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Cyberchondria as Digital Psychopathology: Covid 19 Pandemic Example*

Dijital Psikopatoloji Olarak Siberkondri: Covid 19 Pandemisi Örneği

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Abstract

The COVID-19 pandemic has affected the behavior of individuals on a global scale. This study empirically analyzed the relationship between the stress and anxiety of the COVID-19 pandemic, hygiene and protection measures of young individuals, online medical information search and cyberchondria, and online medical support and assistance. Cross-sectional data obtained from 662 online surveys conducted with Atatürk University Communication Faculty students in 2021 were analyzed by Structural Equation Modeling. Study findings; The COVID-19 Pandemic revealed a positive and solid relationship ($\gamma = 0.70$; $t = 14.26$) between Anxiety and Stress and Personal Hygiene and Protection Measures. Furthermore, a positive and robust relationship was found between COVID-19 Pandemic Anxiety and Stress and Online Medical Information Searching on the Internet ($\gamma = 0.42$; $t = 9.64$), and it was also determined that there was a strong positive relationship between Online Medical Information Search on the Internet and Cyberchondria ($\gamma = 0.72$; $t = 15.07$). Finally, a positive and robust relationship was found between Medical Support and Expert Assistance and COVID-19 Pandemic Anxiety and Stress ($\gamma = 0.45$; $t = 9.24$). The findings show that young individuals intensively use online medical information searches during the COVID-19 pandemic. This situation shows that this global epidemic has increased the behavior of cyberchondria and directed young individuals to seek medical support and personal protection measures. In addition, it is seen that people with high anxiety levels develop cyberchondria behaviors to protect themselves from the virus.

Anahtar Kelimeler: Cyberchondria, pandemic, covid 19, digital psychopathology, structural equation model

Öz

COVID-19 pandemisi küresel ölçekte bireylerin davranışlarını etkilemiştir. Bu çalışma COVID-19 pandemisi stres ve kaygısının; genç bireylerin hijyen ve korunma tedbirlerini, internetten çevrimiçi tıbbi bilgi arama ve siberkondri ile çevrimiçi tıbbi destek ve yardım arasındaki ilişkiyi ampirik olarak analiz etmeyi amaçlamıştır. Atatürk Üniversitesi İletişim Fakültesi öğrencileriyle 2021 yılında yapılan çevrimiçi 662 anket çalışmasından elde edilen kesit veriler Yapısal Eşitlik Modellemesi ile analiz edilmiştir. Çalışma bulguları; COVID-19 Pandemisi Kaygı ve Stresi ile Kişisel Hijyen ve Korunma Tedbirleri arasında pozitif yönde ve çok güçlü bir ilişkinin varlığını ($\gamma = 0.70$; $t = 14.26$) ortaya koymuştur. COVID-19 Pandemisi Kaygı ve Stresi ile İnternette Çevrimiçi Tıbbi Bilgi Arama arasında pozitif yönde ve güçlü bir ilişki tespit edilmiştir ($\gamma = 0.42$; $t = 9.64$) ve İnternette Çevrimiçi Tıbbi Bilgi Arama ile Siberkondri arasında pozitif yönde çok güçlü bir ilişkinin olduğu da ortaya çıkmıştır ($\gamma = 0.72$; $t = 15.07$). Son olarak Tıbbi Destek ve Uzman Yardımı ile COVID-19 Pandemisi Kaygı ve Stresi arasında pozitif yönde ve güçlü bir ilişki tespit edilmiştir ($\gamma = 0.45$; $t = 9.24$). Bu çalışmada COVID-19 pandemisi sürecinde genç bireylerin çevrimiçi tıbbi bilgi arayışlarını yoğun bir şekilde kullandıkları bulgulanmaktadır. Bu durum genç bireyleri tıbbi destek alma ve kişisel korunma tedbirlerine yönelttiği gibi bu küresel salgının siberkondri davranışını artırdığını da göstermektedir. Özellikle kaygı seviyesi yüksek kişilerin virüsten korunmak için siberkondri davranışlarını geliştirdikleri görülmektedir.

Keywords: Siberkondri, pandemi, covid 19, dijital psikopataloji, yapısal eşitlik modeli

Ethics committee decision report regarding this study; It was obtained with the document dated 27.10.2021, Session Number 16 and Decision No: 200 of Atatürk University Social and Human Sciences Ethics Committee Presidency.

Introduction

The COVID-19 process, influential worldwide, has had significant and comprehensive effects on living conditions. While the pandemic significantly changed living conditions, it increased social isolation and seriously disrupted the sense of security. While the trust in political and social institutions decreased, the economy also suffered heavy losses. Governments have allowed people to work under certain conditions while advising people to stay at home in many countries. During this period, physical distance rules were applied, and political decision-makers limited people's freedoms.

When considering the characteristics and results of the pandemic, it is understood that there are various adverse effects on the mental health of individuals (Brooks et al., 2020). During the pandemic process, almost every area of life has shown a digitalization trend. Digitalization has been effective in many areas such as education, trade, health, and banking. Another area where digitalization is practical is the health sector. The digital revolution has changed lives in many ways, including how health-related information is obtained. It has become effortless to access such information at little or no cost.

Internet for most people; It has become the first place they turn to when they need to learn more about symptoms, health, and disease. The consequences of this change are becoming more and more visible but still poorly understood. Thanks to this easy access, some people have become less impressed with the information on the Internet, while others have become more worried and confused. This has affected people's health-seeking behavior and their relationship with doctors (Starcevic, 2017). In this respect, it has become common to search for health information on the Internet in the modern world. Surveys reveal this situation. For example, more than 75% of respondents in nine countries (Russia, China, India, Mexico, Brazil, USA, Italy, Australia, and Germany) use the Internet for health-related questions (McDaid & Park, 2010). On the other hand, nearly 90% of adult internet users in the USA stated that they searched for health information online at least once (Harris Poll, 2010). This indicates an increasing number of visits to health-related websites.

The phenomenon of researching health information on the Internet is not surprising. Among the fundamental reasons for this, it is possible to show that internet access requires minimal cost. Also, accessing online information is easy and fast. Due to the anonymity of the virtual environment, people can do all kinds of disease research by not using their real names. It is simple and easy to access health information from doctors, medical books, encyclopedias, or popular health magazines rather than simple media such as the Internet, making this situation even more attractive (Starcevic and Berlep, 2015). Health research on the Internet makes the phenomenon of cyberchondria widespread.

During the COVID-19 pandemic process, "personal cleaning and hygiene" is seen as the most critical method in preventing the disease. Hand and face cleaning, masks and gloves, and social distance are essential in individual protection. Nevertheless, it is also seen that dramatic behavioral changes occur, such as disproportionate fear from the coronavirus, excessive housekeeping, and the misuse of cleaning products for personal hygiene or food cleaning. Thus, there is an increase in chlorine exposure (Kampf et al., 2020; Le Roux & Sinno-Tellier, 2020).

This study aimed to analyze and measure the stress and anxiety created by the COVID-19 pandemic on individuals, individual protection and hygiene behaviors to prevent disease, internet use, cyberchondria, and medical aid and information acquisition behaviors internet with the help of a model. The study includes individuals studying at Atatürk University, Faculty of Communication. The cross-sectional data obtained from the questionnaires made with a sample group based on voluntary participation over the Internet were analyzed by structural equation modeling.

1. Conceptual Framework

1.1. Cyberchondria As Digital Psychopathology

"Cyberchondria" is a concept triggered by the increase in online medical information searches on the Internet. This notion describes a dysfunctional positive feedback loop that raises concerns about physical symptoms (Stone and Sharpe, 2003). Cyberchondria is the concept that refers to the health concern created or increased by a person using the Internet to search for medical information. Cyberchondria is often

described in the context of health concerns. A British newspaper coined the term in the early 2000s from the word hypochondria. Like hypochondria, cyberchondria involves extreme health concerns. However, it is thought that the effect of cyberchondria is more than hypochondria. The widespread availability of the Internet supports this situation. The basis of the concept of cyberchondria makes people who have health problems want to go to the hospital and diagnose themselves without any help from a doctor, and they apply to the Internet for this. While this provides a sense of relief in some people, it causes many people to experience undue anxiety and fear about their health, on the contrary.

Although there is a tremendous amount of information on the Internet, this information is often not factual. For example, blogs or online support groups feature anecdotes and personal opinions rather than evidence-based and test-based research. As a result, people may face false or distorted information about a disease they research on the Internet and feel unwarranted. In this context, cyberchondria is a clinical condition that manifests as excessive and repetitive online health-related searches associated with health anxiety, obsessive-compulsive symptoms, and intolerance to uncertainty.

Recently, the number of people searching for health-related information on the Internet has increased rapidly. The advantages of this behavior include quick and easy access to health information at little or no cost. However, cyberchondria is also a concept used to refer to the anxiety-inducing effects of online health-related searches. Considering the term's origin (i.e., the digital age equivalent of hypochondria), cyberchondria, with its psychopathological dimension, refers to an abnormal behavior pattern and emotional state. In other words, cyberchondria is not just a trend to search for health-related information on the Internet, which has become a regular part of modern life. Besides, various definitions of cyberchondria have been proposed, involving excessive or repeated online searches for health-related information and health-related concerns (Starcevic, 2017). On the other hand, the disadvantages of using the Internet for health searches include the varying quality and reliability of online information and problems with the interpretation and use.

In cyberchondria, excessive online health searches increase anxiety, depression and distress, and other hostile conditions in internet users. Looking specifically at this phenomenon, McElroy et al. (2019) define the concept of cyberchondria as a versatile model. This model is available in four sizes:

- Extremism (excessive and repetitive online health searches)
- Coercion (interruption of daily life such as work or study)
- Distress (increased negative emotional states)
- Assurance (requesting assurance checks from other sources such as doctors).

These dimensions reflect the putative components of the cyberchondria. When these phenomena are taken together, cyberchondria is a condition in which the individual exhibits behavioral, cognitive, and emotional patterns. These patterns include feelings of compulsion, distress, reassurance, and excessive searching for health information online. Individuals may develop various psychoses due to health searches on the Internet. In cyberchondria, a pathological condition, excessive health anxiety comes to light. The multidimensionality of the concept and the occasional psychotic diagnoses reinforce the thesis that cyberchondria is a psychopathological disorder and almost gives it the status of a disorder.

On the other hand, those who argue that this concept is only an ego-syntonic phenomenon and indicate that individuals search the Internet due to health concerns have also been included in these discussions (Starcevic and Berle, 2015). Empirical research supports strong relationships between the frequency of searching for medical information online and health anxiety (Baumgartner and Hartmann, 2011; Muse et al., 2012; Fergus, 2013). Experimental studies show that exposure to online medical information increases anxiety levels. In a study they conducted, Singh and Brown (2016) gave participants 15 minutes to personally search online for information about their physical health symptoms. As a result, a significant increase in the participants' anxiety levels due to online searches was seen. In another study, it was observed that participants who viewed medical web pages for 20 minutes had a high level of anxiety in the context of anxiety pathology (Norr et al., 2014).

In another study that empirically examined the relationship between obsessive-compulsive symptoms and cyberchondria, it was found that cyberchondria was significantly positively associated with

obsessive-compulsive symptoms. This study established specific positive correlations between obsessive-compulsive and cyberchondria severity scale (CSS-Cyberchondria Severity Scale) dimensions (Fergus, 2014). This is particularly evident in the two obsessive-compulsive clusters, the symptoms of pollution/washing and damage/control. Given the vital link between cyberchondria and health anxiety, it has been observed that some people constantly consult online health information. This situation has increased the health obsessions in individuals. It is also aimed to minimize the pollution with the constant washing request.

Similarly, individuals prone to cyberchondria have attempted to prevent future diseases by constantly checking medical information online. This example points to the harm/control relationship in obsessive-compulsive symptoms (Norr et al., 2015). In this respect, cyberchondria stands out as an increasing psychopathological condition during the COVID-19 period.

1.2. Cyberchondria in The Covid-19 Era

Throughout history, humanity has faced various epidemic diseases. When considered historically, it is possible to say that humanity is better positioned to face infectious diseases today. In particular, the advancement of modern medical science and other scientific disciplines and the development of high-speed information exchange have a significant role in dealing with epidemics. However, while it is better than ever to address the physical consequences of infectious diseases, it is possible to say that the psychological effects of such epidemics are widespread and possibly more severe (Jokic-Begic et al., 2020).

Research has shown that the pandemic can have various psychosocial effects. It is usual for people to fear for their health, family, safety, or financial situation (Taylor, 2019). On the other hand, there is a danger of stigmatization and marginalization of socially infected people or coming into contact with the virus (Singer, 2009). While infectious diseases have always aroused fear throughout history, they have never been more global due to the global information connection as with COVID-19. Since the first patients appeared in China and Europe, information about the spread of the virus has snowballed in all media outlets. In this context, the virus has become a threat to the whole world. The World Health Organization underlined two significant threats to this issue; are the pandemic and the infodemic (WHO, 2 February 2020). Director-General of the World Health Organization (WHO), Dr. Tedros' statement in February 2020, "We are fighting not only the pandemic but also an infodemic," reveals this situation (Munich Security Conference, 15 February 2020). In this respect, infodemic, an expression derived from the concepts of "information" and "pandemic," has become a prominent phenomenon during the epidemic period. Thanks to its high transmission speed, access, and penetration features, the Internet has become an essential global health information resource, where information can be shared over giant digital social media platforms (Bagarić, Jokić-Begić, 2019). In the global pandemic process, digital environments have provided numerous advantages thanks to their ability to spread information very quickly. Among these advantages, preparing health systems for the epidemic and informing individuals about the epidemic comes to the fore.

On the other hand, while the information on the Internet increases the anxiety in individuals, it has fulfilled a vital function in adopting the security warnings of the health workers about the pandemic by the people. Since the COVID-19 pandemic became a global issue in January 2020, universally recommended safety behaviors such as hygiene measures (washing hands, cleaning surfaces, etc.), avoiding social contact, staying at home, and wearing protective masks have been communicated individuals through mass media. (Jokic-Begic et al., 2020). Unfortunately, however, the vast information published about the COVID-19 epidemic from the media and digital media has also caused an increase in cyberchondria, a kind of digital psychopathological condition in individuals.

1.3. Personal Hygiene And Protection Measures in The COVID-19 Process

Individuals have to take preventive measures to protect themselves from the disease. In order to reduce the risk of transmission, individuals are advised to wash their hands carefully, practice respiratory hygiene, and avoid crowds and close contact with sick people as much as possible. In countries such as China, Korea, and Japan, the pandemic has been brought under control much faster, increasing the number of people carrying hand sanitizer for hand hygiene practice and the widespread use of masks among people. In countries where such measures are not made compulsory, the exponential increase in the number of cases continues. It is recommended to maintain social distance, especially in places where there is contamination in

the community (Güner et al., 2020). Hand hygiene has been one of the most critical issues in the fight against the epidemic. Individuals were advised to wash their hands with soap and water for at least 20 seconds, and alcohol-containing antiseptics were recommended for hand hygiene. After contact with a risk of contamination, it was emphasized not to contact the eyes, mouth, and nose without washing the hands (Emmanuel et al., 2020).

1.4. Medical Support And Expert Assistance in The COVID-19 Process

During the COVID-19 pandemic, health services have begun to be provided effectively in the virtual environment. The primary purpose is to provide information about the disease, explain the prevention methods and treatment process, and fulfill the demands of those who want to get information on this subject. The health service offered in the virtual environment is organized to better function the technology-based health system. It is aimed to maintain health services effectively during the pandemic period by providing information about social distance and isolation of chronic patients against the risk of transmission, increasing sensitivity to the disease, disease syndromes, and prevention methods with smartphones and computers (Lukas et al., 2020).

Since health institutions have the highest risk of transmission during the COVID-19 pandemic, health services were offered to individuals in the isolation process in the virtual environment or via telephone (Kalkanlı, 2021). A study conducted during the COVID-19 process; shows that health services emergency applications increased by 135% and non-urgent applications by 4345% through information technologies (Mann et al., 2020).

2. Materials and Method

2.1. Materiel

The analysis conducted in this study is based on data obtained from the sample of Atatürk University Faculty of Communication students. In order to investigate the connection between cyberchondria and COVID-19, students with high digital skills studying at Atatürk University Faculty of Communication were preferred.

Fear and stress on a global scale during the COVID-19 pandemic have also been observed in young individuals. Therefore, a Structural Equation Model was created to investigate the correlation between the anxiety and stress of the COVID-19 pandemic, personal hygiene and protection measures in young individuals, online medical information search and the resulting cyberchondria, and online medical support and expert assistance. The cross-sectional data of the study material used in the Structural Equation Model were obtained through a questionnaire study conducted with students studying at Atatürk University Faculty of Communication over the Internet in 2021. The model was analyzed with LISREL 8.72 and SPSS 21 package programs.

2.2. Method

2.2.1. Determining Sample Size

Questionnaires were asked to the volunteer participants using the purposeful sampling method through open access over the Internet. Six hundred sixty-two people participated in the survey. Although the survey size was calculated as 374 to study with a larger population, all participants were included in the study. Ethics Committee Approval Certificate was obtained before the study was conducted (Atatürk University Social and Human Sciences Ethics Committee Presidency, Session Number: 16, Decision No: 200).

Preparation of Survey Questions

The Cyberchondria Severity Scale developed by McElroy, E., Shevlin, M. (2014) was used. This scale has been a guide in measuring cyberchondria severity with 33 items. This scale was determined as a compulsion, anxiety (distress), excess (excessiveness), reassurance, and mistrust of health professionals and was formed from five dimensions. All questions of the Cyberchondria Severity Scale developed by McElroy,

E., Shevlin, M. (2014) are included in the research.

Participants were asked questions prepared within the widely accepted Covid-19 anxiety scale framework. The problematic participants were asked how the phenomenon of cyberchondria, which includes online health searches, which is one of our research questions, affects the level of anxiety. In addition, it was asked how the pandemic affected cyberchondria as a digital psychopathological phenomenon during the Covid-19 period. Participants rated each item's relevance on a 5-point scale ranging from 1 to 5. This study designed a research model by blending the Covid-19 anxiety scale and the Cyberchondria anxiety scale. Participants participated in the survey and evaluated their Covid-19 anxiety levels and cyberchondria behaviors that were effective in this situation.

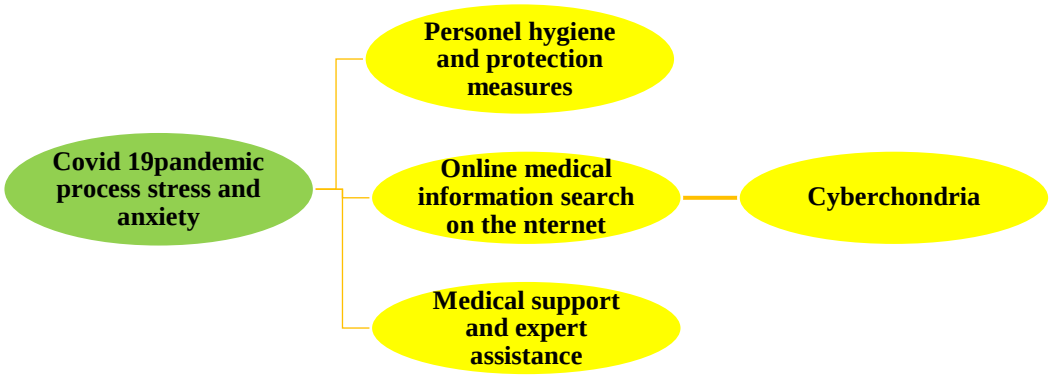
2.3. Analysis of Data

The analyzes of the study were carried out with Structural Equation Modeling. Structural equation models are used to measure a particular theoretical relationship (Jöreskog and Sörbom, 1993), observed and latent, in many different sciences (Bentler and Yuan, 1999; Cheung and Renswold, 2002; Raykov and Marcoulides, 2006), especially in psychology and medicine. In addition, it is frequently used to test the relationships between variables (Hoyle, 1995; Leech et al., 2015; İlhan & Çetin, 2014). Furthermore, unlike traditional econometric measurement methods, structural equation models consider the measurement errors and omissions of the observed variables. Thanks to this feature, Structural Equation Modeling is used extensively in many different areas of measurement and analysis (Hershberger, 2003; Lomax and Schumacker, 2004; Pituch and Stevens, 2009). Another reason why this model is preferred is that it can show indirect and direct effects between variables and allows multivariate model development, estimation, and testing.

COVID-19 has created stress and anxiety in individuals. This stress and anxiety have led individuals to seek information online and seek online medical support, especially personal protection methods. Searching for medical information online on the Internet has also brought about cyberchondria. The study's theoretical model showing this cycle is shown in Figure 1.

Figure 1:

COVID-19 Stress and Anxiety Cycle Model



2.4. Latent Variables And Observed Variables of The Model

COVID-19 Pandemic Anxiety And Stress [CPAS]

COVID-19 Pandemic Anxiety and Stress is the exogenous latent variable of the model. This exogenous latent variable was measured with the following observed variables obtained from the

questionnaire:

CP1 I am concerned about the Covid-19 virus.

CP3 I think there is a possibility that the Covid-19 virus could be transmitted to someone I know.

CP4 I think that if I get infected with the Covid-19 virus, I could become seriously ill.

CP5 I think the Covid-19 virus is more dangerous than the flu

CP6 I have been following the news more closely about the spread of the Covid-19 virus.

CP7 I am stocking up on food and beverage supplies for a crisis situation caused by Covid-19.

Personal Hygiene And Protection Measures [PHC]

Personal Hygiene and Protection Measures are one of the latent variables of the model. This latent variable was measured with the following observed variables:

PH1 I wash my hands more often and more thoroughly than usual.

PH2 I avoid places with large groups of people.

PH3 I am careful not to leave the house when I have no work.

PH4 I am wearing a protective mask.

PH5 I use hand sanitizer.

PH6 I hesitate to shake hands with others.

PH7 I stay away from people with symptoms of illness.

PH8 I stay away from people I don't know.

Online Medical Information Search on The Internet [OMI]

Online Medical Information Search on the Internet is one of the model's internal latent variables. This latent variable was measured with the following observed variables:

OM1 Researching symptoms or perceived medical conditions online interrupts my online leisure activities (e.g., movie streaming)

OM2 Researching symptoms or perceived medical conditions online interrupts my time on Facebook/Twitter/other social networks.

OM3 Researching symptoms or perceived medical conditions online interrupts my offline work activities.

OM4 Researching symptoms or perceived medical conditions online keeps me from reading online news/sports/entertainment articles.

OM5 Researching symptoms or perceived medical conditions online interrupts or slows my online communication (e.g., Instant Messaging, Skype).

OM6 Researching symptoms or perceived medical conditions online is disruptive to my work (e.g., writing emails, working on Word documents or spreadsheets).

OM8 Researching symptoms or perceived medical conditions online interrupts other research (for example, work/college homework/homework).

Cyberchondria [CYC]

This latent variable of the model is a latent variable dependent on the "Online Medical Information Search (OMI) on the Internet" endogenous variable. The latent variable of cyberchondria was measured with the following observed variables:

CY1 After researching online for symptoms or perceived medical conditions, I have trouble relaxing.

CY3 I have trouble falling asleep after researching Symptoms or perceived medical conditions online.

CY4 I feel more anxious or distressed after online researching symptoms or perceived medical conditions.

CY5 I start to panic when I read online that I have a symptom in a rare/severe condition.

CY6 I think I'm fine until I read a serious situation on the Internet.

CY7 I get angry or agitated more easily after researching symptoms or perceived medical conditions online.

CY8 I lose my appetite after researching symptoms or perceiving medical conditions online.

CY9 I read different web pages about similar perceived situations.

Medical Support And Expert Assistance [MSA]

Medical Support and Specialist Assistance (MSA) is the exogenous latent variable of the model. This exogenous latent variable was measured with the following observed variables obtained from the questionnaire:

MS1When researching symptoms or perceived medical conditions online, I only visit reliable sources (e.g., NHS.co.uk).

MS2 I discuss my online medical findings with my family doctor/health professional.

MS3Discussing information online about a perceived medical condition with my doctor gives me confidence.

MS4 Researching symptoms or perceived medical conditions online allows me to consult other medical professionals (e.g., counselors).

MS5 Researching symptoms or perceived medical conditions online allows me to consult my doctor (GP).

MS6 I think: "I would not go to the doctor if I did not read about this symptom/condition online."

3. Findings

3.1. Demographic Findings

The demographic findings show the gender and age distribution of the individuals who answered the questionnaires of this study, which investigated the relationship between the COVID-19 pandemic, personal protection, online information, and cyberchondria and online medical support shown in Table 1.

Table 1.

Age and gender status of the survey participants

Gender	n (Frequency)	Ratio %
Female	342	51,7
Male	320	48,7
Age		
18-20	233	35,2
21-23	301	45,5
24+	128	19,3

Source: Original calculation

Since the participants are university students, they consist of young individuals, and the ages of the students are close to each other. Again, there is a close distribution in terms of gender, and the number of female participants is higher than the male ones.

3.2. Structural Equation Modeling Results

The data of the survey study carried out in the virtual environment were analyzed with the SPSS 21 statistical package program and the Lisrel 8.72 package program:

Data averages, standard deviations, and reliability tests of the Likert scale survey questions were conducted with the SPSS 21 package program.

Cronbach's alpha coefficient was calculated as the most widely used method for reliability tests.

Structural Equation Modeling analysis was performed with the Lisrel 8.72 package program, and standardized factor loading and t values of the observed variables were calculated. The Table 2 contains the calculations of the observed variables.

Table 2.

Calculations of observed variables

Observed Variables	Mean	Standart Deviation	*t* value	Factor Loading Values	Cronbach's Alpha Value
COVID-19 Pandemics Stress and Anxiety [CPAS]					
CP1	3.8252	1.20305	22.93	0.78	0.941
CP2	3.8511	1.12763	17.41	0.64	0.942
CP3	3.9985	1.01360	22.02	0.79	0.942
CP4	3.5578	1.20647	20.64	0.73	0.942
CP5	4.1018	1.03822	18.24	067	0.942
CP6	3.6292	1.14246	11.47	0.45	0.941
Personel Hygiene and Protection Measures [PHC]					
PH1	4.2219	0.88416		0.68	0.942
PH2	3.7842	1.08354	15.27	0.67	0.942
PH3	3.6140	1.19738	14.63	0.63	0.942
PH4	4.2888	0.83414	15.92	0.70	0.942

PH5	4.0182	1.00363	15.69	0.68	0.942
PH6	3.8571	1.00423	17.24	0.76	0.942
PH7	4.3237	0.74234	15.78	0.69	0.942
PH8	4.0228	0.96881	16.36	0.72	0.942
Medical Information Search on the Internet [OMI]					
OM1	3.1687	1.03241		0.73	0.941
OM2	3.0289	1.04572	21.55	0.83	0.941
OM3	3.0350	1.03529	21.35	0.82	0.941
OM4	2.9635	1.03891	22.55	0.87	0.941
OM5	2.9195	1.01640	22.50	0.86	0.941
OM6	2.9179	0.99433	22.20	0.85	0.941
OM8	3.0319	1.01460	20.71	0.80	0.941
Cyberchondria[CYC]					
CY1	3.1535	0.96000		0.74	0.941
CY3	2.9149	1.03753	21.28	0.82	0.941
CY4	3.1125	1.02457	22.30	0.85	0.940
CY5	3.1277	1.01831	20.85	0.80	0.941
CY6	3.2447	0.93926	16.55	0.65	0.941
CY7	3.0046	0.96907	20.98	0.81	0.941
CY8	2.8328	1.03486	19.08	0.74	0.941
CY9	3.4301	0.92429	11.91	0.47	0.942
Medical support and expert assistance [MSA]					
MS1	3.3511	0.88270		0.57	0.942
MS2	3.2523	0.95254	14.15	0.72	0.942
MS3	3.3465	0.91910	15.13	0.81	0.942
MS4	3.2948	0.88862	15.62	0.86	0.942
MS5	3.2781	0.88287	15.71	0.87	0.941
MS6	2.9863	0.97212	10.71	0.49	0.942

Chi-Square = 2395.03 DF = 556 P-value = 0.00000 RMSEA = 0.071

Source: Original Calculation

Since the t values of the observed variables obtained from the surveys conducted in the virtual environment in the model were more outstanding than ± 1.96, they were found to be statistically significant at the 5% significance level. Chi-Square/Degree of Freedom (Chi-Square/DF), p-value, and RMSEA (Root-mean-square error approximation) values were examined as the measurement criteria used to evaluate the fit between the data and the model. The model's X2/DF (2395.03/556) value is 4.30. This value is within the acceptable values of five and less than five. Likewise, the RMSEA value is still within acceptable limits (0.071). Since the model takes the value of p<0.0000, it is statistically significant at the 5% significance level.

The correlation matrix table of the latent variables (scales) in the COVID-19 stress and anxiety cycle structural equation model is given in Table 3. Again, there is a significant and positive correlation between latent variables.

Table 3.

COVID-19 stress and anxiety cycle latent variables correlation table

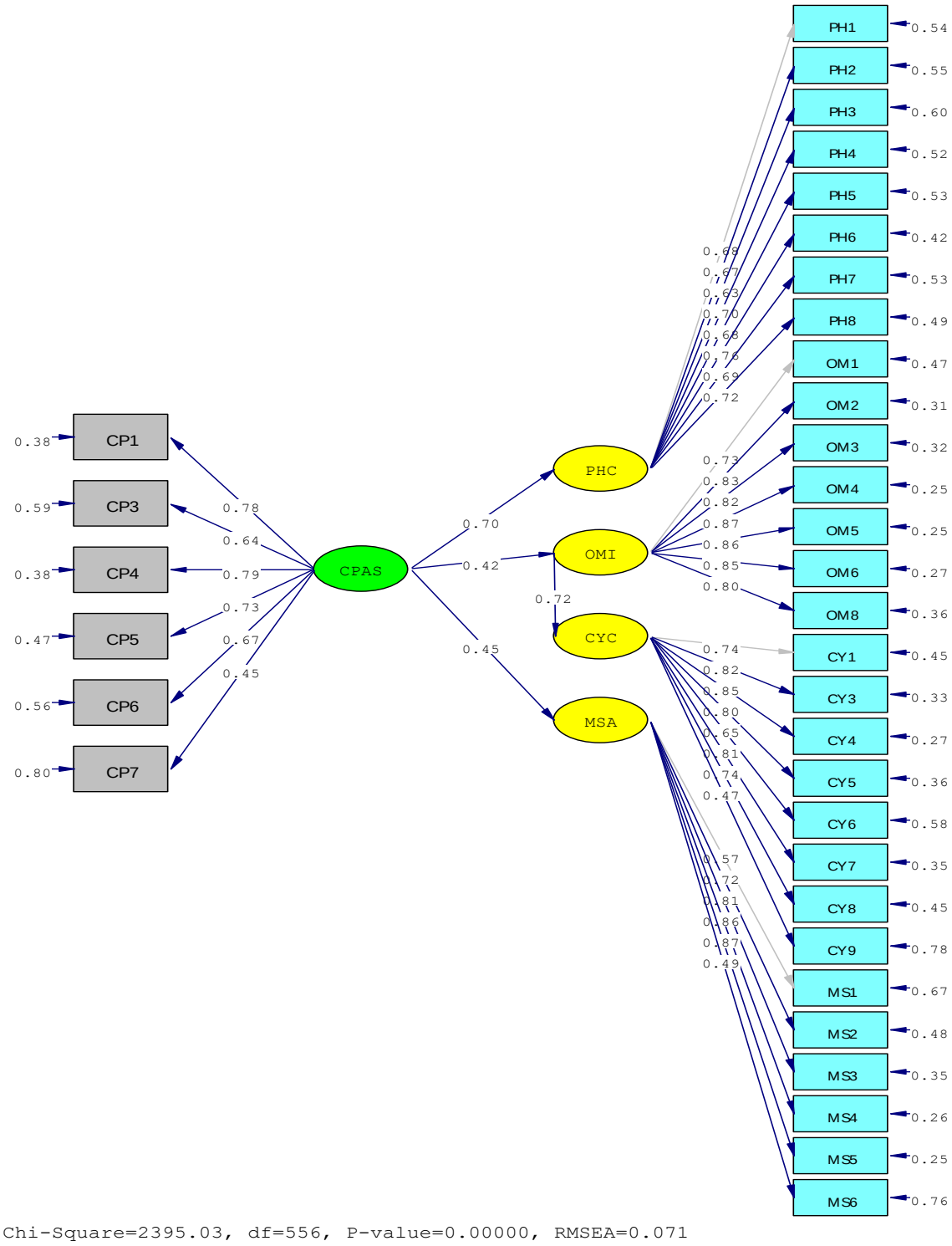
CPAS	**1.00**				
PHC	0.68	1.00			
	(0.03)				
	25.22				
OMI	037	0.28	1.00		
	(0.04)	(0.04)			
	9.87	7.18			
CYC	0.52	0.42	0.71	1.00	
	(0.03)	(0.04)	(0.02)		
	15.49	11.48	32.21		
MSA	0.40	0.46	0.40	0.55	1.00
	(0.04)	(0.04)	(0.04)	(0.03)	
	10.67	12.80	11.21	17.87	

Source: Original calculation

The structural model shows the explanatory relationships between latent variables (Raykov and Marcoulides, 2006). In other words, the structural model is a model used to test the relationships between latent variables (Wetson and Gore, 2006). Structural equation modeling includes observed and latent variables together, and latent variables are defined by observed variables (Kahn, 2006; Tabachnick and Fidell, 2007). The direction of canonical correlation, including dependent and independent variables, and the definition of causal relationships between variables constitute the direction of regression analysis (Tabachnick and Fidell, 2007). The structural equation model shown in Figure 2 gives standardized values (regression values). The model shows the structural relationship between the stress and anxiety caused by the COVID-19 pandemic and individuals' hygiene and protection measures, online medical information search on the Internet, the cyberchondria situation caused by it, and online medical support and expert assistance.

Figure 2.

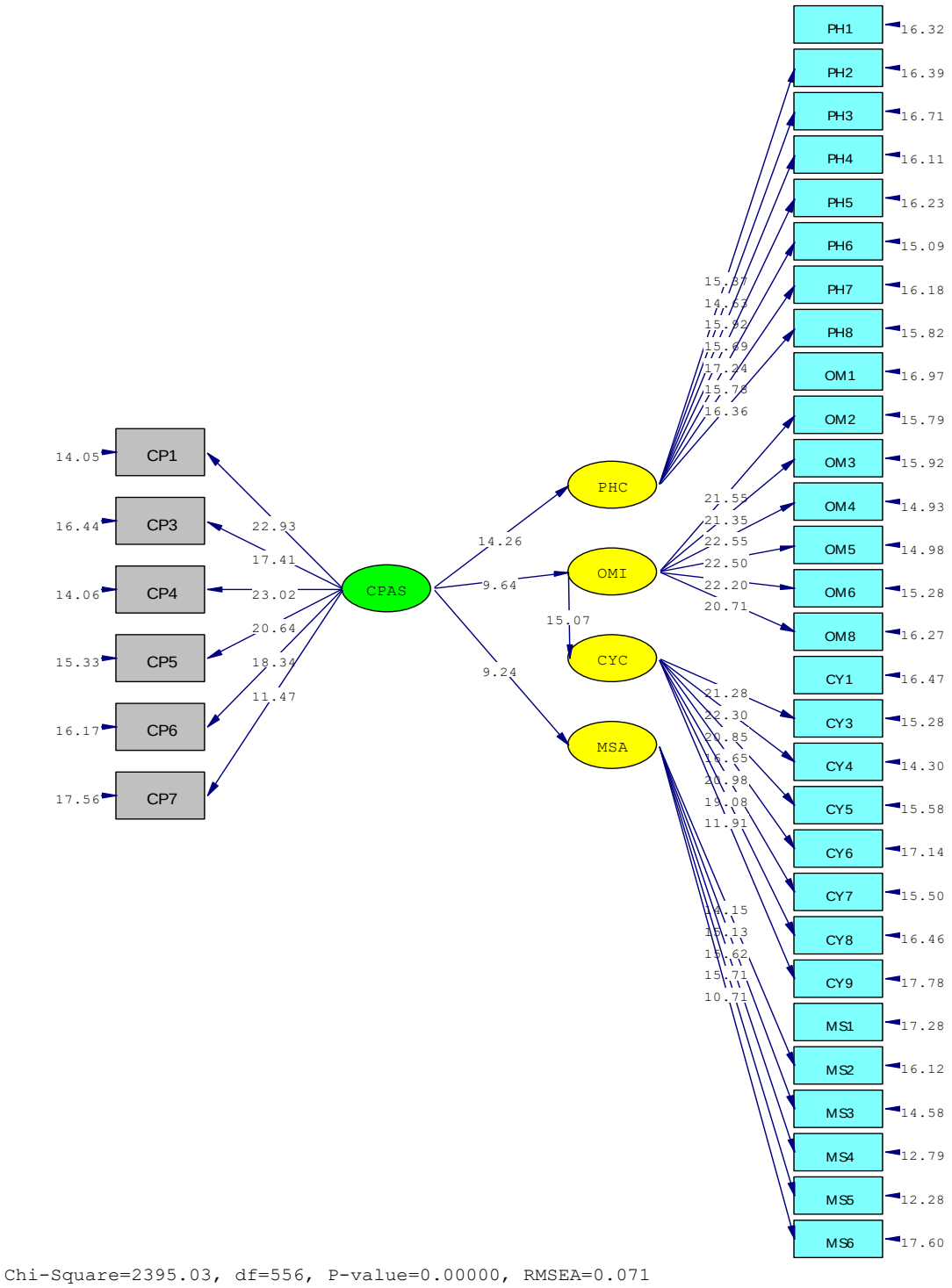
Structural equation model of the COVID-19 stress and anxiety cycle and standardized coefficients



In Figure 3, the structural model t values of the COVID-19 stress and anxiety cycle. Personal Hygiene and Protection Measures (t = 14.26), Online Medical Information Search on the Internet (t = 9.64), Cyberchondria (t = 15.07), Medical Support and Expert Assistance (t = 9.24). The relationship between all endogenous latent variables and exogenous latent variables was statistically significant at the 5% significance level.

Figure 3.

COVID-19 stress and anxiety cycle model structural equation model t values



When the structural model results are examined, the three most critical observed variables of the exogenous latent variable "COVID-19 Pandemic Anxiety and Stress [CPAS]" are "I think there is a possibility of infecting someone with the CP3 Covid-19 virus." (γ = 0.79 and t = 22.02), "I am concerned about the CP1 Covid-19 virus." (γ = 0.78 and t = 22.93) and "I think that if I get infected with the CP4 Covid-19 virus, I could become seriously ill." (γ = 0.73 and t = 20.64).

A robust positive correlation was found between the Personal Hygiene and Protection Measures [PHC] intrinsic latent variable and the COVID-19 Pandemic Anxiety and Stress [CPAS] extrinsic latent variable ($\gamma = 0.70$; $t = 14.26$). The three most critical observed variables of Personal Hygiene and Protection Measures internal latent variable was found as; "PH6 I avoid shaking hands with others.", "PH4 I wear a protective mask.", PH7 I stay away from people with symptoms of illness."

A positive and strong correlation was found between the Internet Online Medical Information Search [OMI] intrinsic latent variable and the COVID-19 Pandemic Anxiety and Stress [CPAS] extrinsic latent variable ($\gamma = 0.42$; $t = 9.64$). Furthermore, the essential observed variables of Online Medical Information Search on the Internet; "Researching OM4 Symptoms or perceived medical conditions online prevents me from reading news/sports/entertainment articles online.", OM5 Researching symptoms or perceived medical conditions online interrupts or slows my online communication (e.g., Instant Messaging, Skype).", OM6 Symptoms or researching perceived medical conditions online interferes with my work (e.g., writing emails, working on Word documents or spreadsheets)." was detected.

A solid positive correlation was found between the Internet Online Medical Information Search [OMI] intrinsic latent variable and the cyberchondria [CYC] variable ($\gamma = 0.72$; $t = 15.07$). The three most critical observed variables of cyberchondria endogenous latent variable are: "I feel more anxious or distressed after researching online for CY4 Symptoms or perceived medical conditions." "I have trouble falling asleep after researching online for CY3 Symptoms or perceived medical conditions." and "I get angry or agitated more easily after researching CY7 Symptoms or perceived medical conditions online."

A positive and strong correlation was found between the latent variable of Medical Support and Specialist Assistance [MSA] and the latent variable of COVID-19 Pandemic Anxiety and Stress [CPAS] ($\gamma = 0.45$; $t = 9.24$). The essential observed variables of the internal latent variable of Medical Support and Specialist Assistance are, respectively, "Researching MS5 Symptoms or perceived medical conditions online allows me to consult my physician (GP). And "Discussing information online about a perceived medical condition with my MS3 Doctor gives me confidence." form was found.

Whether the data set validates the theoretical structure to be tested is determined using fit indices (Bentler & Yuan, 1999). The criteria showing the compatibility of the model and dataset are given in Table 4. The fact that the values in the fit indices are close to 1 indicates that the fit between the data set and the model is perfect, while zero represents the mismatch. In this study, the fit index values are close to 1. This shows that the study model and the data set are compatible.

Table 4.

Fit Indices

Fit index	Model value	Fit criterion
$\chi 2/df$	**4.30**	**$0 \leq \chi 2/sd \leq 5$**
RMSEA	0.071	$0.00 \leq$ RMSEA ≤ 0.10
GFI	0.90	$0.90 \leq$ GFI ≤ 1
AGFI	0.86	$0.85 \leq$ AGFI ≤ 1
NFI	0.95	$0.90 \leq$ NFI ≤ 1.00
NNFI	0.96	$0.90 \leq$ NNFI (TLI) ≤ 1.00
RFI	0.95	$0.90 \leq$ RFI ≤ 1.00
CFI	0.96	$0.90 \leq$ CFI ≤ 1.00
IFI	0.96	$0.90 \leq$ IFI ≤ 1.00

Source: Original Calculation

Conclusion

This article presents the results of an empirical study that analyzes the regression and correlational relationship between individual hygiene prevention measures, online medical information-seeking behavior, and the accompanying cyberchondria behavior and receiving online medical support to protect young individuals from the COVID-19 pandemic stress anxiety.

When the structural model results are analyzed, the COVID-19 pandemic appears to cause intense anxiety and stress in young individuals. During the COVID-19 pandemic, young individuals mostly think that "the virus is likely to be transmitted to someone I know," "They are concerned about the Covid-19 virus," and "They think that they can become seriously ill if they are infected with the COVID-19 virus." indicated that they agreed with the titles.

The stress and anxiety of the COVID-19 pandemic have directed young individuals to hygiene and protection measures. For this reason, young individuals refrain from shaking hands with others, wear protective masks and stay away from people with signs of illness.

Young individuals intensively perform the behavior of "seeking medical information online" during the COVID-19 pandemic. They most often search for "symptoms or perceived medical conditions" online, which can interfere with their entertainment, sports, and newsletter reading. It can also prevent actions such as communicating with other individuals, doing homework, reading texts, and writing articles.

It has been determined that there is a strong relationship between online medical information search on the Internet and cyberchondria. The most common cyberchondria behavior observed in young individuals; is feeling "more anxious or distressed" after researching symptoms or perceived medical conditions online. Again, "difficulty falling asleep" and "being easily angered or agitated" frequently recur.

The anxiety and stress of the COVID-19 pandemic have driven a high percentage of young individuals to online medical support and expert help. For medical support and assistance, young individuals most often consult their doctors and other medical professionals online for their symptoms or perceived medical conditions. As a result, young individuals feel confident "discussing information online about a perceived medical condition with their doctor."

The findings show that young individuals extensively use online medical information searches during the COVID-19 pandemic. This situation shows that this global epidemic has increased the behavior of cyberchondria and directed young individuals to seek medical support and personal protection measures. Furthermore, it is seen that people with high anxiety levels develop cyberchondria behaviors to protect themselves from the virus. In this respect, cyberchondria reveals a psychopathological situation in the protection of mental health. People with high levels of cyberchondria may have a similar tendency to protect their mental health, as they immediately take the necessary measures to protect themselves from the virus. In this respect, health authorities must provide unambiguous instructions to protect the mental health of individuals in dire times such as the pandemic.

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Publication Ethics

The authors declare that all ethical principles and rules are followed in data collection, analysis and reporting processes.

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Authors contributed to the work in equal proportion.

Conflict of interest

The authors declare no conflict of interest.

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