

Determination of COVID-19 Knowledge-attitude-awareness Levels Among Pregnant Women in a Tertiary Care Hospital in Western Türkiye

Batı Türkiye’de Bir Üçüncü Basamak Sağlık Kurumunda Gebeler Arasında COVID-19 Bilgi-tutum-farkındalık Düzeylerinin Belirlenmesi

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Abstract

Objective: The effect of coronavirus disease-2019 (COVID-19) on pregnancy remains controversial. Currently, literature investigating levels of knowledge, behavior, and attitudes regarding COVID-19 among pregnant women is scarce. This study aims to determine the knowledge, attitudes, and awareness levels of pregnant women followed up at the obstetrics and gynecology clinic of a tertiary care hospital in Western Türkiye.

Methods: Pregnant women admitted to a tertiary care hospital in İzmir, a metropolitan city in Türkiye, between May 1 and June 30, 2020, were enrolled in the study. The researchers used a questionnaire to measure COVID-19 knowledge, attitudes, and awareness levels. Anxiety level was evaluated using the generalized anxiety disorder-7 scale. All analyses were performed using SPSS v.25 (IBM Corp., Armonk, NY) at a significance level of 0.05.

Results: The median COVID-19 knowledge score of the study group was 13.00 (12.00-15.00). Negative correlations were detected between the COVID-19 knowledge score and the number of pregnancies, live births, and children. Conversely, the knowledge score increased with higher education levels among pregnant women and their partners. Similarly, higher family income levels were associated with higher knowledge scores. Severe anxiety was detected in 109 (26.2%) pregnant women.

Conclusion: Pregnant women in the study had substantial COVID-19 knowledge levels. Knowledge level was positively correlated with positive behaviors, post-pandemic attitudes, higher education levels, and higher soci-economic status.

Keywords: Pregnancy, COVID-19, knowledge, anxiety

Öz

Amaç: Koronavirüs hastalığı-2019 (COVID-19)’un gebelik üzerindeki etkisi tartışmalıdır. Literatürde gebelerde bilgi, davranış ve tutum düzeylerini araştıran çok fazla çalışma bulunmamaktadır. Bu çalışmanın amacı, Türkiye’nin batısında bulunan bir üçüncü basamak hastanenin kadın hastalıkları ve doğum bölümünde izlenen gebelerin COVID-19 hakkında bilgi-tutum-farkındalık düzeylerini belirlemektir.



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Öz

Yöntem: 1 Mayıs-30 Haziran 2020 tarihleri arasında üçüncü basamak bir hastaneye başvuran gebeler çalışmaya alındı. Araştırmacılar tarafından hazırlanan bir anket, COVID-19 bilgi, tutum ve farkındalık düzeylerini ölçmek için kullanılmıştır. Anksiyete, yaygın anksiyete bozukluğu-7 ölçeği ile değerlendirildi. İstatistiksel analizler SPSS v.25 (IBM Corp., Armonk, NY) paket programı kullanılarak yapıldı. Analizlerde p-değerinin <0,05 olması istatistiksel olarak anlamlı kabul edildi.

Bulgular: Çalışma grubunun COVID-19 hakkındaki medyan bilgi düzeyi puanı 13.00 (12.00-15.00) idi. COVID-19 bilgi düzeyi puanı ile gebelik sayısı, canlı doğum sayısı ve çocuk sayısı arasında negatif korelasyonlar tespit edildi. Gebelerin ve eşlerinin eğitim düzeyi yükseldikçe COVID-19 bilgi düzeyi puanı da yükseldi. Aile gelir düzeyi arttıkça COVID-19 bilgi düzeyi puanı da arttı. Gebelerin 109'unda (%26,2) şiddetli anksiyete saptandı.

Sonuç: Çalışma grubunu oluşturan gebelerin COVID-19 bilgi düzeyleri oldukça yüksek bulunmuştur. Bilgi düzeyi ile olumlu davranışlar, pandemi sonrası tutumlar, yüksek eğitim düzeyi ve yüksek sosyo-ekonomik düzey parametreleri arasında pozitif yönde bir ilişki olduğu görüldü.

Anahtar Kelimeler: Gebelik, COVID-19, bilgi, kaygı

Introduction

Coronaviruses (CoVs) are a large family of viruses that cause a variety of diseases, ranging from the common cold to more serious conditions such as middle east respiratory syndrome (MERS-CoV) and severe acute respiratory syndrome (SARS-CoV)⁽¹⁾. CoVs cause zoonotic infections; however, many CoVs detected in animals have not yet been transmitted to humans. The subtypes of coronavirus currently circulating in humans are HCoV-229E, HCoV-OC43, HCoV-NL63, and HKU1-CoV⁽²⁾.

On December 31, 2019, the World Health Organization (WHO) reported pneumonia cases of unknown etiology in Wuhan, China. Through sequence analysis of samples, a previously unknown novel coronavirus was discovered and named 2019-nCoV⁽³⁾. Soon after, this disease was defined as coronavirus disease-2019 (COVID-19) by the WHO⁽⁴⁾. Due to its structural similarity to SARS-CoV, the novel coronavirus was named SARS-CoV-2⁽⁵⁾. The first COVID-19 cases in Türkiye were reported on March 19, 2020⁽⁶⁾.

The spectrum of infection ranges widely from mild to critical; however, most symptomatic infections are not severe⁽⁷⁾. COVID-19 infection is characterized by a wide spectrum of clinical manifestations, ranging from completely asymptomatic cases to severe acute respiratory distress syndrome (ARDS). Approximately 5-10% of patients with COVID-19 develop severe ARDS⁽⁸⁾. Severe infection and increased mortality rates are associated with older age or underlying comorbidities such as cardiovascular diseases, diabetes mellitus, hypertension, chronic lung disease, and cancer⁽⁹⁾. Currently, no specific treatment for COVID-19 has been proven effective. Except for remdesivir, no antiviral drug has been fully approved, although many agents have been investigated *in vitro* and in some *in vivo* studies, showing promising results⁽¹⁰⁾.

It is known that physiological changes in the immune system during pregnancy can affect susceptibility to and the severity of infectious diseases⁽¹¹⁾. In SARS and MERS-CoV experiences, pregnant women were observed to be a high-risk group for complications of coronavirus infections⁽¹²⁾. However, data regarding the effect of COVID-19 on pregnancy remain limited⁽¹³⁻¹⁵⁾. Most pregnant patients exhibit mild or moderate symptoms similar to non-pregnant women, and morbidity and mortality rates comparable to the general population have been observed^(16,17).

This study aims to determine the levels of knowledge, attitudes, and awareness regarding COVID-19 among pregnant women attending the obstetrics and gynecology clinic of a tertiary care hospital in Western Türkiye.

Materials and Methods

This cross-sectional study was conducted between May 1 and June 30, 2020. The survey was conducted in the clinic of obstetrics and gynecology at a tertiary care hospital in Western Türkiye. The target population, consisting of pregnant women who sought pregnancy follow-up or were hospitalized in wards during the study period, was estimated to be 600 individuals. An a priori power analysis was conducted, and the minimum sample size was calculated to be 316, assuming a type 1 error of 1% (99% confidence) and a confidence interval of 5%. The final study group consisted of 416 pregnant women. A total of 21 pregnant women who declined to participate were excluded.

The questionnaire was administered by the researchers via face-to-face interviews. The first part of the questionnaire contained 13 questions regarding demographic characteristics, pregnancy, and birth history. In the second part, the question "Have you heard of the epidemic of the new coronavirus (COVID-19) disease?" was asked to assess

awareness. In the third, fourth, and fifth sections, knowledge levels regarding COVID-19 symptoms (5 questions, 3-point Likert scale), transmission pathways (4 questions, 3-point Likert scale), and treatment/prevention (9 questions, 2-point Likert scale, true/false) were evaluated. One point was awarded for each correct answer. The total COVID-19 knowledge score ranged from 0 to 18 points; higher scores indicated a higher level of knowledge.

In the sixth section, positive behaviors related to COVID-19 were evaluated using a 5-point Likert scale by asking about seven specific behaviors. The frequency of participants responding "I apply very well/well" was recorded, and correlations between this frequency and the COVID-19 knowledge score were analyzed. The seventh chapter examined participants' self-perception of the sufficiency of their knowledge and their sources of information about COVID-19.

In chapter eight, changes in attitudes following the onset of the pandemic were evaluated using 16 questions. The first 4 questions related to increased anxiety, while the other 5 related to self-restraint in social life. For these questions, the frequency of participants responding "I strongly agree/I agree" was presented, along with correlations to the knowledge score. Additionally, information regarding childcare and the stocking of materials after the start of the pandemic was presented as frequencies.

The anxiety levels of participants were evaluated using the generalized anxiety disorder-7 (GAD-7) scale⁽¹⁸⁾, which has been adapted to Turkish with proven validity and reliability⁽¹⁹⁾. Total scores were categorized as follows: 0 points indicated "no anxiety"; 1-4 points indicated "mild anxiety"; 5-9 points indicated "moderate anxiety"; and 10 points and above indicated "severe anxiety".

The study group was divided into three categories based on gestational age: 1st trimester (1-13 weeks), 2nd trimester (14-26 weeks), and 3rd trimester (27-40 weeks). Marital status was categorized as married, cohabiting, or single/divorced/separated. Professions were grouped into the categories: housewife, unemployed, blue collar, and white collar. Spousal profession was categorized similarly. Monthly family income was categorized based on multiples of the minimum wage: below the minimum wage, around the minimum wage, 2-3 times the minimum wage, and 4 times the minimum wage or above.

This study was approved by University of Health Sciences Türkiye, İzmir Tepecik Education and Research Hospital,

Local Ethics Committee (approval no: 2020/6-20, date: 13.05.2020). All procedures were performed in accordance with the ethical standards of the institutional and/or national research committee. All participants provided written informed consent. Confidentiality was maintained throughout the study.

Statistical Analysis

IBM SPSS® (Statistical Package for the Social Sciences) version 25.0 (IBM Corp., Armonk, NY) was used for statistical analyses. The Normal distribution was evaluated using Q-Q plots, histograms, skewness and kurtosis values, and the Shapiro-Wilk test. As the data did not conform to a normal distribution, non-parametric tests were used. Frequency values were presented as n (%), and average values as median (25th-75th percentile). Spearman correlation analysis was used to assess the relationships between variables. A p-value <0.05 was considered statistically significant.

Results

The median age of the 416 pregnant women in the study group was 28. Those in the third trimester of pregnancy accounted for 210 (50.5%) of the participants. Primigravida women (first pregnancy) constituted 108 (25.9%) of the group. The proportion of women with one live birth was 38.2% (n=159). The median (25-75%) values for the number of pregnancies, live births, and children were 2 (1-3), 1 (0-2), and 1 (0-2), respectively.

In our study, 338 (93.3%) of the pregnant women were married, and 205 (49.3%) were primary- or secondary-school graduates. A large majority (n=398, 95.7%) lived in urban areas. Among the spouses of participants, 218 (52.4%) were primary or secondary school graduates, and 291 (70.0%) were blue collar workers. It was reported that 29.8% (n=124) of pregnant women had monthly incomes below the minimum wage. Socio-demographic characteristics of the study group are presented in Table 1.

All participants were aware of the COVID-19 pandemic. The three least-known propositions about the pandemic were: "People with the disease certainly have a complaint/finding" (27.2% correct); "All COVID-19 patients have serious symptoms" (31.5% correct); and "In order not to get COVID-19, we must try to stay at least 10 meters away from other people" (4.4% correct). Conversely, the most commonly known propositions were: "Touching the eyes, nose or mouth with dirty hands is risky" (90.9%); "Hands should be cleaned frequently with water-soap or alcohol-based disinfectants"

Table 1. The distribution of the study group according to some socio-demographic characteristics		
Socio-demographic characteristics	Median (25-75%)	n (%)
Age group (year)	28.00 (24.00-33.00)	
Trimester		
1 st trimester		41 (9.9)
2 nd trimester		165 (39.7)
3 rd trimester		210 (50.5)
Number of pregnancy	2.00 (1.00-3.00)	
Number of live births	1.00 (0.00-2.00)	
Number of children	1.00 (0.00-2.00)	
Marital status		
Separate, single, divorced		5 (1.2)
Married		388 (93.3)
Lives with her partner		23 (5.5)
Educational level of the pregnant		
Illiterate		23 (5.5)
Primary or secondary school		205 (49.3)
High school		115 (27.6)
Higher education		73 (17.5)
Profession of the pregnant		
Housewife		313 (75.2)
Unemployed		12 (2.9)
Blue collar		46 (11.1)
White collar		45 (10.8)
Residential area		
Rural		18 (4.3)
Urban		398 (95.7)
Educational level of the husband/partner		
Illiterate		19 (4.6)
Primary or secondary school		218 (52.4)
High school		104 (25.0)
Higher education		75 (18.0)
Profession of the husband/partner		
Unemployed		42 (10.0)
Blue collar		291 (70.0)
White collar		83 (20.0)
Monthly family income		
Below the minimum wage		124 (29.8)
Around the minimum wage		205 (49.3)
Twice of the minimum wage		55 (13.2)
Three times the minimum wage		16 (3.8)
Four times the minimum wage and above		16 (3.8)

(91.1%); "When coughing/sneezing, mouth/nose should be covered with tissue or elbow" (91.1%); "One should try to stay at home except in compulsory situations" (91.1%); and "As far as possible, we should avoid touching the eyes, nose and mouth with our hands" (91.3%). Questions and affirmative answers are presented in Table 2.

The median COVID-19 knowledge score of the study group was 13⁽¹²⁻¹⁵⁾, with minimum and maximum values of 0 and 18, respectively. No correlation was found between the COVID-19 knowledge score and age ($r=0.064$; $p=0.195$). However, negative correlations were observed between the knowledge score and the numbers of pregnancies, live births, and children ($r=-0.152$, $p=0.002$; $r=-0.162$, $p=0.001$; and $r=-0.169$, $p=0.001$, respectively).

No relationship was found between the knowledge score and either marital status or residential area (rural/urban). However, the knowledge score increased with the education level of pregnant women and their partners ($r=0.415$, $p<0.001$; $r=0.284$, $p<0.001$, respectively). Similarly, scores were higher when pregnant women and their partners worked in white collar jobs. As the family income level increased, the COVID-19 knowledge score increased ($r=0.288$;

$p<0.001$). Correlations between knowledge scores and socio-demographic characteristics are presented in Table 3.

In the study, 77.4% ($n=322$) of participants reported their level of knowledge regarding the pandemic as sufficient. A positive correlation was found between the COVID-19 knowledge score and self-perceived knowledge sufficiency ($r=0.209$; $p<0.001$). Sources of information were television (93.8%), internet (54.1%), health workers (40.6%), social media (40.6%), mobile news applications (33.4%), and friends/relatives (31.3%).

The frequency of participants who reported performing the seven positive behaviors as "very well/well" ranged from 92.8% to 96.4%. Positive correlations were found between the application of each positive behavior rated "very well/well" and the COVID-19 knowledge score ($p<0.001$ for each). Frequency distributions for positive behaviors are presented in Table 4.

Regarding changes in attitudes, 53.0% of participants reported, "My concerns about my children increased. No correlation was found between anxiety regarding children and knowledge level ($p>0.05$). However, correlations were

Table. 2. Pregnant women's' knowledge regarding COVID-19

Questions	Affirmative answer, n (%)
The main symptoms of the disease are fever, weakness, dry cough and myalgia	362 (87)
Symptoms such as diarrhea, inability to taste and smell are not seen in this disease	179 (43)
Symptoms such as nasal congestion and runny nose are rarely seen	176 (42.3)
All COVID-19 patients have any complaint or finding	113 (27.2)
Most of COVID-19 patients have serious disease	131 (31.5)
It is transmitted by the inhalation of droplets of patients with coughing and sneezing	360 (86.5)
Virus can infect us, when we touch the contaminated places	370 (88.9)
Touching the eyes, nose or mouth with dirty hands is risky for the transmission of the disease	378 (90.9)
Although patients do not have a fever, they can infect other people	319 (76.7)
There is no effective cure for COVID-19 currently, but early symptomatic and supportive treatment may help patients to recover	340 (81.7)
An effective vaccine of the disease exists and is also applied in our country	219 (52.6)
To prevent the COVID-19 infection, people should avoid being in crowded places such as bazaars, buses, trains	372 (89.4)
No need to wear a mask in public places	333 (80)
Hands should be cleaned frequently with water-soap or alcohol-based disinfectants	378 (90.9)
As far as possible, we should avoid touching the eyes, nose and mouth with our hands	380 (91.3)
We must try to stay at least 10 meters away from other people	168 (40.4)
When coughing/sneezing, mouth/nose should be covered with tissue or elbow	379 (91.1)
It should be tried to stay at home except compulsory situations	379 (91.1)
COVID-19: Coronavirus disease-2019	

found between other concerns and knowledge level ($p<0.05$). A positive correlation was found between self-restraint in social life (reported at $>90\%$ frequency) and knowledge level ($p<0.05$). The proportion of respondents stating "I try to stay away from the healthcare professionals I know" was 80.7%; no correlation was found between this avoidance and the knowledge score.

Among the 293 (70.4%) pregnant women with children, 70 (23.9%) reported needing additional childcare support during the pandemic. Of those not needing support, care was provided by themselves (17.9%), by older family members (20.6%), or by professional caregivers or friends (1.8%).

The median anxiety score (GAD-7) was 6.00 (2.00-10.00). Anxiety was absent in 68 (16.3%) women. Mild, moderate, and severe anxiety were found in 107 (25.7%), 132 (31.7%), and 109 (26.2%) women, respectively. No correlation was found between the anxiety score and the COVID-19 knowledge score ($r=0.077$; $p=0.116$).

Discussion

There is currently no evidence that pregnancy acts as a risk factor for COVID-19⁽¹⁴⁾. Literature investigating the levels of knowledge, behavior, and attitudes among pregnant women is limited. Our study offers an opportunity to assess these parameters among pregnant women in Türkiye.

Table 3. Correlations between COVID-19 knowledge level score and some socio-demographic characteristics

Spearman correlation (r; p)	COVID-19 knowledge level score
Some socio-demographic characteristics	
Age group (year)	$r=0.064$; $p=0.195$
Number of pregnancy	$r=-0.152$; $p=0.002$
Number of live births	$r=-0.162$; $p=0.001$
Number of children	$r=-0.169$; $p=0.001$
Marital status	$r=-0.050$; $p=0.310$
Residential area (rural/urban)	$r=0.094$; $p=0.055$
Educational level of the pregnant	$r=0.415$; $p<0.001$
Educational level of the husband/partner	$r=0.284$; $p<0.001$
Profession of the pregnant (Housewife, unemployed, blue collar, white collar)	$r=0.143$; $p=0.003$
Profession of the husband/partner (Unemployed, blue collar, white collar)	$r=0.271$; $p<0.001$
Monthly family income	$r=0.288$; $p<0.001$

COVID-19: Coronavirus disease-2019

Table 4. Frequency distributions for positive behaviors and their correlations with COVID-19 knowledge level score

Positive behaviors	"Very good-good" practice, n (%)	Correlation with COVID-19 knowledge level score, (r; p)
I try to stay away from crowded places (bazaar, market, bus, metro...) to prevent disease	386 (92.8)	$r=0.349$; $p<0.001$
I definitely wear a mask in public places	397 (95.5)	$r=0.301$; $p<0.001$
I often clean my hands with water-soap or alcohol-based disinfectants	391 (96.4)	$r=0.238$; $p<0.001$
As far as possible, I avoid touching the eyes, nose and mouth with my hand	396 (95.2)	$r=0.191$; $p<0.001$
I try to stay at least 1 meter away from other people	398 (95.6)	$r=0.195$; $p<0.001$
I cover my mouth/nose with handkerchief or elbow while coughing/sneezing	401 (96.4)	$r=0.308$; $p<0.001$
I try to stay at home, except when it is necessary	396 (95.2)	$r=0.230$; $p<0.001$

COVID-19: Coronavirus disease-2019

Table 5. Frequencies for attitudes which developed after the onset of the pandemic and their correlations with COVID-19 knowledge level scores

Attitudes which developed after the onset of the pandemic	I strongly agree-I agree, n (%)	Correlations with COVID-19 knowledge level scores, (r; p)
Attitudes (about concerns)		
My concerns about my own health/Life have increased	360 (86.5)	r=0.263; p<0.001
I am worried about my unborn child	374 (89.9)	r=0.231; p<0.001
I am worried about my children	262 (53.0)	r=0.036; p=0.458
I have increased concerns about my elderly relatives (mom, dad... etc.)	374 (89.9)	r=0.290; p<0.001
Self-restraint in social life after the beginning pandemic		
I try to stay home as much as possible	397 (95.4)	r=0.283; p<0.001
I try not to use public transportation (bus, metro, etc.)	387 (93.0)	r=0.315; p<0.001
I try to stay away from social events such as visiting for relatives and friends	389 (93.5)	r=0.153; p=0.002
I try to stay away from all social activities	384 (92.3)	r=0.232; p<0.001
I try to stay away from the healthcare professionals who I know	336 (80.7)	r=0.045; p=0.363
COVID-19: Coronavirus disease-2019		

All participants were aware of the COVID-19 pandemic. The average knowledge score was 13 out of 18, indicating a knowledge level of over 70%. In a study by Nwafor et al.⁽¹³⁾ in Nigeria, the knowledge level regarding preventive measures was reported as good in 60.9% of pregnant women. Similarly, another study found that the majority of respondents had adequate knowledge about COVID-19 infection⁽²⁰⁾.

In our study, the level of knowledge decreased as the number of pregnancies, live births, and children increased. Although this could be affected by age, no correlation was found between age and knowledge level. Multiparity was also a factor reducing knowledge levels in the Nigerian study⁽¹³⁾. In Türkiye, multiparity is frequently observed in women with lower socio-economic status and lower education levels. This may be due to various cultural factors, as well as insufficient knowledge of, or access to, birth control methods.

Our results indicated that higher levels of COVID-19 knowledge were associated with higher education levels, white collar professions, and higher family income (Table 3), aligning with the results of the Nigerian study⁽¹³⁾.

Mass media were the primary sources, whereas the proportion obtaining information from healthcare workers was relatively low (40%). Another study similarly reported that most participants received information from mass media, while only 20% received information from healthcare

workers⁽²⁰⁾. This suggests that healthcare professionals should increase educational efforts to provide adequate disease information.

The positive correlation between the study group's acceptance of their knowledge as "sufficient" and their actual knowledge scores suggests that participants consciously obtained information and followed pandemic developments. Knowledge level is a critical factor influencing attitudes and practices. Several studies have presented a positive correlation between knowledge levels and attitudes/practices regarding COVID-19^(21,22). Similarly, our study showed a positive correlation between knowledge level and the adoption of protective behaviors (Table 4). Conversely, the Nigerian study reported insufficiencies in the development of positive behaviors⁽¹³⁾.

Anxiety, depression, and self-reported stress are common psychological reactions to the pandemic⁽²³⁾. In this study, concerns about personal health, the unborn baby, and elderly relatives were high. Although vertical transmission and transmission via breast milk appear possible, current data have not yet definitively demonstrated COVID-19 positivity in fetal samples⁽²⁴⁾. While correlations were observed between general anxiety and knowledge level, 53% of participants expressed concern for their children regardless of their knowledge level. Another study similarly found heightened

anxiety regarding older relatives, children, and unborn babies among pregnant women⁽²⁵⁾.

Approximately a quarter of pregnant women with children reported needing childcare support during the pandemic. This need should be addressed by governmental and non-governmental organizations, individually or jointly.

Our results showed that approximately 90% of pregnant women complied with social restrictions as suggested by the Turkish government and WHO^(26,27), with compliance correlating with knowledge levels. Healthcare workers on the front lines may face stigma and discrimination⁽²⁸⁾, which may intensify as cases and mortality rates rise. Approximately 80% of our participants preferred to avoid contact with healthcare workers. Interestingly, as the level of knowledge increased, stigmatization decreased (Table 5). Disseminating precise information may help mitigate COVID-19-related stigma.

Managing health anxiety is crucial during pandemics⁽²⁹⁾. Prenatal maternal distress can have negative impacts. Increased levels of anxiety and psychiatric symptoms have been reported in pregnant women during the pandemic⁽³⁰⁾. Saccone et al.⁽³¹⁾ found that more than half of pregnant women (53%) experienced severe psychological impacts. In our study, moderate-to-severe anxiety was observed in approximately 60% of participants. No correlation was found between anxiety levels and knowledge levels. However, Wang et al.⁽³²⁾ reported that while accurate health information was associated with lower stress levels, female gender and poor self-rated health were associated with higher psychological impact.

Study Limitations

Because of the rapid progression of the pandemic, a validity and reliability study of the questionnaire could not be conducted. Furthermore, this was a cross-sectional, single-center study. However, given the limited number of publications measuring knowledge, attitudes, and awareness among pregnant women, this study makes a significant contribution to the literature.

Conclusion

Little is known about the effects of COVID-19 on pregnancy. The COVID-19 knowledge levels of the pregnant women in this study were found to be substantial. Positive correlations were found between knowledge levels and positive behaviors, post-pandemic attitudes, education level, and socio-

economic status. To protect the physical and psychological well-being of pregnant women and their babies, continuing education for health professionals is recommended. These results also highlight the need to focus on groups with lower knowledge levels.

Ethics

Ethics Committee Approval: This study was approved by University of Health Sciences Türkiye, İzmir Tepecik Education and Research Hospital, Local Ethics Committee (approval no: 2020/6-20, date: 13.05.2020).

Informed Consent: All participants provided written informed consent.

Footnotes

Authorship Contributions

Concept: S.A.N., Design: S.A.N., Data Collection or Processing: Ö.N., S.S., Analysis or Interpretation: Ö.N., S.A.N., Literature Search: Ö.N., S.S., Writing: Ö.N., S.A.N.

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References

1. Cascella M, Rajnik M, Aleem A, Dulebohn SC, Di Napoli R. Features, evaluation, and treatment of coronavirus (COVID-19). In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026.
2. Lau SK, Woo PC, Yip CC, et al. Coronavirus HKU1 and other coronavirus infections in Hong Kong. *J Clin Microbiol.* 2006;44:2063-71.
3. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med.* 2020;382:727-33.
4. World Health Organization. Coronavirus disease (COVID-19) pandemic [Internet]. 2020. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> [Accessed: December 30, 2025].
5. Coronaviridae Study Group of the International Committee on Taxonomy of Viruses. The species severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat Microbiol.* 2020;5:536-44.
6. Republic of Turkey Ministry of Health. COVID-19 weekly situation report [Internet]. 2022. Available from: <https://covid19.saglik.gov.tr>
7. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet.* 2020;395:497-506.
8. Rollas K, Şenoglu N. Covid-19 hastalarının yoğun bakım ünitesinde yönetimi. *Anatol J Gen Med Res.* 2020;30:142-55.
9. Petrilli CM, Jones SA, Yang J, et al. Factors associated with hospital admission and critical illness among 5279 people with coronavirus disease 2019 in New York City: prospective cohort study. *BMJ.* 2020;369:m1966.

10. Atalay S, Ersan G. Treatment of COVID-19. *Tepecik Eğitim ve Araştırma Hastanesi Dergisi*. 2020;30:126-34.
11. Mor G, Cardenas I. The immune system in pregnancy: a unique complexity. *Am J Reprod Immunol*. 2010;63:425-33.
12. Li N, Han L, Peng M, et al. Maternal and neonatal outcomes of pregnant women with coronavirus disease 2019 (COVID-19) pneumonia: a case-control study. *Clin Infect Dis*. 2020;71:2035-41.
13. Nwafor JI, Anikwu JK, Anozie BO, Ikeotuonye AC, Okedo-Alex IN. Pregnant women's knowledge and practice of preventive measures against COVID-19 in a low-resource African setting. *Int J Gynaecol Obstet*. 2020;150:121-3.
14. Rasmussen SA, Smulian JC, Lednický JA, Wen TS, Jamieson DJ. Coronavirus disease 2019 (COVID-19) and pregnancy: what obstetricians need to know. *Am J Obstet Gynecol*. 2020;222:415-26.
15. Qiao J. What are the risks of COVID-19 infection in pregnant women? *Lancet*. 2020;395:760-2.
16. Public Health England. COVID-19: investigation and initial clinical management of possible cases [Internet]. 2020. Available from: <https://www.gov.uk/government/publications/wuhan-novel-coronavirus-initial-investigation-of-possible-cases/investigation-and-initial-clinical-management-of-possible-cases-of-wuhan-novel-coronavirus-wn-cov-infection>
17. Ellington S, Strid P, Tong VT, et al. Characteristics of women of reproductive age with laboratory-confirmed SARS-CoV-2 infection by pregnancy status — United States, January 22–June 7, 2020. *Morbidity and Mortality Weekly Report*. 2020;69:769-75.
18. Kessler RC, Keller MB, Wittchen HU. The epidemiology of generalized anxiety disorder. *Psychiatr Clin North Am*. 2001;24:19-39.
19. Konkan R, Şenormancı Ö, Güçlü O, Aydın E, Sungur MZ. Validity and reliability study for the Turkish adaptation of the generalized anxiety disorder-7 (GAD-7) scale. *Archives of Neuropsychiatry*. 2013;50:53-8.
20. Anikwe CC, Ogah CO, Anikwe IH, Okorochukwu BC, Ikeoha CC. Coronavirus disease 2019: knowledge, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki, southeast Nigeria. *Int J Gynaecol Obstet*. 2020;151:197-202.
21. Zhong BL, Luo W, Li HM, et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *Int J Biol Sci*. 2020;16:1745-52.
22. Zhang M, Zhou M, Tang F, et al. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hosp Infect*. 2020;105:183-7.
23. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. *Asian J Psychiatr*. 2020;52:102066.
24. Demirçelik Y, Kanık A. Covid-19 in children: epidemiology and clinical features. *Anatol J Gen Med Res* 2020;30:58-62.
25. Corbett GA, Milne SJ, Hehir MP, Lindow SW, O'Connell MP. Health anxiety and behavioural changes of pregnant women during the COVID-19 pandemic. *Eur J Obstet Gynecol Reprod Biol*. 2020;249:96-7.
26. Republic of Turkey Ministry of Health. 14 rules against coronavirus risk [Internet]. 2020. Available from: <http://www.istanbul.gov.tr/koronavirus-riskine-karsi-14-kural>
27. World Health Organization. Coronavirus disease (COVID-19) advice for the public [Internet]. 2020. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
28. World Health Organization. Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health [Internet]. 2020. Available from: <https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf>
29. Asmundson GJG, Taylor S. How health anxiety influences responses to viral outbreaks like COVID-19: what all decision-makers, health authorities, and health care professionals need to know. *J Anxiety Disord*. 2020;71:102211.
30. Berthelot N, Lemieux R, Garon-Bissonnette J, Drouin-Maziade C, Martel É, Maziade M. Uptrend in distress and psychiatric symptomatology in pregnant women during the coronavirus disease 2019 pandemic. *Acta Obstet Gynecol Scand*. 2020;99:848-55.
31. Saccone G, Florio A, Aiello F, et al. Psychological impact of coronavirus disease 2019 in pregnant women. *Am J Obstet Gynecol*. 2020;223:293-5.
32. Wang C, Pan R, Wan X, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health*. 2020;17:1729.