

Evaluating Factors Related to Health Anxiety in COVID-19 Patients

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ABSTRACT

Background: The COVID-19 outbreak affects both the physical and mental health of individuals and society. This study investigates the factors related to health anxiety in COVID-19 patients and explores their sociodemographic-, disease-, and treatment-related factors, trait anxiety, and characteristics of secure or insecure attachment.

Methods: The sample consisted of 420 individuals aged 18-65 years and diagnosed with COVID-19 between March 15 and May 15, 2020. The participants completed a sociodemographic data form and the Health Anxiety Inventory (HAI), Adult Attachment Scale (AAS), and State-Trait Anxiety Inventory (STAI).

Results: Hierarchical regression analysis revealed that female gender, presence of chronic physical diseases, presence of mental health problems, and high AAS insecure attachment scores significantly predicted high HAI scores. Moreover, results indicated that the model explained approximately 21% of variance in HAI scores.

Conclusions: Factors such as gender, presence of chronic physical diseases, presence of mental health problems, and attachment style influence health anxiety. Determining the appropriate factors that cause health anxiety can contribute to the implementation of protective measures for mental health and to the application of effective interventions for individuals who develop mental problems.

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INTRODUCTION

Previous studies have found that epidemic diseases increase the anxiety levels of a society as well as cause psychological trauma in individuals, similar to those experienced during earthquakes and floods.¹⁻³ The recent COVID-19 epidemic, which emerged from Wuhan in China at the end of 2019 and has since become a pandemic, was detected in Turkey on March 11, 2020.⁴ Individuals diagnosed with COVID-19 experience different physical and mental health problems, and the severity of the symptoms varies individually.³⁻⁶

Health anxiety is an exaggerated perception of a person's existing physical symptoms and anxious thoughts regarding the course of a disease, for example, that it will progress severely.⁷ Health anxiety impairs functionality and negatively affects the treatment process.⁸ During the COVID-19 outbreak, a study conducted in Turkey, revealed that women and patients with chronic diseases

were reported to experience high levels of health anxiety.⁹ Witnessing the negative consequences of the disease through exposure to endless information served on social media was perceived to negatively influence mental health and increase health anxiety.¹⁰

Social isolation during and after treatment, uncertainty regarding the course of the disease, increased levels of perceived danger, and physical problems caused by the disease may increase the anxiety level of the person.¹¹ Social isolation and quarantine can deprive the individual of social support, which also increases anxiety level.¹² Several studies that investigated anxiety levels related to the COVID-19 outbreak reported that age, gender, presence of offspring, presence of chronic diseases, and history of infection may affect the level of anxiety experienced.¹¹⁻¹⁴ Furthermore, other studies illustrated that patients diagnosed with COVID-19 experience

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different mental health problems compared with the general population, and undergo various degrees of anxiety disorders even after remission.^{11,13}

Individuals react differently to stressful situations.¹⁴ The manner in which a person reacts to events differs depending on many variables, such as past experiences, cultural characteristics of a society, personality traits, and especially attachment style.^{14,15} The ability to establish and maintain healthy relationships with others enables people to share their difficult situations. In turn, this form of social support influences the regulation of emotions and enables the individual to cope with stressful life events with ease.¹⁶ Alternatively, insecure attachment is well known to make it difficult for the person to benefit from environmental support and can increase anxiety.¹⁷ Insecure attachment can lead to challenges in developing suitable strategies against adverse events and has been shown to increase anxiety levels.¹⁸

The current literature reveals that in the long-term follow-up of patients who recovered from the virus that caused severe acute respiratory failure syndrome (SARS), the severity of anxiety and depression symptoms remained high even after 1 year.¹⁹ Studies have reported that people who have been infected and quarantined may experience anxiety disorders with depressive symptoms, which can increase in prevalence with prolonged quarantine practice.²⁰ For this reason, determining the levels of anxiety experienced by patients and the factors affecting them is of great importance to protect and improve the mental health of recovered patients, which can contribute to suitable psychosocial interventions.

Although studies on the physical effects of COVID-19 are numerous, studies that examine the effects of the disease on mental health remain limited. The majority of previous studies focused on identifying outbreak-related mental health problems among the general population and healthcare professionals. Variables such as attachment style and social and cultural characteristics are well known to play a role in psychological responses to stressful life events, which suggests the necessity for personalized treatment. Further, these factors should be taken into account to identify individuals who need psychiatric

support and specific interventions for them.²¹ The study investigates factors related to health anxiety in COVID-19 patients and explores their sociodemographic, disease-, and treatment-related factors, trait anxiety, and secure and insecure attachment characteristics.

METHODS

Procedures and Participants

To conduct the study, permissions were obtained from the Ethics Committee of the Faculty of Medicine of Sakarya University (71522473/050.01.04/164) and the Republic of Turkey Ministry of Health COVID-19 Scientific Research Board (2020-05-01T12_42_59). The sample consisted of 420 individuals aged 18 to 65 years who were diagnosed with COVID-19 (laboratory confirmed cases; SARS CoV-2 RNA detected by molecular method) between March 15 and May 15, 2020, in Turkey. The participants were excluded if they were still hospitalized, were illiterate, or if they had a neurological disorder affecting cognitive skills (i.e., epilepsy and a history of cerebrovascular accident), mental retardation, psychosis, bipolar disorder, or a history of substance abuse. Pregnancy was also considered another exclusion criterion. Figure 1 illustrates the stages of sample selection.

Procedure

After obtaining the necessary permission for the study, the date of birth, contact information, and diagnosis dates of all COVID-19 patients were obtained from the Sakarya Provincial Health Directorate. Clinical psychologists contacted subjects that matched the age range group for the research criteria over the phone, and informed them about the aim of the study. Consent for participation was collected using an online form. The sociodemographic information form and questionnaires were sent online to 970 subjects. Although all the patients gave consent, a total of 470 were excluded because they failed to fill up the forms properly or on time. Video calls were used to support subjects who faced difficulty in filling up the questionnaires. Data from 420 patients who completed the questionnaires were used for statistical analyses.

Measurement Tools

Sociodemographic Data Form: Sociodemographic variables, such as age, gender, education, marital status, employment status, occupation, number of children, as well as COVID-19 disease course and previous physical and mental illnesses, were obtained from the sociodemographic form prepared by the researchers.

Health Anxiety Inventory (HAI): Salkovskis et al. developed the HAI, an 18-item self-report scale that aims to evaluate health anxiety.²² A total of 14 items of the scale evaluate the current psychological status of patients, whereas four

MAIN POINTS

- The COVID-19 outbreak affects both the physical health and the mental health of individuals and society.
- Women are more at risk in terms of health anxiety, and the presence of physical and mental illnesses increases health anxiety in infected individuals during the course of the COVID-19.
- The presence of negative life events also leads to increased health anxiety during the course of the disease.
- The attachment characteristics of individuals are significant to their health anxiety. Especially, insecure attachment has a linear relationship with health anxiety.

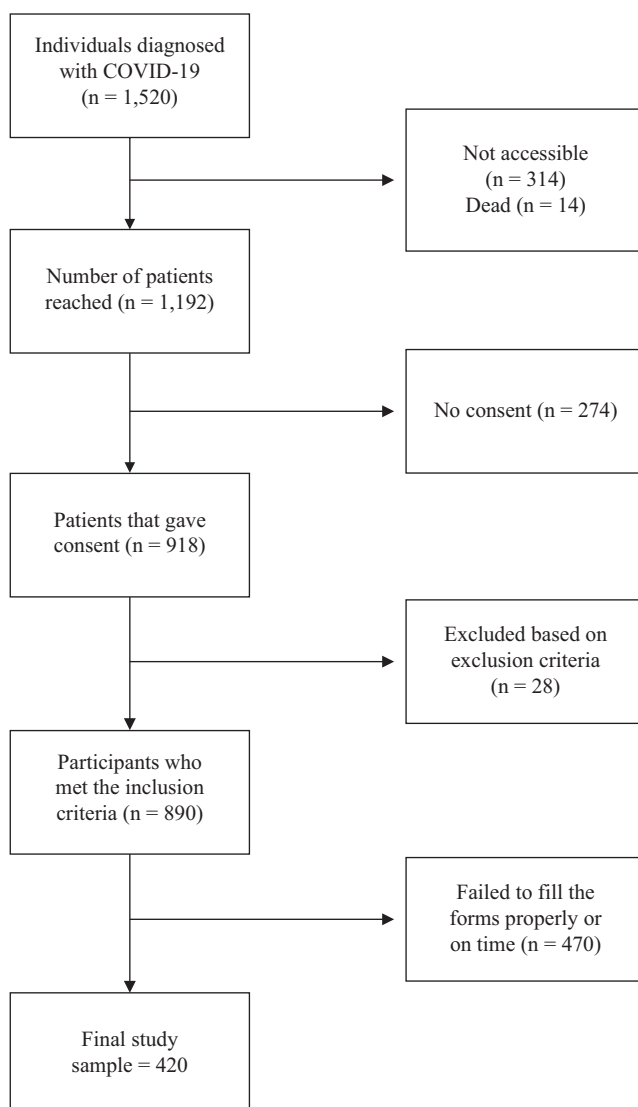


Figure 1. Sample selection.

questions evaluate their psychological status with the assumption of having a serious disease. Previous studies have stated that HAI can be used in clinical groups and community samples. Aydemir et al.⁷ have established the reliability and validity of the Turkish version of the HAI and calculated its Cronbach's alpha coefficient value as 0.92.

Adult Attachment Scale (AAS): Hazan et al. developed the AAS that consists of 18 items rated on a Likert-type scale and evaluates adult attachment styles, such as secure, avoidant, and anxious/ambivalent styles.²³ Kesebir et al. verified the Turkish version of the inventory.²⁴ The present study calculated Cronbach's alpha coefficient for the secure, avoidant, and anxious/ambivalent attachment styles at 0.75, 0.72, and 0.80, respectively.

State-Trait Anxiety Inventory (STAI): Spielberger developed the STAI that is rated using a four-point Likert-type scale with two subscales that measure temporary anxiety symptoms and relatively stable disposition to experience

anxiety symptoms.²⁵ High scores indicate high levels of anxiety. Öner and LeCompte²⁶ adapted it to the Turkish version of the inventory. Cronbach's alpha coefficient was reported to vary between 0.83 and 0.87.^{27,28} In the study, however, only the trait anxiety subscale was used, given that state anxiety can be confused with health anxiety.

Statistical Analysis

Data obtained were entered on Statistical Package for the Social Sciences (SPSS) version 23.0 (IBM SPSS Corp.; Armonk, NY, USA), in line with the responses given by the participants. An independent sample *t*-test and analysis of variance were used to compare health anxiety scores based on sociodemographic and disease-related categorical variables. Pearson's correlation was applied to examine the association between continuous variables. Lastly, hierarchical regression analysis was used to conduct predictive analysis of the variables.

RESULTS

Sociodemographic Characteristics of Sample

Differences in HAI scores of the 420 participants in terms of sociodemographic and disease-related variables were compared. The study found that the HAI scores for women were significantly higher than those for men ($t = -5.25$; $P < .01$). Moreover, the HAI scores reported by participants with chronic physical diseases were higher ($t = 3.91$; $P < .01$). Further, the HAI scores of participants who reported psychiatric problems before the outbreak were found to be significantly higher ($t = 3.81$; $P < .01$). Lastly, the HAI scores of participants who stated that changes in the family occurred due to the outbreak were found to be significantly high ($t = 2.26$; $P < .01$). When the sample was grouped in terms of number of children, employment status, marital status, place of residence, COVID-19 treatment method, and presence of COVID-19 patients in the family, no statistically significant differences were noted between HAI scores ($P > .05$). Table 1 illustrates the comparison of HAI scores based on the sociodemographic and disease-related variables.

Pearson's Correlation Analysis

Pearson's correlation analysis was used to identify the correlations between HAI score, age, duration of diagnosis, treatment of COVID-19, STAI trait anxiety subscale score, and AAS secure/insecure attachment subscale scores. A significant positive correlation was observed between HAI score and duration of diagnosis and treatment of COVID-19 ($r = 0.10$; $P < .05$), STAI trait anxiety subscale score ($r = 0.19$; $P < .01$), and AAS insecure attachment subscale score ($r = 0.28$; $P < .01$). Conversely, a significant negative correlation was found between HAI score and AAS secure attachment subscale score ($r = -0.12$; $P < .05$). Table 2 summarizes the results.

Table 1. Comparison of Health Anxiety Inventory Scores Based on Sociodemographic and Disease-Related Variables

Demographic Variables	N (420)	ss	t	F	P
Gender					
Male	215	0.76	0.382	-5.25**	<.01
Female	205	0.97	0.443		
Employment status					
Employed	206	0.84	0.414		
Healthcare worker	63	0.83	0.352	0.93	.39
Unemployed	151	0.90	0.467		
Education					
Primary School	104	0.94	0.484		
High School	173	0.86	0.449	2.84	.10
Undergraduate School	143	0.81	0.338		
Children					
Yes	262	0.87	0.445	.83	.38
No	158	0.84	0.392		
Marital status					
Married	126	0.86	0.424	0.02	.98
Single	294	0.86	0.427		
Place of residence					
Urban	225	0.89	0.436	1.50	.13
Rural	195	0.83	0.412		
COVID-19 treatment					
In-patient Treatment	223	0.86	0.445	0.19	.84
Home Quarantine	197	0.86	0.404		
COVID-19 diagnosis in family members					
Yes	208	0.87	0.426	0.29	.77
No	212	0.86	0.427		
Presence of chronic illness					
Yes	73	1.03	0.480	3.91**	<.01
No	347	0.82	0.405		
Presence of mental problems					
Yes	25	1.17	0.500	3.81**	<.01
No	395	0.84	0.414		
Changes in family processes other than COVID-19 outbreak					
Yes	130	0.93	0.431	2.26*	.02
No	290	0.83	0.421		

Table 2. Correlation Analyses of Variables

	1	2	3	4	5	6
1. Age	1					
2. COVID-19 Treatment (day)	-0.02	1				
3. Health Anxiety	-0.01	0.10*	1			
4. Trait Anxiety	-0.01	0.01	0.19**	1		
5. Secure Attachment	-0.01	-0.02	-0.12*	-0.05	1	
6. Insecure Attachment	-0.07	0.08	0.28**	0.14**	-0.20**	1

** $P < .01$, * $P < .05$.

Regression Analysis

According to the findings of hierarchical regression analysis used to examine the predictors of HAI scores, four models with sociodemographic variables, disease-related variables, and scores of the scales used in the study were proposed. The first model was examined and found to be statistically significant [$F(3/416) = 19.28$; $P < .01$]. In the model, three variables, namely, gender (female) ($\beta = 0.25$; $P < .01$), presence of chronic diseases ($\beta = -0.16$; $P < .01$), and presence of mental health problems ($\beta = -0.16$; $P < .01$), were found to significantly increase HAI scores. The explanatory rate of the model was 12% ($R^2 = 0.12$).

In the second model, the COVID-19 treatment process and changes in the family apart from the COVID-19 outbreak variables were used. In the same manner, the second model was found to be statistically significant [$F(5/414) = 13.92$; $P < .01$]. In the model, gender (female) ($\beta = 0.23$; $P < .01$), presence of chronic diseases ($\beta = -0.17$; $P < .01$), presence of mental health problems ($\beta = -0.18$; $P < .01$), and changes in the family process other than the COVID-19 outbreak ($\beta = -0.11$; $P < .01$) significantly predicted HAI scores. The explanatory rate of the model was found as 14% ($R^2 = 0.14$). The STAI trait anxiety and AAS secure and insecure attachment subscale scores were added to the third model, which was found to be statistically significant [$F(7/412) = 12.20$; $P < .01$]. In the model, gender (female) ($\beta = 0.22$; $P < .01$), presence of chronic diseases ($\beta = -0.16$; $P < .01$), presence of mental health problems ($\beta = -0.17$; $P < .01$), changes in family processes other than the COVID-19 outbreak ($\beta = -0.10$; $P < .01$), STAI trait anxiety subscale scores ($\beta = 0.11$; $P < .01$), and AAS insecure attachment subscale scores ($\beta = 0.12$; $P < .01$) were variables that significantly predicted health anxiety. The explanatory rate of the model was found as 17% ($R^2 = 0.17$). Lastly, the fourth model was found to be statistically significant [$F(7/412) = 13.39$; $P < .01$]. In the fourth model, the variables gender (female) ($\beta = 0.23$; $P < .01$), presence of chronic physical diseases ($\beta = -0.15$; $P < .01$), presence of mental health problems ($\beta = -0.14$; $P < .01$), and insecure attachment ($\beta = 0.23$; $P < .01$) significantly predicted HAI scores. Results indicated that the three predictors explained health anxiety scores with approximately 21%

of variance ($R^2 = 0.21$). Table 3 summarizes the results of hierarchical regression analysis performed to determine the predictors of HAI scores.

DISCUSSION

The study investigated the relationship between health anxiety and sociodemographic factors, disease-related factors, trait anxiety, and attachment characteristics in patients diagnosed with COVID-19. Gender (female), presence of chronic physical diseases, presence of mental health problems, and high scores for the insecure attachment subscale were found as factors that increase health anxiety.

Reviewing the literature, the study finds that the incidence of problems related to anxiety occurs more frequently among women.²⁹ Moreover, various studies have shown that level of anxiety tends to increase more among women during stressful life events and in adaptation to disease course.^{30,31} Receiving a diagnosis of COVID-19 is a process that constitutes a significant level of stress in individuals and society due to the diagnosis of a fatal and life-changing disease.³² Other studies that were conducted during the COVID-19 outbreak have also shown that anxiety symptoms appear in women three times more than in men.¹² The results of the present study point to the fact that apart from general anxiety problems, those related to health anxiety also appeared more frequently among women during the course of the outbreak.

Table 3. Summary of Hierarchical Regression Analysis: Predictors of Health Anxiety

Model		F Change	R ²	B	t	P
1	(Constant)				7.79	<.01**
	Gender	19.28**	0.12	0.25	5.36	<.01**
	Chronic Illness			-0.16	-3.53	<.01**
	Presence of Mental Health Problems			-0.16	-3.55	<.01**
2	(Constant)				8.15	<.01**
	Gender			0.23	5.16	<.01**
	Chronic Illnesses			-0.17	-3.62	<.01**
	Presence of Mental Health Problems	13.92**	0.14	-0.18	-3.83	<.01**
	COVID-19 Treatment (day)			0.09	1.99	.05
	Changes in Family Processes Other than COVID 19 Pandemic			-0.11	-2.44	.01*
3	(Constant)				4.08	<.01**
	Gender			0.23	4.95	<.01**
	Chronic Illness			-0.15	-3.40	.01**
	Presence of Mental Health Problem			-0.14	-3.15	.02**
	COVID-19 Treatment Duration (day)	13.39**	0.21	0.07	1.65	.10
	Changes in Family Processes Other than COVID 19 Pandemic			-0.06	-1.27	.20
	Trait Anxiety			0.08	1.79	.07
	Secure Attachment			-0.01	-0.29	.77
	Insecure Attachment			0.23	4.93	<.01**

Dependent Variable: Health Anxiety Inventory Scores.

Advanced age and presence of chronic diseases have been identified as the two most important risk factors for contracting COVID-19 and its mortality.^{12,33} Similar to the results of the current study, previous studies proposed that individuals with chronic diseases experience high levels of health anxiety.^{9,34-36} Furthermore, the results of the present study revealed that individuals with chronic diseases were more sensitive and responsive to bodily sensations.⁹ However, the study detected no correlation between age and health anxiety.

Moreover, previous studies reported that health anxiety increased during the COVID-19 pandemic in individuals with psychiatric illnesses that were present before the pandemic.^{9,37} Ozdin et al. focused on individuals that were not diagnosed with the disease during the COVID-19 outbreak and found that those with mental illnesses were more prone to experience health anxiety.⁹ Their results also indicated that gender (female), accompanying chronic diseases, and previous psychiatric illness histories are also risk factors for health anxiety. Moreover, the present study found that the health anxiety scores of individuals who stated having a psychiatric illness before the COVID-19 pandemic were significantly high. However, evaluating each effect of a mental disease on health anxiety is impossible due to the small sample size of cases with mental problems. However, the results point us to the fact that the mental states of individuals with histories of psychiatric illnesses are more sensitive and responsive to common diseases, such as that of the current pandemic.

In previous outbreaks, many individuals became non-functional due to health problems; their businesses were interrupted without any planning.³⁸ Additionally, previous studies illustrated that individuals experienced difficulties in fulfilling their needs for water, food, and medication.³⁹ The Ebola outbreak, for example, revealed that the majority of people could receive support; however, it was insufficient for their needs and professional expenses or was supplied very late.⁴⁰ Scholars proposed that such reasons increased individuals' levels of anxiety and anger.⁴¹ In a study conducted in Canada after the SARS outbreak, more symptoms of post-traumatic stress disorder and depression were observed in individuals with low annual income. Such studies claimed that this result was probably due to the fact that low-income families were more affected by the temporary financial losses.²⁰ The present study found that during the course of the disease, individuals who experienced other negative life events showed increased levels of health anxiety than those who did not. These results point out the importance of providing additional support for individuals with negative life events other than the pandemic.

Individuals with high levels of health anxiety tend to perceive a minor physical change as more dangerous than the reality, and they can even regard harmless physical changes as disease symptoms. Such thoughts have been

reported to render these individuals weaker and more vulnerable against the disease.⁴² The higher the level of anxiety in individuals, the more concerned they are about their health. Hence, they are more adversely affected by the disease.^{43,44} The current study acknowledged that high levels of anxiety lead to health anxiety. However, the regression analysis model revealed that trait anxiety has no statistically meaningful predictability of health anxiety. Furthermore, the results suggested that trait anxiety is an important determinant of health anxiety. However, the concept of health anxiety differs from that of trait anxiety and is also affected considerably by factors other than trait anxiety.

The interpersonal model is one of the models used to explain health anxiety through insecure attachment and care-seeking behavior.⁴⁵ Sherry et al.⁴⁵ examined the relationship between health anxiety and attachment, and their study revealed that insecure attachment was associated with health anxiety and found to be an underlying factor of health anxiety. In the same regard, the present study found that insecure attachment increases health anxiety. Moreover, the results indicate that individuals with problems related to attachment tend to have more mental health problems similar to those of other life events during the course of the pandemic. Furthermore, attachment problems can be an important factor for individuals with mental health problems. Protective mental health services should include interventions for attachment problems and emphasize the importance of evaluating the attachment problems of individuals with mental health problems.

In the current study, no difference was observed between individuals' marital status, number of children, presence of a COVID-19 patient in the family, and health anxiety. In reviewing the studies on marital status, a study on patients diagnosed with COVID-19 observed that nearly half of them showed depressive symptoms; more than half displayed anxiety, and approximately 70% showed somatic symptoms. In the same study, although married individuals with positive polymerase chain reaction test results experienced severe levels of depression than other cases, non-married individuals with negative PCR test results complained of experiencing more somatic symptoms.⁴⁶ Furthermore, other studies noted that individuals with high levels of education were more knowledgeable about COVID-19 and tended to display better attitudes toward the disease.⁴⁷ However, the current study found no meaningful difference in individuals' health anxiety relative to their educational backgrounds.

According to Bo et al.,¹¹ hospitalization for COVID-19 could cause post-traumatic stress disorder symptoms and reduced quality of life and exert an impact on individuals' professional lives. Conversely, the present study found no difference in hospitalized or ambulant individuals in quarantine with regard to health anxiety. However, excluding individuals undergoing hospital treatment may

have affected the results of the present study. The fact that a positive correlation exists between health anxiety and extension of the disease course leads the authors to propose that variables during treatment can be a risk factor for health anxiety.

In previous studies, different results were obtained among individuals in terms of employment status and employment in health services.^{9,47,48} Huang et al. conducted a study on 230 healthcare workers during the COVID-19 pandemic and reported that health anxiety increased among healthcare professionals. In another study, data from 304 healthcare professionals suggested that health anxiety tends to exist more among healthcare professionals.⁴⁸ Especially, female professionals were more affected mentally due to the pandemic. Liu et al.⁴⁹ reported that health anxiety scores were lower among workers in the COVID-19 department than among those who did not work in this department. The authors did not observe a relationship between individuals' health anxiety, employment status, and employment as healthcare professionals.

Previous studies have suggested that the disease could be seen more frequently in crowded places, such as city centers, because the virus can be transmitted through droplets or direct contact.⁵⁰ In contrast to these studies, the majority of the samples in the present study was derived from rural areas. Ozdin and Bayrak Ozdin illustrated that the most mentally affected groups were living in city centers.⁹ In the present study, no relationship was observed between individuals' level of health anxiety and place of residence. However, results may differ across geographic and sociological features in various countries and cities.

The study has a few limitations. The most important one is that face-to-face interviews were not possible due to the risk of infection. Other important limitations are that individuals' overall hospital records could not be evaluated in terms of variables during treatment. As the study was conducted only on individuals diagnosed with COVID-19, it cannot be compared with other studies that include samples from large communities. Moreover, the completion rate of the patients with consent was low. However, the study is valuable because the current research area on COVID-19 patients is limited. Moreover, the research was carried out on specific occupational groups; in general, the study was conducted with a limited number of samples. To the best of our knowledge, the present study differs from others because it is the first to examine the factors that predict health anxiety and to evaluate the attachment characteristics of patients.

In conclusion, the findings show that women are more at risk in terms of health anxiety, and the presence of physical and mental illnesses increases health anxiety in infected individuals during the course of the pandemic. The presence of negative life events also leads to increased health anxiety during the course of the disease. Moreover,

the study determined that the attachment characteristics of individuals are significant to their health anxiety. Especially, insecure attachment has a linear relationship with health anxiety.

Ethics Committee Approval: Ethics committee approval was received from the Sakarya University School of Medicine (71522473/050.01.04/164).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

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