083.

10. Robertson C, Hellström J, Cross M, Syldjö G. Anxiety in early pregnancy: prevalence and contributing factors. Arch Women Ment Hlt 2014;17: 221-228.

11. Woods SM, Melville IL, Guo Y, Fan MY, Gavín A. Psychosocial stress during pregnancy. Am J Obstet Gynecol 2010;202:1-7.

12. Dunkel Schetter C, Tanner L. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. Curr Opin Psychiatry 2012;25:141-48.

13. Sanchez SE, Puente GC, Atencio G, Quu C, Yanez D, Gelaye B, et al. Risk of spontaneous preterm birth in relation to maternal depressive, anxiety and stress symptoms. J Reprod Med 2013;58:25-33.

14. Szegda K, Markenson G, Bertone-Johnson ER, Chasan-Taber L. Depression during pregnancy: a risk factor for adverse neonatal outcomes? A critical review of the literature. J Matern-Fetal Neonat Med 2014;27:960-967.

15. de Paz NC, Sanchez SE, Huaman LE, Chang GD, Pacora PN, Garcia PJ, et al. Risk of placental abruption in relation to maternal depressive, anxiety and stress symptoms. J Affect Disord 2011;130:280-284.

16. Farias DR, Pinto TDJP, Teofilo MMA, Vilela AAF, dos Santos Vaz J, Nardi AE, et al. Prevalence of psychiatric disorders in the first trimester of pregnancy and factors associated with current suicide risk. Psychosom Res 2013;210:962-968.

17. Wisner KL, Sli DK, McShea MC, Rizzo DM, Zoretich RA, Hughes CL, et al. Onset timing, thoughts of self-harm, and diagnoses in postpartum women with screen-positive depression findings. JAMA Psychiatry 2013;70:490-498.

18. Staneva A, Bogossian F, Pritchard M, Wittkowski A. The effects of maternal depression, anxiety, and perceived stress during pregnancy on preterm birth: A systematic review. Women Birth 2015;28:179-193.

19. Thapa SB, Mainali A, Schwank SE, Acharya G. Maternal mental health during the time of the COVID-19 pandemic. Acta Obstet Gynecol Scand 2020;99:817-818.

20. Feduniv S, Modzelewski J, Kwatkiowski S, Kajdy A. Prevalence and impact of anxiety on mental health of pregnant women in the time of catastrophic events including COVID-19 pandemic—a rapid systematic review. 2020. https://www.crd.york.ac.uk/PROSPEROFILES/178944_PROTOCOL_20200408.pdf. Accessed June 10, 2020.

21. American College of Obstetricians and Gynecologists. Practice Advisory: Novel Coronavirus 2019 (COVID-19). 2020. https://www.acog.org/Practice-Guidance-and-Publications/Practice-Advisories/Practice-Advisory-Novel.
39. Ali NS, Azam IS, Ali BS, Tabbusum G, Moin SS. Frequency and associated factors for anxiety and depression in pregnant women: a hospital-based cross-sectional study. *Sci World J* 2012;1-9: 10.1100/2012/653096.

40. Effati-Daryani F, Mohammad-Alizadeh-Charandabi S, Mirghafourvand M, Taghizadeh M, Mohammadi A. Effect of lavender cream with or without foot-bath on anxiety, stress and depression in pregnancy: a randomized placebo-controlled trial. *J Caring Sci* 2015;4:63-73.

41. Orta OR, Gelaye B, Qiu C, Stoner L, Williams MA. Depression, anxiety and stress among pregnant migraineurs in a pacific-northwest cohort. *J Affect Disord* 2015;172:390-396.

42. Tunc S, Yenicesu O, Cakar E, Ozcan H, Pekcetin S, Danisman N. Anxiety and depression frequency and related factors during pregnancy. *JGON* 2012;9:1431-1435.

43. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. *Asian J Psychiatr* 2020;52:1-5.