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Anxiety during the COVID-19 Pandemic: Prevalence, Effects and Predisposing Factors

COVID-19 Salgını Döneminde Anksiyete: Yaygınlığı, Etkileri ve Yatkınlık Faktörleri

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ABSTRACT

Although infectious diseases have emerged in various periods of history, the outbreaks seen worldwide due to globalization have started to increase in recent years. Epidemics had significant effects on the psychological health of individuals. The most important effect of COVID-19 pandemic on individuals was anxiety. In the days when other pandemic diseases are at the door, the understanding of anxiety during the COVID-19 pandemic in individuals is a very important issue. In the COVID-19 outbreak, the general sample, university students, those diagnosed with COVID-19, and healthcare workers were the groups most affected by anxiety. In different countries, moderate anxiety symptoms in different waves of the epidemic ranged from 6.3% to 66.8% in the general sample, between 18.6% and 87.7% in university students, between 13.0-60.3% in people diagnosed with COVID-19, and between 13.0-51.6% in healthcare workers. In the follow-up studies, it was noted that the anxiety symptoms did not regress to the pre-pandemic level for a long time in these samples. According to the findings, anxiety associated with COVID-19 is associated with psychological health. As COVID-19-related anxiety increased, negative emotions, dysfunctional behaviors, sleep problems and depressive symptoms increased.The fact that anxiety is common, persistent and associated with other psychological symptoms during the epidemic made it necessary to understand the underlying factors of anxiety. Findings indicate that anxiety sensitivity, disgust susceptibility/sensitivity, intolerance to uncertainty, and health anxiety play a role in explaining anxiety symptoms associated with COVID-19. These susceptibility factors may contribute to the development of cognitive-behavioral oriented therapeutic and preventive intervention programs both during/after epidemic and future epidemics especially in the general sample, university students, those diagnosed with COVID-19, and healthcare workers.

Keywords: Anxiety, COVID-19, prevalence, psychological health, predisposing factors

ÖZ

Bulaşıcı hastalıklar tarihin çeşitli dönemlerinde ortaya çıkmış olsa da son yıllarda küreselleşme nedeniyle dünya çapında görülen salgınlar artmaya başlamıştır. Salgın hastalıkların kişilerin psikolojik sağlıkları üzerinde önemli etkileri olmaktadır. COVID-19 salgınının ise bireyler üzerindeki en önemli etkisi anksiyete olmuştur. Diğer salgın hastalıkların kapıda olduğu günlerde COVID-19 salgınında bireylerde görülen anksiyetenin anlaşılması oldukça önemli bir konu olarak karşımıza çıkmaktadır. COVID-19 salgınında genel örneklem, üniversite öğrencileri, COVID-19 tanısı alanlar ve sağlık çalışanları anksiyeteden en fazla etkilenen gruplar olmuştur. Farklı ülkelerde, salgının farklı dalgalarında orta derecede anksiyete belirtileri genel örneklemde %6.3-%66.8 arasında, üniversite öğrencilerinde %18.6-%87.7 arasında, COVID-19 tanısı alan kişilerde %13.0-%60.3 arasında, sağlık çalışanlarında %13.0-%51.6 arasında değişmiştir. İzlem çalışmalarında, anksiyete belirtilerinin bu örneklemlerde uzun süre salgın öncesi düzeye gerilemediği dikkat çekmiştir. Bulgulara göre COVID-19 ile ilişkili anksiyete psikolojik sağlık ile ilişkilidir. COVID-19 ile ilişkili anksiyete arttıkça olumsuz duygular, işlevsel olmayan davranışlar, uyku problemleri ve depresif belirtiler artmıştır. COVID-19 salgınında anksiyetenin yaygın, kalıcı ve diğer psikolojik belirtilerle ilişkili olması anksiyetenin altında yatan faktörlerin anlaşılmasını gerekli kılmıştır. Bulgular anksiyete duyarlılığı, tiksinti yatkınlığı/ duyarlılığı, belirsizliğe tahammülsüzlük ve sağlık anksiyetesinin COVID-19 ile ilişkili anksiyete belirtilerini açıklamada rol oynadığına işaret etmektedir. Bu yatkınlık faktörleri özellikle genel örneklemde, üniversite öğrencilerinde, COVID-19 tanısı alanlarda, sağlık çalışanlarında salgın sırasında/sonrasında anksiyeteye yönelik bilişsel-davranışçı yönelimli tedavi edici ve gelecek salgınlar için önleyici müdahale programlarının geliştirilmesine katkı sağlayabilir.

Anahtar sözcükler: Anksiyete, COVID-19, yaygınlık, psikolojik sağlık, yatkınlık faktörleri

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Introduction

In the COVID-19 disease, all attention was focused on the control of the pandemic so the psychological dimensions of it were not sufficiently emphasized (Wang et al. 2020). However, this pandemic has significantly negatively affected the psychological well-being of individuals in the worldwide (Erdoğdu et al. 2020, Sani et al. 2020). It has drawn attention that one of the most important predictors affecting the psychological well-being of individuals during and even after the COVID-19 pandemic is COVID-19 anxiety (Lee et al. 2020, Banerjee et al. 2022, Caycho Rodríguez et al. 2022).

Uncertainty about the course, treatment and long-term effects of the pandemic play an important role in the emergence of COVID-19 anxiety. In addition, changing the lives and work policies of families and institutions and establishing measures such as closure, quarantine and social distancing rules to ensure safety have inevitably increased anxiety (Moghanibashi-Mansourieh 2020, Sher 2020, Yoon and Choi 2021, Silva et al 2021, Rehman et al. 2022). However, even on individuals living in countries where the pandemic is under control, strict security measures are not taken, and mortality rates are low, the uncertainty caused by the pandemic has led to widespread anxiety symptoms (Costa et al. 2022).

Increased anxiety during crisis periods such as pandemics is a normal response to a stressful situation (Taylor 2022). Experiencing anxiety during this period can even be functional, as it leads to adaptation to the measures taken, hygiene behaviors and decrease in attitudes related to anti-vaccination. For example, in studies conducted in Turkey (Salali and Uysal 2022), France (Detoc et al. 2020) and the United Kingdom (Mohanty et al. 2021) COVID-19 anxiety was one of the most important predictors of vaccine acceptance. Similarly, in Taiwanese adults, COVID-19 anxiety was associated with the frequency of adherence to protective measures such as social distancing and wearing masks to reduce the spread of infection (Wong et al. 2020). In Turkish adults, it was observed that those with high anxiety practiced more frequently hygiene behaviors, which have an important role in reducing and preventing transmission (Altun 2020).

On the other hand, health-related anxiety can easily become excessive and disrupt functionality during the pandemics. COVID-19 related anxiety includes worries related with one's own death, losing relatives, infecting relatives, not being able to reach health institutions, experiencing food shortages, and becoming unemployed (Lee 2020, Lee et al. 2021). Research indicates that anxiety associated with COVID-19 can lead to significant impairments at the emotional (stress, anger), interpersonal (perceived lack of social support, divorce), behavioral (excessive hand washing, unnecessary occupation of health facilities, avoidance of health services despite being necessary, hoarding of certain items, etc.) and physiological levels (muscle tension) (Ahorsu et al. 2020, Asmundson and Taylor 2020, Lee 2020, Lee et al. 2021).

The aim of this review study is to understand the effects of anxiety in the general sample, university students, those diagnosed with COVID-19 and healthcare professionals and to shed light on predisposing factors for a better understanding of anxiety in these individuals. In line with this purpose, firstly, the prevalence rates and long-term effects of anxiety were included. Second, the relationship between anxiety and other aspects of psychological health during the pandemic in these samples was examined. In the third stage, the psychological predisposing factors of anxiety associated with COVID-19 were discussed. Finally, the limitations of the studies conducted within the scope of this study were mentioned, and the effects of anxiety on psychological health were emphasized despite the limitations of the research. Also in this section, the importance of intervening to anxiety and preparing for future pandemics is emphasized and recommendations are made. In this review article, a broad scan was made and it was aimed to emphasize that COVID-19 anxiety affects almost all countries of the world. In this context, it is thought that the article may contribute to the rapid identification of risk groups in current and future pandemics and the development of the models needed to treat anxiety more effectively in these people.

Prevalence Rates of COVID-19 Anxiety

Anxiety related to the pandemic has significantly affected many groups of the society. The most studied groups to understand the prevalence effects of anxiety during the pandemic period are general sample, university students, those diagnosed with COVID-19 and healthcare workers (Gupta et al. 2022, Saeed et al. 2022).

General sample

Longitudinal studies conducted in general samples indicate that the number of people experiencing anxiety symptoms increased with the onset of the pandemic. For example, Twenge and Joiner (2020) conducted a

longitudinal study examining the overall prevalence of anxiety disorders included in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (APA 2013) in the United States from the beginning of 2019 to May 2020. The researchers observed that the number of participants diagnosed with anxiety disorders were tripled in may 2020 compared to the beginning of 2019. In the American sample, it was observed that the number of participants with moderate anxiety symptoms in April 2021 (26.4%) increased compared to the pre-pandemic period (18.9%) in 2018 (Klaser et al. 2021). Gilbar et al (2022) conducted a longitudinal study in which they evaluated anxiety symptoms with self-report scales in Israeli adults at 3-year intervals between September 2017 and June 2020. The researchers observed that the anxiety symptom scores of the same participants increased (15%) compared to the pre-pandemic period.

Numerous cross-sectional studies have been conducted during the pandemic to understand the prevalence of COVID-19 anxiety. Xiong et al (2020) included China, Spain, Italy, Iran, Turkey, Nepal and Denmark countries in their study and observed that the proportion of participants experiencing mild to moderate and severe anxiety symptoms ranged between 6.3% and 50.1% according to scale scores. In another meta-analysis and systematic review of 21 studies conducted in Eastern Europe, including Turkey, it was observed moderate to severe anxiety symptoms in 30% of the participants on self-report scales (Zhang et al. 2022). Similarly, Santabarbara et al (2021) conducted a systematic review and meta-analysis including the findings of 43 studies from the Middle East, Europe, China, America and Asia and they assessed anxiety using different scales. The researchers reported that between december 2019 and august 2020, the estimated proportion of participants aged 29-47 years who experienced anxiety symptoms ranging from moderate to severe according to the cut-off scores of the scales was 25%. In the studies collecting data from Turkish, Indian and Saudi Arabian samples, the rates of moderate anxiety symptoms in participants according to anxiety scale scores (respectively: 24.3%, 20.4% and 23.6%) were similar (Alkhamees et al. 2020, Erdoğdu et al. 2020, Sahu et al. 2021).

Follow-up studies focusing on the long-term prevalence effects of COVID-19 anxiety suggest that it might be resistant to extinction. It was observed that anxiety levels did not decrease in Chinese adults after the pandemic was controlled, also in them anxiety symptoms increased during the period of vaccination (Wu et al. 2022). In poor parts of Canada Lakhan et al. (2021) investigated with self-report scales the extent to which adults adapted the 'new normal' period when the flow of life was organized without removing all covid-19 measures. According to the findings, the rate of mild-to-moderate anxiety of the participants before the new normal period was found to be 21.3% and anxiety symptom levels did not differ significantly in the new normal period. Gambin et al. (2021) observed that moderate anxiety symptoms decreased in only 10% of the participants according to scale scores at the end of 5 different waves of the pandemic between March 2020 and May 2021 in Poland. In the Brazilian sample, which included only female participants, the incidence of anxiety symptoms according to self-report scale scores was 64.7% in the first year of the pandemic (September 2020) and 66.8% in the second year (November 2021) (Dos-Santos et al. 2022).

University Students

The COVID-19 pandemic increased anxiety symptoms in university students by causing uncertainties and obstacles related to education and training (Rajabimajd et al. 2021). Follow-up studies conducted with university students indicate that the number of those who experienced anxiety symptoms increased with the onset of the pandemic. For example, Hawes et al. (2022) longitudinally examined prevalence of anxiety symptoms between 2014 and May 2020 to examine the normative developmental process in increasing anxiety symptoms from adolescence to young adulthood in the United States. In the same young people, the increase in generalized anxiety symptoms with the onset of the pandemic was 40% compared to previous years. Hajduk et al. (2022) compared 2018 and April 2020 in terms of anxiety symptoms and various variables in Slovakian youth. The researchers found that moderate to severe anxiety symptoms (20%) on self-report scales doubled in university students in the early stages of the pandemic compared to 2018.

Numerous studies also have been conducted to understand the prevalence of COVID-19 anxiety in university students during the pandemic period. In a systematic review and meta-analysis of 8 cross-sectional studies using qualitative and quantitative analysis methods, in which 89% of the sample consisted of Chinese participants, the prevalence of anxiety symptoms in medical students was found to be 28%. In Germany, 18.6% of students had moderate anxiety symptoms and 9.1% had severe anxiety symptoms (Karing 2021). In Malaysia, 16.5% of the students reported moderate anxiety symptoms, while 13.2% reported severe anxiety symptoms (Woon et al. 2021). In the Kosovo sample, it was seen that anxiety symptoms were lower. In this study, according to self-report scale scores, 10.9% of the university students reported moderate anxiety, 3.7% reported severe anxiety, and 1.2% reported very severe anxiety (Arënliu et al. 2021). On the other hand, according to the scale scores, countries where anxiety symptoms were more prevalent draw attention. For example, in the Oman sample, 79%

of senior medical students had moderate to severe anxiety symptoms, while in Bangladesh, 87.7% of the university students had moderate to severe anxiety symptoms, and 18.1% of these students had severe symptoms (Islam et al. et al. 2020).

In follow-up studies focusing on the long-term prevalence effects of COVID-19 anxiety, it was observed that anxiety symptoms in university students persisted at different stages of the pandemic. In the longitudinal evaluation of fear and anxiety in university students in China (July 2020-July 2021), it was observed that the scores of students on the COVID-19 related fear scale decreased, while their anxiety scores on the self-report scale increased. While the participants of 23.30% experienced moderate anxiety at the first time point, the participants of 26.50% reported moderate anxiety at the second time point (Peng et al. 2022).

People Diagnosed with COVID-19

Anxiety symptoms are common in patients diagnosed with COVID-19 due to social isolation, not being able to see relatives, fear of death, disability and stigmatization during the illness and in the post-illness period (Demiryurek et al. 2022). The prevalence of anxiety in participants diagnosed with COVID-19 during the pandemic has been examined in cross-sectional studies. In Indonesia, the participants of 14.3% diagnosed with COVID-19 with mild COVID symptoms had anxiety symptoms (Luisida et al. 2022). The prevalence of anxiety symptoms in inpatients with a diagnosis of COVID-19 is also noteworthy. In a systematic review and meta-analysis of 31 observational studies conducted in Chinese sample with inpatients with COVID-19, it was observed moderate anxiety symptoms in 47% of the participants according to their scores on anxiety scales (Deng et al. 2021). Moderate anxiety symptoms were observed in 57.2% of the hospitalized COVID patients in Bangladesh and 60.35% of the hospitalized patients in Cameroon in Africa (Ngasa et al. 2021, Rahman et al. 2021). One and a half years after the onset of the pandemic, 43.75% of the patients aged 40-60 years who were about to leave hospital in India reported anxiety symptoms (Arul-Varman et al. 2022).

Where as in Turkey, the prevalence rates of anxiety symptoms in inpatients diagnosed with covid-19 were lower than in Asian and African samples. In Turkey, severe anxiety symptoms were observed in 7.70% and mild anxiety symptoms in 16% of 300 patients hospitalised in chest diseases, infectious diseases and internal medicine wards in May-June 2020 (Ayguder et al. 2020). Also in Turkey it was observed that anxiety levels of inpatients diagnosed with COVID-19 were 20% after 7 days of hospitalization (Hoşgoren-Alıcı et al. 2022).

Long-term effects of anxiety symptoms in patients diagnosed with COVID-19 have been examined in cross-sectional and longitudinal studies. In Turkey, anxiety symptoms were observed in 25% of the participants 15 days after hospital discharge (Demiryurek et al. 2022). Researchers observed that anxiety symptoms were more common in both women and young people. In a systematic review and meta-analysis of 15 studies with control groups from Europe, the United Kingdom, the United States, Australia, China, Egypt and Mexico, patients aged 17-87 years were followed up at intervals ranging from 14 to 110 days after discharge and anxiety symptoms were found in 13% of the participants (Lopez-Leon et al. 2021).

In a follow-up study conducted in Turkey, it was observed that the proportion of participants with anxiety symptoms 30-35 days after leaving the hospital decreased from 20% to only 18% compared to the initial period of the disease. In Grahana, one of the poorest countries of the African continent, 46.5% of the participants reported the presence of anxiety symptoms in the evaluation, which made 3 months after recovery (Danquaha and Mantea 2022). Furthermore, anxiety symptoms persisted in 45% of Chinese participants 1 year after leaving the hospital (Zang et al. 2021).

Healthcare Workers

During the COVID-19 pandemic, anxiety symptoms were commonly observed in healthcare workers due to the high risk of infection, transmission of infection to family members, perceived organizational inadequacies, workload, isolation and stigmatization (Maben et al. 2020, Preti et al. 2020). In cross-sectional studies conducted in different periods of 2020, the presence of anxiety symptoms in healthcare workers attracted attention. Cag et al (2020) observed that COVID-19 anxiety in healthcare workers living in 75 different world cities was one-sixth of the sample (17%), regardless of the number of cases and deaths in the cities. In Singapore, anxiety symptoms were observed in 13% of the healthcare workers, and it was reported that anxiety symptom rates did not change in monthly assessments over six-month period (Teo et al. 2021). Similarly, 13.4%-15.6% of the participants in the Iranian sample reported experiencing moderate or severe anxiety (Tabrizi et al. 2022). In Finland, 15% of the Finnish sample experienced anxiety symptoms that could develop into long-term problems during this period (Mattila et al. 2021).

On the other hand, studies conducted in the same period also draw attention to the countries where anxiety symptoms were more common in healthcare workers. Moderate level anxiety symptoms were observed in 36% of 334 healthcare workers working in 7 different hospitals in Africa and 37.2% of 924 participants working in hospitals in India (GebreEyesus et al. 2021, Gupta et al. 2021). In two separate studies focusing on the psychological effects of the pandemic in Turkey, 51.6% of the healthcare workers experienced moderate anxiety symptoms (Elbay et al. 2020), while in another study, 33% of the healthcare workers experienced clinically significant anxiety symptoms (Korkmaz et al. 2020).

It was observed that anxiety symptoms were more common in frontline health workers than in general health workers. For example, in a meta-analysis of 26 independent samples of 21 studies conducted in Eastern Europe between february 2020 and february 2021, anxiety symptoms were observed in 33% of the general healthcare workers and 46% of the frontline healthcare workers (Zang et al. 2022). In a meta-analysis of 71 studies conducted between december 2019 and september 2020, anxiety prevalence rates were found to be 25% in healthcare workers, 27% in nurses, 17% in medical doctors and 43% in frontline healthcare workers (Santabarbara et al. 2020).

The long-term effects of anxiety in health workers were assessed in cross-sectional and longitudinal studies conducted at different waves of the pandemic. In India, in the first wave (2020), 41.3% of the healthcare workers experienced anxiety symptoms, while in the second wave (2021), the proportion of participants with anxiety symptoms decreased to 16.3% (Gupta et al. 2022). In a large-sample longitudinal study in Northern Ireland, 27% of healthcare workers in november 2020 and 26% of them in february 2021 had moderate level anxiety symptoms. In the second phase of this study, it was reported that the incidence of anxiety symptoms did not change, despite the fact that all participants in the second phase had completed their first dose of vaccine compared to the first phase (Jordan et al. 2021). Similarly, Rizk and Ghanima (2022) examined the prevalence of anxiety in healthcare workers working as anesthesia and intensive care doctors in the United Arab Emirates during the later stages of the pandemic (March 2021). The researchers observed that the anxiety rate was 51.6% in healtcare workers and reported that despite they completed second dose of vaccine, vaccination did not affect anxiety symptoms in them too.

Relationship between COVID-19 Anxiety and Psychological Health

COVID-19 anxiety was observed with many psychological symptoms in the general sample, university students, those diagnosed with COVID-19 and healthcare workers. Anxiety was associated with negative emotions and low life satisfaction in healthcare workers and university students during the pandemic. It has been observed that the level of hopelessness and burnout increases as the anxiety associated with COVID-19 increases in healthcare workers in Turkey (Hacımusalar et al. 2020, Ay and İçen 2021, Elbay et al. 2021). In Romania medical students continuing online education and also working voluntarily in COVID-19 units, who had high anxiety, perceived more stress and felt burnout (Armean et al. 2021). In Turkish sample of university students aged 18-45 years, the higher the COVID-19 anxiety were, the more loneliness they felt (Aslan et al. 2022). A negative correlation was found between quality of life and COVID-related anxiety in Filipino nursing university students (Berdida and Grande 2022).

Anxiety in the general sample and in university students during the pandemic period was reported to be associated with dysfunctional behaviors. For example, smartphone overuse is common among university students. However, in the samples of Peru (Santander-Hernández et al. 2022) and China (Song et al. 2022), the frequency of problematic smartphone use increased much more in medical school students with high COVID anxiety according to the scale scores during the period of curfews and online courses. It has been suggested that smartphone use at the level of addiction with increased anxiety may be a way of emotional relief in medical students. In Iran as COVID-19 anxiety increased, cybercronymy behavior, which is the emotional distress experienced as a result of repetitive search for health-related information, increased in the general sample (Wu et al. 2021). In the general sample of 300 participants from each of the Latin American and Caribbean countries, increased anxiety changed consumer behavior and predicted impulsive and compulsive buying behavior, which negatively affected the well-being of individuals (Caycho Rodríguez et al. 2022).

COVID-19 anxiety also led to changes in the health behaviors of the general sample and university students. In Polish women cluster analysis was conducted based on their anxiety and overweight status according to the scale scores, and it was observed that impaired eating attitudes/behaviors and negative body image increased in overweight women with those who had high COVID-19 related anxiety. Therefore, it was stated that COVID-19 anxiety has a disruptive effect on eating behavior and body image (Czepczor-Bernat et al. 2021). In Chinese university students anxiety was found to play a mediating role in the relationship between binge eating behavior

and coronavirus stress. Coronavirus stress increased anxiety, and increased anxiety increased the frequency of binge eating behaviors (Wang et al. 2022). Similarly, it was observed that COVID-19 anxiety increased alcohol and smoking behaviors in Turkish male university students with attention deficit hyperactivity disorder, regardless of whether the participants had a previous history of anxiety (Evren et al. 2021).

The relationship between COVID-19 anxiety and sleep problems was also attracted attention. In Taiwan, it was observed that the incidence of sleep disorders increased as COVID-19 related anxiety increased in a general sample older than 20 years of age (Li et al. 2021). COVID-19 related anxiety was positively associated with sleep disorders in self-report scales in outpatient and emergency healthcare workers in pandemic hospitals of Turkey (Korkmaz et al. 2020). Again in Turkey, in a general sample between the ages of 18-65, those with sleep disorders had 2.5 times more COVID anxiety than those without sleep disorders (Karaaslan et al. 2021).

Anxiety during the pandemic has triggered or exacerbated psychological disorders. For example, it was observed that when controlling for confounding variables such as participants' previous health status, age, gender, and common anxiety symptoms, COVID-19 related anxiety was associated with unexplained gastrointestinal and fatigue symptoms in the general sample of England (Shevlin et al. 2020). On the other hand, the presence of coronavirus anxiety appears to be a risk factor for depression. It was observed that coronavirus anxiety predicted depressive symptoms both in nurses in Poland (Mokros et al. 2021) and American sample (Lee et al. 2021). Also in the American general sample, COVID-19 anxiety scale scores were found to be associated with depression scale scores regardless of age, gender, personality traits, and occupation (Albery et al. 2021).

In conclusion, research indicates that anxiety associated with COVID-19 is related to other psychological symptoms. According to the findings, low life satisfaction, dysfunctional behaviors, negative health behaviors, sleep problems and depressive symptoms, all of which are common in individuals during the pandemic, are associated with anxiety. In this context, focusing on anxiety during the pandemic may help address other mental health issues effectively.

Predisposing Factors in COVID-19 Anxiety

Many people, including the general sample, university students, those diagnosed with COVID-19 and healthcare workers, experienced anxiety symptoms during the pandemic. Even after the impact of the pandemic subsided, there were individuals who experienced these symptoms. Also in these samples with anxiety symptoms, other mental health symptoms were found. All these have made it necessary to understand the individual factors underlying anxiety during the pandemic. In this context, the predisposing-stress model may be helpful in explaining the anxiety reactions of the individuals. Clark and Beck (2010) emphasize predisposing, triggering and sustaining factors in the emergence and continuation of symptoms in the cognitive model of anxiety. Based on this conceptualization, the covid-19 pandemic can be thought as a triggering or sustaining factor. On the other hand predisposing factors play a role in the emergence and maintenance of anxiety symptoms (Shafran et al. 2021). Knowing the predisposing factors in the COVID-19 pandemic will be useful for understanding the responses in during/after and future pandemics. Theoretical knowledge and empirical relationships indicate that intolerance of uncertainty, health anxiety, disgust propensity/sensitivity and anxiety sensitivity may play a role in the emergence and persistence of anxiety symptoms during the pandemic.

Intolerance of Uncertainty

The COVID-19 pandemic has been characterized by uncertainties in terms of its nature, duration, transmission route, treatment and prevention methods. In addition, whether the pandemic is over, whether a new wave will come, and if so, when it will come has been a subject of uncertainty. In short, rather than perceived uncertainty, the pandemic itself involved objective uncertainty (Shafran et al. 2021). For this reason, researchers trying to understand the factors underlying anxiety have focused on intolerance of uncertainty.

Studies conducted during the COVID-19 pandemic has showed that intolerance of uncertainty is a clinically central variable that interacts with cognition, behavior and emotions. Mertens et al (2020) found that intolerance to uncertainty predicted coronavirus anxiety in female participants aged 20-40 years. Similarly, at the beginning of the pandemic Kardaş (2021) observed that intolerance to uncertainty played a full mediating role in the transformation of fear of coronavirus into coronavirus anxiety in participants aged 18-60 in Turkey. Beck and Daniels (2023) observed that intolerance to uncertainty was the most predictive factor for anxiety among the variables of gender, perceived social support, age and fear of contagion in 342 healthcare workers working in public and private hospitals during the covid-19 epidemic. Researchers emphasized that psychological

interventions should target intolerance of uncertainty in healthcare workers who are in uncertainty due to the epidemic conditions.

Intolerance to uncertainty has been identified as a significant precursor of anxiety during the COVID-19 pandemic. This phenomenon is underpinned by a variety of mechanisms as expounded by scholarly investigations. Notably, Rettie and Daniels (2021) have postulated that intolerance to uncertainty can instigate maladaptive coping strategies, exemplified by an excessive tendency to seek reassurance, which, in turn, fosters heightened anxiety reactions. In a similar vein, Satıcı et al. (2020) have discerned that intolerance of uncertainty plays a pivotal role in precipitating and exacerbating anxiety related to COVID-19, primarily through the lens of negative cognitive processes like rumination, as observed in Turkish participants. The authors of this study underscore the pivotal role of intolerance of uncertainty as a determinant of anxiety within the context of COVID-19, thus emphasizing its significance as a critical variable in the realm of psychological well-being. Concurrently, Carnahan et al. (2022) conducted a longitudinal investigation among university students, employing assessments at three-month intervals. Their findings illuminated the association between intolerance of uncertainty and cognitive styles characterized by cognitive distortions and mental constructs concerning the rapid emergence and proximity of impending threats at the outset of the pandemic. Moreover, the study unveiled an intricate relationship between intolerance of uncertainty and the adoption of avoidance-based coping mechanisms, including distraction and substance use, as the former escalated. It is noteworthy that the cognitive style under scrutiny did not serve as a predictor for depressive symptoms but emerged as a significant predictor for anxiety symptoms. This dynamic was underscored by a sequential mediation effect, wherein intolerance to uncertainty and avoidance-based coping strategies jointly contributed to the manifestation of anxiety symptoms..

Health Anxiety

People with high health anxiety misinterpret body sensations and changes in a catastrophizing way. People with extreme health anxiety tend to be highly anxious during epidemics, as they tend to interpret bodily changes and sensations (fatigue, etc.) as being infected (Marcus et al. 2007, Taylor 2019). People with high health anxiety may engage in dysfunctional reassurance-seeking behaviors. These people may cause overcrowding in the health system by frequently visiting physicians and hospitals for fear of catching a virus (Asmundson and Taylor 2020). On the other hand, some people with high health anxiety may give up seeking medical help because they see doctors and hospitals as a source of infection. Low health anxiety, however, may have a negative impact on health behavior. People with low health anxiety are less likely to comply with pandemic control measures such as hand washing and vaccination. As a result, it has been observed that individuals' health anxiety can vary during epidemics (Taylor 2019).

Health anxiety was thought to be one of the predisposing factors in the emergence of anxiety symptoms in the COVID-19 pandemic, and studies were carried out in the center of this variable. In the COVID-19 pandemic, it was found that health anxiety predicted COVID-19 related anxiety in a general sample of young adults and women in the Turkish population (Yalçın 2021). Mertens et al (2020) suggested that health anxiety predicted COVID anxiety rather than general measures of generalized anxiety and worry.

The moderator role of health anxiety in anxiety reactions during the epidemic period has also attracted attention. In a study conducted in the sample of Slovenia, scenario-based imagery tasks were used. In this study each of the participants visualized scenarios that evoked a neutral stimulus (putting the dishes in the dishwasher), standard fear (being attacked by a stranger), and fear associated with COVID-19 (experiencing the symptoms of COVID). Participants evaluated their anxiety during imagery tasks with self-report scales. Both standard and COVID-19 related fear scenarios triggered a sense of fear in the participants. However, anxiety reactions during imagery of the COVID-19 related scenario were only seen in those with high health anxiety. Researchers have suggested that in people with high health anxiety, the cues related to the threat of COVID-19 over-activate the fear network in the brain compared to people with low health anxiety, which results in dysfunctional anxiety symptoms (excessive social isolation, etc.) (Benke et al 2022). Jungmann and Witthöft (2020) examined the relationships between increased distress with excessive or repeated searches on the internet for health-related information, called cyberchondria, COVID-19 anxiety in German adults who reported above-average health anxiety due to the pandemic. They observed that health anxiety had a moderating role in the relationship between cyberchondria and COVID-19 anxiety. The presence of cyberchondria reassurance-seeking behavior and health anxiety in participants increased the COVID-9 anxiety. In this context, it was suggested that people with pre-existing health anxiety would be more prone to experience COVID anxiety.

Disgust Propensity and Sensitivity

Disgust is one of the important emotional components in the behavioral immune system to protect the person from diseases. There are individual differences in the degree to which disgust is experienced. Disgust consists of two components: disgust propensity and disgust sensitivity. While disgust propensity is the tendency to experience disgust, disgust sensitivity is the negative interpretation of the experience of disgust. Disgust propensity has the function of facilitating avoidance of stimulus that carries risk of pollution, contagion and disease, but it is an important risk factor for anxiety disorders associated with contagion symptoms (Olatunji et al. 2005). Since disgust provides a disease avoidance function, it appears as a factor to explain increased safety behaviors during the epidemic and anxiety associated with COVID-19.

Propensity and sensitivity of disgust observed in different degrees in individuals affect the emergence and continuation of COVID-related anxiety. In the United States, Cox et al (2020), in their study focusing on the propensity dimension of disgust with participants aged 18-65 years, collected data for the research on sleep and anxiety symptoms in 2016, and re-reached 28.5% of the participants again in April 2020. Researchers stated that covid-related anxiety was found to be higher in those with a high disgust propensity four years before the outbreak. Furthermore, They also observed that participants with a disgust propensity overused safety behaviors such as hand washing, using disinfectants, and avoiding crowded environments to protect themselves from the disease, even though it was not necessary. In short, it was reported that people with a high disgust propensity before the outbreak had higher COVID anxiety and used more frequent safety behaviors during the outbreak. The researchers concluded that the propensity to disgust plays an important role in the symptoms of increased anxiety during the COVID epidemic and that anxiety symptoms occur with the stressor of the epidemic in those with a predisposition to disgust. Troisi et al (2022) focused only disgust sensivity in 131 healthcare workers consisting of doctors, nurses and laboratory technicians working in COVID-19 hospitals after the outbreak began in Italy. The researchers observed that disgust sensitivity was the strongest predictor of worry over contracting COVID-19 compared to perceived stress and depression symptoms.

Mckay et al (2020), in China, focused on both the propensity and sensivity components of disgust to examine the mechanisms underlying virus transmission anxiety in adults. They stated that when age, gender and Depression Anxiety Stress Scale scores were controlled, both disgust propensity and disgust sensitivity had a high predictive power of COVID-related anxiety. Pascal and Blidaru (2021) conducted a study with university students in Romania and examined the mechanisms by which disgust causes coronavirus anxiety. They observed that disgust propensity predicts COVID-related anxiety and that coronavirus-related fear has a partial mediating role in this relationship. Researchers emphasized that disgust responses associated with fear of contracting illness is a psychological risk factor for anxiety symptoms.

Anxiety Sensitivity

Anxiety sensitivity is the fear that anxiety-related sensations will have physical (such as having a heart attack), cognitive (such as insanity, loss of control) and social (such as exclusion, seeing the person experiencing anxiety) consequences (Reiss et al. 1986). Anxiety sensitivity is a multidimensional trait conceptualized on one dimension. This feature is a cognitive risk factor that plays a role in the emergence and continuation of negative emotions (Krebs et al. 2020). People with high anxiety sensitivity may interpret even neutral bodily changes as dangerous (Taylor et al. 2007).

Research has focused on the role of anxiety sensitivity during the epidemic. Since COVID-19 infection, which has a high risk of transmission and has a lethal feature, is associated with bodily sensations, anxiety sensitivity may play a role in epidemic-related anxiety. In Argentina Rogers et al (2021) examined the relationship between anxiety sensitivity and COVID-19 anxiety, worry, impairment in functioning in two different adult samples consisting of those with a previous diagnosis of anxiety disorder and the general sample. In the study, in which the variables of age, gender, diagnosis of COVID-19 and previous medical history were controlled, it was seen that the Anxiety Sensitivity Scale total score predicted the COVID-19 anxiety in both the normal sample and the clinical sample. In addition, the relationship between anxiety sensitivity and COVID-19 anxiety was found to be higher in those with a previous diagnosis of anxiety disorder than in the general sample. This finding indicated that anxiety sensitivity exacerbated COVID-related anxiety in a clinical sample with a previous diagnosis of anxiety disorder.

It is noteworthy that studies examining the anxiety sensitivity more comprehensively focus on the social, cognitive and physical sensitivity sub-dimensions of this variable. In the study conducted with university

students consisting mostly of women and excluded those with positive COVID-19 diagnosis in USA, it was observed that the fear of physical symptoms sub-dimension of anxiety sensitivity predicted COVID-19 anxiety (Ojaletho et al 2020). In a study of participants diagnosed with COVID-19 in the USA, the total score of the Anxiety Sensitivity Index and the three sub-dimensions of this scale, physical sensitivity, cognitive sensitivity and social anxiety, predicted COVID-related anxiety symptoms. It was observed that the cognitive dimension of anxiety sensitivity predicted the anxiety symptoms the most and the physical dimension the least (Warren et al. 2021).

There are also studies focusing on the mediator and moderator role of anxiety sensitivity. Manning et al (2021) administered online scales to 563 people, mostly men (58.1%) in the American sample. They observed that the transformation of perceived stress associated with COVID-19 into anxiety is in the condition of the presence of anxiety sensitivity. In other words, when anxiety sensitivity was high in participants who experienced stress by evaluating the COVID-19 epidemic as uncontrollable, destructive and unpredictable, anxiety symptoms emerged and the severity of anxiety symptoms increased.

Guo et al (2021) observed that those with high attentional control skills in the Chinese adult sample had lower anxiety symptoms during the epidemic, as they focused less on threatening stimuli, and were also able to move away from the threatening stimulus more easily when faced with negative information. Researchers examined anxiety sensitivity and its sub-dimensions in order to understand the mechanisms by which the negative relationship between attention control skills and anxiety symptoms occurs. They have stated that attention control affects anxiety symptoms with cognitive and physical sub-dimensions of anxiety sensitivity, while the social dimension has no role in the emergence of anxiety symptoms. In conclusion, studies indicate that anxiety sensitivity predicts COVID-19 related anxiety and has moderator and mediator roles in anxiety symptoms.

Conclusion

Epidemics are stressful life events. Therefore, negative emotions might be easily triggered during the pandemic period and psychological health could be affected. One of the most frequently experienced negative emotions during the COVID-19 pandemic was anxiety. Many studies conducted to understand the effect of anxiety on individuals during this period. Self-assessment scales were frequently used in these studies. However, these scales were generally suggested to have lower sensitivity and specificity compared to clinician/observer-rated scales or structured clinical interviews. For example, Xiong et al (2020), in a systematic review study on the prevalence rates of anxiety in general samples in different countries, observed that anxiety prevalence rates were lower when assessed with clinical interviews than with self-report scales.

On the other hand, some of the self-report scales used in the studies are developed before the pandemic (e.g. Beck Anxiety Scale). It is suggested that these scales would not be suitable for assessing anxiety and its related dysfunctional thoughts and behaviors (Ransing et al. 2020). Furthermore, the reliability and validity studies of the scales developed during the pandemic (e.g. COVID-19 Anxiety Scale, Coronavirus Anxiety scale, COVID-19 related Fear Scale) were conducted on an online platform in a sample of middle-aged adults who are less prone to anxiety (Ahorsu et al. 2020, Lee et al. 2020, Taylor et al. 2020). In addition, the scales in the studies varied considerably and used different cut-off scores for the criteria of anxiety presence (Deng et al. 2021). This may have led to biases and inconsistencies in understanding the prevalence and effects of anxiety symptoms during the pandemic. Another factor that might lead to biases in researches focusing on the prevalence effects of COVID-19 anxiety were cross-sectional studies. Each of these studies was conducted at different times of the pandemic. In addition, the studies did not control for demographic (e.g. being female), economic (e.g. being unemployed), situational (e.g. having a family member diagnosed with COVID-19) and other psychological factors (e.g. the presence of previous anxiety and depressive symptoms) which would be associated with COVID-19 anxiety.

Despite the methodological limitations of the studies, the findings indicated that anxiety symptoms are commonly seen in the general sample, university students, healthcare workers and those diagnosed with COVID-19. In this context, it could be considered that these sample groups, especially young people, are at the greatest risk in terms of psychological health during pandemic periods. In addition, the findings indicate that anxiety is resistant to change in these risky samples. Indeed, Taylor (2019) argues that anxiety symptoms persist even after the pandemics end. There are findings supporting this view. For example the study conducted with the people being treated for severe acute respiratory syndrome in a local hospital in Hong Kong, found that 32.5% of the participants had still anxiety symptoms with a semi-structured clinical interview 50 months after the epidemic disease (Lam et al. 2009). Another similar study, in participants behavioral changes related to anxiety disorders were observed to continue two years after the Ebola outbreak (Shultz et al. 2015).

Despite all these empirical findings, we see that studies focusing on the psychological effects of the COVID-19 pandemic after its severity decreases remain limited. Therefore, the long-term effects of the COVID-19 pandemic are still unknown. However, it has been suggested that the effects of the COVID-19 pandemic on psychological health may be greater than previous coronavirus outbreaks (Lotfi et al. 2020, Zhao et al. 2021). In particular, it should not be ignored that the samples most affected by anxiety in the pandemic might be more sensitive to the long-term psychological effects and the importance should be given to conducting studies with these samples.

Cross-sectional studies conducted with a general sample, university students, those diagnosed with COVID-19, and healthcare professionals indicate that COVID-19 anxiety may play a negative role on psychological health. As the anxiety increased, the feelings of hopelessness, loneliness and burnout increased in the participants. In addition, anxiety increased the risk of worsening existing psychological disorders, dysfunctional behaviors, impaired health behaviors and insomnia. However, longitudinal studies rather than cross-sectional studies are needed to understand the effects of anxiety on individuals during the epidemic.

In conclusion, the findings indicate that COVID-19 anxiety might be common, persistent and associated with other psychological health problems. All these require intervention for anxiety during and after the epidemic (Azevedo et al. 2022). Therefore, it is important to conceptualize the mechanisms underlying anxiety (Shevlin et al. 2020). Research shows that psychological structures such as intolerance to uncertainty, health anxiety, anxiety sensitivity and disgust may play a role in the emergence of anxiety symptoms during the COVID-19 epidemic. Researchers and clinicians need to develop models to prevent and treat to anxiety during/ after an outbreak and before future epidemic diseases begin. The psychological constructs mentioned in this study could be used to conceptualize anxiety and to develop cognitive-behavioral intervention strategies for it.

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