



The Effect of Symptoms on Mental Health in COVID-19 Patients

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ABSTRACT

Objective: The aim of this study was to examine the effects of COVID-19 symptoms on patients' mental health.

Material and Methods: In this study, 451 COVID-19 patients treated at Adana City Training and Research Hospital were included. The patients' symptoms such as fever, cough, myalgia, rhinorrhea, sore throat, smell disorder, taste disorder, diarrhea, dyspnea were questioned and their mental health was evaluated with the Beck Depression Scale. The patients were divided into four groups as normal, mild, moderate, and severe depression according to the Beck Depression Scale. Symptom profiles were compared between groups, and which symptoms negatively affected mental health were examined.

Results: Forty-seven patients were classified as normal, but depressive symptoms were observed in 404 patients. Moderate depression symptoms were observed in 214 patients, which made up the largest group with 47.4%. Depression symptoms were generally moderate in women and mild in men. There was a significant relationship between myalgia, fever, cough, and depression symptoms ($p < 0.001$). Smell disorders were also seen in 220 of 451 patients. The presence of diabetes, coronary artery disease (CAD), chronic obstructive pulmonary disease (COPD), and chronic renal failure (CRF) did not differ between the depression groups ($p > 0.05$). A significant relationship was found between the presence of hypertension (HT) and depression classification ($p < 0.05$).

Conclusion: COVID-19 negatively affects the mental health of patients. Fever, cough, myalgia, smell disorders, and being a woman increase the symptoms of depression. A significant relationship was found between the presence of hypertension and depression classification.

Keywords: Coronavirus, symptoms, depression

ÖZ

COVID-19 Hastalarında Semptomların Ruh Sağlığına Etkisi

Giriş: Bu çalışmanın amacı COVID-19 semptomlarının hastaların ruh sağlığı üzerindeki etkilerini incelemektir.

Gereç ve Yöntemler: Bu çalışmaya Adana Şehir Eğitim ve Araştırma Hastanesinde tedavi gören 451 COVID-19 hastası dahil edildi. Hastaların ateş, öksürük, kas ağrısı, burun akıntısı, boğaz ağrısı, koku bozukluğu, tat alma bozukluğu, ishal, solunum sıkıntısı gibi semptomları sorgulandı ve Beck Depresyon Ölçeği ile ruh sağlıkları değerlendirildi. Hastalar Beck Depresyon Ölçeği'ne göre normal, hafif, orta ve şiddetli depresyon olarak dört gruba ayrıldı. Gruplar arasında semptom profilleri karşılaştırılıp ve hangi semptomların ruh sağlığını olumsuz etkilediği incelendi.

Bulgular: 47 hasta normal olarak sınıflandırıldı ancak 404 hastada depresif belirtiler gözlemlendi. 214 hasta orta düzeyde depresyon belirtileri gözlemlendi ve bu %47,4 ile en büyük grubu oluşturdu. Depresyon belirtileri genellikle kadınlarda orta düzeyde, erkeklerde ise hafif düzeydeydi. Miyalji, ateş, öksürük ve depresyon belirtileri arasında anlamlı ilişki vardı ($p < 0,001$). 451 hastanın 220'sinde koku bozuklukları da görüldü. Diyabet, koroner arter hastalığı (KAH), kronik obstrüktif akciğer hastalığı (KOAH), kronik böbrek yetmezliği (KBY) varlığı depresyon grupları arasında farklılık göstermedi ($p > 0,05$). Hipertansiyon varlığı ile depresyon sınıflaması arasında anlamlı bir ilişki bulundu ($p < 0,05$).

Sonuç: COVID-19 hastaların ruh sağlığını olumsuz etkilemektedir. Ateş, öksürük, miyalji, koku bozukluğu ve kadın olmak depresyon belirtilerini arttırmaktadır. Hipertansiyon varlığı ile depresyon sınıflaması arasında anlamlı bir ilişki vardır.

Anahtar Kelimeler: Koronavirüs, semptom, depresyon

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INTRODUCTION

A new type of B-coronavirus was identified in a sample obtained from throat swab studies conducted in December 2019 in Wuhan, China, based on a series of unexplained pneumonia cases (1). This virus was named by the World Health Organization (WHO) as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) (2). General symptoms of COVID-19 are fever, cough, and dyspnea (2). In addition, patients have symptoms such as sore throat, headache, myalgia, diarrhea, nausea, vomiting, abdominal pain, nasal congestion, rhinorrhea, and smell and taste disorders. COVID-19 symptoms can affect all systems, including the central nervous system (CNS), and findings vary according to the system involved (3). The WHO announced SARS-CoV-2 as a pandemic, and Türkiye declared its first official coronavirus cases on March 11th, 2020 (4).

This virus, which causes major respiratory infections, threatens the physical health of individuals and adversely affects their mental health (5). It has been observed that individuals perceive increased levels of fear, anxiety, and stress, especially during the emergence of the epidemic and the increasing number of cases (6). The fact that its cause is not fully known, the virus is very contagious, and individuals from all parts of society are at risk, have turned the epidemic into a global trauma. With the uncertainty, feelings such as fear, unhappiness, hopelessness, and despair experienced along with the anxiety of getting sick have become an epidemic (5). A series of studies consecutively conducted in this process showed that the frequency of anxiety disorders, depressive symptoms, obsessive-compulsive symptoms, post-traumatic stress, and health anxiety symptoms increased in the general population (7). Social relationships decreased, and feelings of loneliness increased due to compulsory isolation (6). There are few studies in the literature on symptoms and effects on mental health. However, they have not been clearly explained.

In our country, there is no sufficient data about the effects of this process, which affects all segments of society to different degrees, in the field of mental health, as in many other areas. Our aim in this study was to evaluate the mental health of COVID-19 patients with the Beck Depression Scale (BDS) and compare the results with the COVID symptom profiles of the patients and examine which symptoms negatively affect their mental health.

MATERIALS and METHODS

In this study, 900 patients treated in Adana City Training and Research Hospital following the possible/definitive case definition according to the COVID-19 guideline of the

General Directorate of Public Health between October 30th, 2020, and December 30th, 2020, were examined. In order to prevent selection bias, 600 people were selected from these 900 people by randomization method. One hundred and forty-nine people were excluded because they could not continue the study. Four hundred and fifty-one people were included in the study. All patients were tested using reverse transcription-polymerase chain reaction (RT-PCR). Those with previous psychiatric disorders were excluded from the study.

Demographic data of the patients were recorded from the hospital information system. Communication with the patients was only possible using room phones because the patients stayed in single rooms in isolated COVID wards and strict isolation measures were taken at the entrance and exit of the room. Symptoms such as fever, cough, dyspnea sore throat, myalgia, rhinorrhea, taste disturbance, smell disorder, and diarrhea were asked by phone to their rooms and recorded.

These volunteering patients completed the updated BDS themselves, or with our help, if necessary. In the BDS, there are 21 questions about how the patients felt in the last week. Each question has four answers, which are scored from 0 to 3 points. The patients marked the most appropriate answer and, based on their total scores, the patients were grouped as normal, mild, moderate and severe depression. Then, it was determined how often which symptoms were seen according to these groups. Symptom profiles were compared between groups, and which symptoms negatively affected mental health were examined.

The study was approved by the Adana City Training and Research Hospital Ethics Committee (Decision No. 1082, Date: 23.09.2020). Informed consent form was obtained from the patients.

Statistical Analysis

Data analysis was performed using the SPSS 22.0 package program. The demographic data of the groups were evaluated using Student's t-test and the Chi-square test, and symptoms and BDS results were evaluated using the Chi-square test. p-values <0.05 were considered significant.

RESULTS

A total of 451 patients were included in the study. The patients were divided into four groups as normal-mild-moderate-severe depression according to the BDS results. Forty-seven patients were classified as normal, but depressive symptoms were observed in 404 patients. Moderate depression symptoms were observed in 214 patients, and

Table 1. Relationship of depression symptoms with age groups

| | Mean age ± SD | Min-Max age | P |
|------------------------------|---------------|-------------|--------|
| Normal (n= 47) | 55.04 ± 16.34 | 24-91 | |
| Mild depression (n= 188) | 59.82 ± 12.88 | 28-90 | |
| Moderate depression (n= 214) | 65.01 ± 13.72 | 18-97 | <0.001 |
| Severe depression (n= 2) | 82 ± 5.66 | 78-86 | |
| Total (n= 451) | 61.88 ± 14.09 | 18-97 | |

p: One-way analysis of variance.

this made up the largest group with 47.4%. Mean age differed statistically between the groups ($p < 0.001$) (Table 1). As the average age increased, the degree of depression increased.

Depression rates were significantly higher in the PCR (+) group than in the PCR (-) group ($p = 0.015$). Depression rates were significantly higher female patients than in male patients. Depression symptoms were generally moderate in women and mild in men (Table 2).

There was a significant relationship between myalgia, fever, cough, diarrhea, and depression symptoms ($p < 0.001$).

Myalgia, fever, and cough were found to be significantly higher in those with moderate depression compared to the other groups ($p < 0.05$). Smell disturbance was also seen in 220 (48.8%) of 451 patients (Table 3).

The presence of diabetes, coronary artery disease (CAD), chronic obstructive pulmonary disease (COPD), and chronic renal failure (CRF) did not differ between the depression groups ($p > 0.05$). A significant relationship was found between the presence of HT and depression classification ($p < 0.05$) (Table 4).

Table 2. Relationship of depression symptoms with sex and PCR results

| | | Normal | | Mild depression | | Moderate depression | | Severe depression | | Total | | p |
|-----|----------|--------|-------|-----------------|------|---------------------|------|-------------------|-----|-------|------|-------|
| | | n | % | n | % | n | % | n | % | n | % | |
| PCR | Negative | 25 | 17.0* | 56 | 38.1 | 65 | 44.2 | 1 | 0.7 | 147 | 32.6 | 0.015 |
| | Positive | 22 | 7.2 | 132 | 43.4 | 149 | 49.0 | 1 | 0.3 | 304 | 67.4 | |
| Sex | Female | 14 | 7.3 | 75 | 38.9 | 103 | 53.4 | 1 | 0.5 | 193 | 42.8 | 0.093 |
| | Male | 33 | 12.8 | 113 | 43.8 | 111 | 43.0 | 1 | 0.4 | 258 | 57.2 | |

PCR: Polymerase chain reaction.

Table 3. Relationship between depression symptoms and COVID symptoms

| Symptoms | Normal | | Mild depression | | Moderate depression | | Severe depression | | Total | | p |
|----------------------|--------|------|-----------------|------|---------------------|-------|-------------------|------|-------|------|--------|
| | n | % | n | % | n | % | n | % | n | % | |
| Smell | 15 | 6.8 | 93 | 42.3 | 111 | 50.5 | 1 | 0.5 | 220 | 48.8 | 0.102 |
| Taste | 14 | 6.4 | 94 | 42.9 | 110 | 50.2 | 1 | 0.5 | 219 | 48.6 | 0.058 |
| Myalgia | 26 | 6.8† | 158 | 41.6 | 195 | 51.3* | 1 | 0.3 | 380 | 84.3 | <0.001 |
| Fever | 19 | 6.5† | 116 | 39.9 | 155 | 53.3* | 1 | 0.3 | 291 | 64.5 | <0.001 |
| Cough | 23 | 7.0† | 138 | 41.9 | 168 | 51.1* | 0 | 0.0 | 329 | 72.9 | <0.001 |
| Diarrhea | 11 | 7.7† | 70 | 49.0 | 60 | 42.0 | 2 | 1.4* | 143 | 31.7 | 0.020 |
| Runny nose | 8 | 11.3 | 30 | 42.3 | 33 | 46.5 | 0 | 0.0 | 71 | 15.7 | 0.929 |
| Sore throat | 14 | 9.1 | 58 | 37.7 | 81 | 52.6 | 1 | 0.6 | 154 | 34.1 | 0.418 |
| Respiratory distress | 23 | 8.0 | 117 | 40.8 | 145 | 50.5 | 2 | 0.7 | 287 | 63.6 | 0.064 |

p: Chi-square test, *refers to high ratio, †refers to low ratio.

Table 4. Relationship between depressive symptoms and chronic diseases

| | Normal (n= 47) | | Mild depression (n= 188) | | Moderate depression (n= 214) | | Severe depression (n= 2) | | Total (n= 451) | | p |
|--------------|-------------------|------|-----------------------------|------|---------------------------------|------|-----------------------------|-------|-------------------|------|-------|
| | n | % | n | % | n | % | n | % | n | % | |
| Hypertension | 17 | 36.2 | 101 | 53.7 | 141 | 65.9 | 2 | 100.0 | 261 | 57.9 | 0.001 |
| DM | 17 | 36.2 | 94 | 50.0 | 107 | 50.0 | 0 | 0.0 | 218 | 48.3 | 0.164 |
| CAD | 9 | 19.1 | 60 | 31.9 | 71 | 33.2 | 1 | 50.0 | 141 | 31.3 | 0.268 |
| COPD | 11 | 23.4 | 53 | 28.2 | 73 | 34.1 | 2 | 100.0 | 139 | 30.8 | 0.060 |
| CRF | 7 | 14.9 | 28 | 14.9 | 24 | 11.2 | 1 | 50.0 | 60 | 13.3 | 0.307 |

p: Chi-square test, DM: Diabetes mellitus, CAD: Coronary artery disease, COPD: Chronic obstructive pulmonary disease, CRF: Chronic renal failure.

DISCUSSION

Medical complications are generally noted during the COVID-19 pandemic; besides, the effects of SARS-CoV-2 on mental health should not be ignored. Considering that many psychiatric disorders were seen after the SARS-CoV-1 epidemic in 2002-2003, the effects on the mental health of both society and patients should be examined in the SARS-CoV-2 epidemic, which lasted longer and caused the pandemic. However, when we look at the literature, there are very few studies examining the mental health of COVID-19 patients. In a meta-analysis conducted over PubMed about the effects of the COVID-19 pandemic on mental health, 43 studies were examined and it was seen that only two of these 43 studies evaluated patients infected with COVID-19. Of these 43 studies, 41 were conducted on healthcare workers and the general public. In both studies that investigated patients with COVID-19, high levels of post-traumatic stress symptoms (PTSS) (96.2%) and significantly higher depressive symptoms ($p= 0.016$) were observed (8).

Social isolation and quarantine during the pandemic process reduced the spread of the virus but caused psychosocial side effects. In a study conducted in China, it was stated that 35% of society was psychologically affected by the pandemic (9). Concomitant chronic illness, female sex, and a previous history of a psychological illness increased the sensitivity to physical feelings in society. As shown in some studies, the high incidence in depression and anxiety may also be related to previous psychiatric diseases (10). Many studies have shown that anxiety and depression symptoms are seen at a higher rate in women during the COVID-19 pandemic (11). Female sex is the most important risk factor in post-pandemic posttraumatic stress disorder, which shows us that women may be more psychologically affected by the COVID-19 pandemic (12). In our study, women were found to be particularly prone to moderate and severe depression. Minimal depression was seen in men, and moderate depression was more common in women.

It has been stated in many studies that curfew, quarantine, and isolation conditions increase symptoms of anxiety and depression (13). In some studies, anxiety symptoms of 18.6% and depression symptoms of 13.4% were observed in patients with COVID-19, and impaired sleep quality was reported. In our study, depressive symptoms were observed in 404 (89.5%) of 451 patients. Moderate depressive symptoms were present in 47.4% of these patients. Since quarantine conditions were strictly enforced during the pandemic period, it was not possible for us to reach patients receiving home treatment and follow their symptom profiles. Therefore, hospitalized patients were included in the study. We think that we found a higher rate of depression because we conducted our study on patients with moderate and severe symptoms who had to be hospitalized and were treated in isolated COVID wards. We believe that the follow-up of the patients after discharge may change the results.

Various studies reported that comorbid diseases increased anxiety and depression during the pandemic period (13). Given that our study was conducted on patients who were hospitalized with SARS-CoV 2, most of them had chronic diseases. Among chronic diseases, HT has been associated with the degree of depression. The presence of HT increased as the degree of depression increased ($p< 0.05$). This pathophysiologic response has been shown to be mediated by physiologic pathways, including the hypothalamic-pituitary-adrenal (HPA) axis, sympathetic activation, vagal withdrawal, and immune system (14).

In different studies, poor sleep quality in patients with COVID-19, female sex, and having colleagues with COVID-19 were risk factors for anxiety, and female sex and family members infected with SARS-CoV-2 were seen as risk factors for depression; more than two physical symptoms for both anxiety and depression (15). The symptoms most associated with depression in patients with COVID have been stated as cough, dyspnea, and sore throat (15). In our study, we investigated the effects of COVID-19 symptoms on the

degree of depression symptoms. We concluded that symptoms such as fever, cough, myalgia, diarrhea, smell and taste disorder were related to the degree of depression symptoms. dyspnea was observed in 287 (63.6%) of 451 patients, and this symptom increased the degree of depression. However, some studies have also shown that there is no relationship between dyspnea and depression (16). Due to the frequent changes in quarantine and isolation conditions in COVID-19 services during the pandemic period, we could not follow the patients for a long time and completed our study in two months. We could not follow our patients after they were discharged, and we could not question their symptoms for a long time. COVID-19 is not a chronic respiratory disease and is characterized by acute onset situation causing anxiety in patients. Perhaps, if the patients are followed for a long time, they will get used to these symptoms and the symptoms of depression will decrease. We think that the follow-up of the patients after discharge may change the results.

Many studies reported that cranial nervous system (CNS) symptoms such as delirium were observed with direct cranial nerve invasion in patients infected with SARS-CoV-2, and that it was a neurotrophic virus (17,18). Although many symptoms of COVID-19 is associated with anxiety and depression, some studies have also reported the relationship between loss of smell and taste with depressive mood and anxiety. Anosmia is one of the early symptoms of COVID-19, and the SARS-CoV-2 virus reaches the CNS via the olfactory bulb, causing neuropsychiatric symptoms. These results occur when it invades the central nervous system via the trans-olfactory route (19). Therefore, patients with anosmia should be paid attention in terms of neuropsychiatric disorders (8). In our study, depressive symptoms were found at quite high levels in patients with smell disorders. Moderate depression symptoms were observed in 50.5% of 220 patients with smell disorders. We should pay attention to depressive symptoms in patients with COVID-19 who have smell disorders and keep in mind possible CNS and cranial nerve involvement.

Limitation

It was not possible to reach patients who were treated at home under quarantine conditions during the pandemic period due to isolation conditions. Therefore, we only evaluated patients who were treated at the hospital. We also evaluated patients who were hospitalized in the hospital's covid ward in just a two-month period because during the pandemic period, the isolation conditions of the COVID services were constantly changing and we had difficulties following the patients for a long time.

CONCLUSION

Among the symptoms of COVID-19; fever, cough and myalgia increase the symptoms of depression in patients. In addition, being a woman and HT are risk factors.

Ethics Committee Approval: The study was approved by the Adana City Training and Research Hospital Clinical Research Ethics Committee (Decision No: 1082, Date: 23.09.2020).

Author Contributions: Concept/Design: AK, SOE; Analysis/Interpretation: BT, MK, HES; Data Acquisition: AK, SOE; Writing: AK, BT, HES; Critical Revision: AK, MK; Final Approval: AK, SOE.

Conflict of Interest: All authors declare that they have no conflict of interest.

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