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The Relationship between Intolerance to Uncertainty, Health Cognition and Depression, Stress and Anxiety of COVID-19 Pandemic

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ABSTRACT

The aim of this study was to determine how the uncertainty created by the COVID-19 affected participants' levels of depression, stress and anxiety along with their health-related cognition.Using an easily accessible sampling model, considering the pandemic process, scales were sent to the participants via social media. With the web-based data collection technique, a total of 556 volunteers, 415 women (74.6%) and 141 men (25.4%), were reached. The age range was between 18 and 80 with the mean value 33.22. Depression Anxiety Stress Scale, Health Cognitions Survey and Intolerance to Uncertainty Scale were used. The research emphasized that health cognition and intolerance to uncertainty are predictors of stress. Among the findings, it was emphasized that "negative self-evaluations about uncertainty" and "uncertainty preventing action" caused stress by intolerance to uncertainty. In the study, it was determined that there is a significant relationship between depression and anxiety, there are negative self-evaluations about uncertainty, and especially uncertainty prevents taking action. In the study, intolerance to uncertainty was emphasized as a predictor of anxiety during the COVID-19 pandemic process.

The virus, which emerged in China in December 2019, had high transmission and mortality rates, and World Health Organization on March 11, 2020, has declared that the COVID-19 virus is a cause of a worldwide pandemic (WHO, 2020). On February 19, 2021, 109,594,835 COVID-19 cases and 2,424,060 deaths due to COVID-19 occurred (WHO, 2021). The harsh measures taken to control the high rate of spread of the virus and the high mortality rates have increased the levels of insecurity and uncertainty of individuals and caused sharp life changes. (Ge, Wan, Zheng, & Zhang, 2020). Constant concern for the health of individuals themselves and their family members is a major risk factor for mental health illness (Li et al 2020).

Intolerance to uncertainty first described by Frenkel- Bruswik in 1948 as a personality trait that activates when an individual perceive or interpret a situation as a threat or a source of discomfort and anxiety (Grenier, Barette and Ladouceur, 2005). Budner (1962) described intolerance to uncertainty as the interpretation of the uncertain situations as threat. Freestone et al. (1994) defined intolerance to uncertainty as a tendency to give prejudiced negative cognitive, emotional and behavioural responses due to erroneous cognitions, where it is difficult to cope with the situation or phenomenon due to anxiety. Cognitive, emotional, and behavioural negative reactions to uncertain situations and events, and the inability to perform some functions, are common in individuals with an intolerance to uncertainty (Carleton, Norton, & Asmundson, 2007, Birrell, Meares, Wilkinson, & Freeston, 2011). Uncertainty brings along feelings of worry, anxiety and fear (Sarı & Dağ, 2009). Uncertainty is common in psychosocial crises that affect the entire population, such as the uncertain future and

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pandemics (Gu, Gu, Lei, & Li, 2020). Carleton, Mulvogue, Thibodeau et al. (2012), McEvoy and Mahoney (2012) found that intolerance to uncertainty increases the level of depression and anxiety. The intolerance to uncertainty is an important predictor in generalized anxiety disorders, obsessive-compulsive disorders, and depressive disorders (Gentes and Ruscio, 2011). Fetzner, Horswill, Boelen, and Carleton (2013) found that intolerance to uncertainty is a factor that causes post-traumatic stress disorder due to traumatic experience.

Health cognition is a term used to describe the cognitive processes underlying human behaviour in the face of illness-related conditions and is associated with health anxiety (Patel, Sharma, Kumar, & Binu, 2018). Hadjistavropoulos, Janzen, Kehler, Leclerc, Sharpe, and Bourgault-Fagnou (2012) stated that health cognition consists of the individual's probability of being sick, the horror of the disease, the difficulties in coping with the disease, and the perceptions they develop due to the inadequacy of health services. The importance of health cognitions gain importance with the recognition of psychological and cognitive state of an individual highly effects health condition and behaviours related to health (Altay and Yüksel, 2019). In other words, the concept of health cognitions is used to understand the cognitive processes underlying any condition or possibility of discomfort and illness by making changes in human behavior (Patel et al., 2018).

Depression is one of the mental illnesses that increases the disease burden and has the most common prevalence in society (Sinyor, Rezmovitz, & Zaretsky, 2016). The prevalence of depression was 12.9% before the pandemic (WHO, 2001, Lim, Tam, Lu et al.2018). The negative effects of the COVID-19 pandemic on mental health have been reported by many studies like the increase in tension disorder, fear, anxiety, stress, depression and sleep disorders due to traumatic experience has been reported by many studies (Rajkumar, 2020, Torales, O'Higgins, Castaldelli-Maia and Ventriglio, 2020, Wang, Di, Ye and Wei, 2021).

Taha, Matheson, Cronin, and Anisman (2014) identified the pandemic as a factor that increased anxiety levels in their studies on the HINI pandemic in 2009. Kasapoğlu (2020), who researched the COVID-19, found that intolerance to uncertainty increased anxiety levels. Gica, Kavaklı, Durduran, and Ak (2020) found that psychosomatic symptoms are related with the interpretation of the risk and intolerance to uncertainty. Duman (2020) found a positive significant relationship between fear of COVID-19 and intolerance to uncertainty. Bakioğlu, Korkmaz, and Ercan (2020) found a positive significant relationship between fear of COVID-19 , intolerance to uncertainty, depression, anxiety and stress levels. Karataş and Tagay (2021) found that fear of COVID-19 and intolerance of uncertainty together negatively affect psychological resilience. Rettie and Daniels (2020) found in their study in the United Kingdom that individuals who are more vulnerable in terms of health increased their level of intolerance to uncertainty with the increase of their concerns about their health conditions. Petzold, Bendau, Plag, Pyrkosch, Mascarell Maricic, Betzler, Rogoll, Große, and Ströhle, (2020) found that participants' thinking of being infected more than the physical effects of COVID-19 increased anxiety. Hyland, Shevlin, McBride, Murphy, Karatzias, Bentall, Martinez, and Vallières (2020) found a positive relationship between COVID-19 and generalized anxiety disorder or depression in one out of every four people in their screenings in the first week of the pandemic in Ireland. Havnen, Anyan, Hjemdal, Solem, Gurigard Riksfjord, and Hagen, (2020) found that exposure to stress due to COVID-19 was associated with depression symptoms and this relationship was mediated by anxiety.

The aim of this study was to determine how the uncertainty created by the COVID-19 affected participants' levels of depression, stress and anxiety along with their health-related cognition. Although there are researches that are done to measure the consequences of COVID-19 pandemic on mental health issues the health cognitions and the effects of the situational uncertainty caused by the pandemic and the capacity of bear uncertain situations is not well studied subject yet.

Method

Participants

Using an easily accessible sampling model, considering the pandemic process, questionnaire were prepared and sent to the participants via social media platforms. With the web-based data collection technique, a total of 556 volunteers, 415 women (74.6%) and 141 men (25.4%), were reached. The mean age of the participants

was calculated as 33.22 with the range18-65. Thirty-three questionnaires were not included to the research due to incompletion and exceeding the age limits of the scales. 451 (81.6%) of the participants graduated from university and/or higher education and the rest of the participants were had at least high school graduations.

Data Collection Tools

Using an easily accessible sampling model, considering the pandemic process, scales were prepared and sent to the participants.

Socio-Demographic Information Form. The form prepared by the authors included questions on gender, age, fear of the COVID-19 pandemic, and the adequacy of public service ads.

Depression Anxiety Stress Scale (DASS). The Depression Anxiety Stress Scale (DASS) consists of 21 items. DASS developed by Lovibond and Lovibond (1995) and adapted into Turkish by Yıldırım, Boysan, and Kefeli (2018) was used. Internat consistency of the DASS-Depression, DASS-Anxiety and DASS- Stress were calculated as .89, .87 and .90 respectively. DASS-21 have three sub-scales each consist of 7 questions. Totals scores obtained for each sub-scale by summing the relevant questions for DASS-Depression, DASS-Anxiety and DASS- Stress. DASS-21 is a 4 point Likert type self-report scale ranging from 0 to 3. DASS-21 can be applied to ages starting from 17 and up.

Health Cognitions Survey. The Health Cognition Survey adapted to Turkish by Yılmaz and Dirik (2018) was developed by Hadjistavropoulos, Janzen, Kehler et al. (2012). The Cronbach Alpha values of the scale, which has a four-factor structure, were reported as .88 for "Difficulty in Coping with Disease" (DCD), .67 for "Insufficiency of Medical Services" (IMS), .66 for "The Probability of Disease" (PD), and .73 for "Frightening of the Disease" (FD). The age range of Health Cognitions Survey is between 18-65. The scale is a 5 point Likert type self-report scale ranging from 1 to 5. Questions 2, 4, 7, 9, 10, 15, 19 and 20 is reverse coded questions and the higher scores indicates dysfunctional health cognitions of the individuals.

Intolerance to Uncertainty Scale. The original form of the scale was in French and was adapted to English (Buhr & Dugas, 2002). Adapted into Turkish by Sarı and Dağ (2009), the Intolerance to Uncertainty Scale consists 26 questions and has four factors: "*uncertainty is stressful and sad*" (USS) (9 items), "*negative self-assessments about uncertainty*" (NSE) (8 items), "*not knowing the future is disturbing*"(NNF) (4 items) and "*uncertainty prevents taking action*"(PA) (5 items). Internal consistency coefficients of the factors was found as .88, .79, .79, and .79 respectively. There is no reverse coded items in the scale. The whole scale score and scores from each factor can be obtained by summing up relevant questions. The scale is a 5 point Likert type self-report scale ranging from 1 to 5. Higher total score and sub-scale scores indicates higher intolerance to uncertainty.

Results

Both Kolmogorv-Smirnov test as well as the Shapiro-Wilk test results suggest that all variables are normally distribute in this sample (Table 1).

Table 1. Values of normal distribution

	N	x̄	SD	K-Smirnov z	p
Anxiety	556	6.600	5.569	1.036	.123
Depression	556	8.451	6.056	1.093	.131
Stress	556	9.248	5.896	1.137	.057
IMS	556	11.907	2.493	1.092	.137
DCD	556	25.446	4.126	1.173	.055
FD	556	14.827	3.425	1.127	.083
PD	556	10.119	3.657	1.087	.142
USS	556	31.259	8.297	1.031	.181
NSE	556	23.971	7.412	1.090	.140
NNF	556	12.261	4.264	1.110	.101
PA	556	14.983	4.673	1.097	.126

In terms of gender variable, it was observed that the difficulty in coping with the disease scores, which is the sub-dimension of intolerance to uncertainty, showed a significant difference, $t=2.351$, $p <.05$. (Table 2)

According to this result, male participants scored significantly higher in coping with the disease than female participants, for male=26.149+4.246 and for female=25.207+4.062. There was no other significant differences between the scales, p> .05.

Table 2. The t-test for the gender variable

		N	x̄	SD	df	t
Difficulty coping with the disease	Female	415	25.207	4.062	554	2.351*
	Male	141	26.149	4.246		

***p<.001; **p<.01; *p<.05

When the obtained results are examined (Table 3), anxiety, fear of the disease, illness probability cognitions and negative self-evaluations about uncertainty scores showed a significant difference in terms of fear of the Covid-19 pandemic variable, values respectively F(2.552) = 3.495, p <.05; F (2.551) = 7.887, p <.001; F (2,551) = 4.036, p <.05. Tukey, one of the Post Hoc Tests, was conducted to determine among which groups these differences exist. According to this, the difference in anxiety level was between the participants who stated that they had a very high level of fear and the participants who stated that they had a low level of fear, for high level x̄ = 7.248 and for low level of fear x̄ = 5.239; Among the participants who stated that the fear of illness was very low, moderate and low, values for very low x̄ = 15.610, for moderate x̄ = 14.656 and for low x̄ = 13.269; disease probability cognition level is between very high (x̄ = 10.807) to medium x̄ = 9.916 and very high to low x̄ = 8.910, p <.05; Negative self-assessment scores regarding uncertainty were determined to be between very high x̄ = 24.431 and low x̄ = 21.597 and medium level x̄ = 24.228 and low, p <.05.

Table 3. Examination according to the level of fear of the Covid-19 pandemic

		Sum of squares	df	Mean square	F
Depression	Between groups	88.707	2	44.354	1.208
	Within groups	20230.753	551	36.716	
	Total	20319.460	553		
Anxiety	Between groups	215.016	2	107.508	3.495*
	Within groups	16948.413	551	30.759	
	Total	17163.430	553		
Stress	Between groups	189.374	2	94.687	2.735
	Within groups	19078,229	551	34.625	
	Total	19267.603	553		
IMS	Between groups	11.880	2	5.940	0.954
	Within groups	3429.239	551	6.224	
	Total	3441.119	553		
DCD	Between groups	28.637	2	14.319	0.840
	Within groups	9387.391	551	17.037	
	Total	9416.029	553		
FD	Between groups	294.482	2	147.241	13.086***
	Within groups	6199.570	551	11.251	
	Total	6494.052	553		
PD	Between groups	205.225	2	102.613	7.887***
	Within groups	7168.912	551	13.011	
	Total	7374.137	553		
USS	Between groups	238.960	2	119.480	1.743
	Within groups	37763.668	551	68.537	
	Total	38002.628	553		
NSE	Between groups	439.029	2	219.515	4.036*
	Within groups	29967.825	551	54.388	
	Total	30406.854	553		
NNF	Between groups	71.272	2	35.636	1.970
	Within groups	996.6723	551	18.088	
	Total	10037.995	553		
PA	Between groups	62.276	2	31.138	1.431
	Within groups	11993.717	551	21.767	
	Total	12055.993	553		

***p<.001; **p<.01; *p<.05

When the obtained results are examined (Table 4), depression, USS, NSE, NNF and PA scores were found to be significant, values respectively t = -2.346, p <.05, t = -3.963, p <.001, t= -2.609, p <.01, t = -2.390, p <.05, t = -2.091, p <.05. According to this, depression and USS,NSE,NNF and PA scores were higher, values respectively 33.216 + 7.498, 25.103 + 7.417, 12.870 + 4.057, 15.557 + 4.680.

Table 4. Results of the t-test for sufficient public service ad

		N	x̄	SD	df	t
Depression	Yes	365	7.100	6.052	548	-2.346*
	No	185	9.270	5.931		
Anxiety	Yes	365	6.367	5.588	548	-1.193
	No	185	6.962	5.410		
Stress	Yes	365	9.027	5.898	548	-1.151
	No	185	9.638	5.828		
IMS	Yes	365	11.948	2.484	548	0.659
	No	185	11.800	2.491		
DCD	Yes	365	25.542	4.024	548	0.946
	No	185	25.189	4.353		
FD	Yes	365	14.699	3.507	548	-1.282
	No	185	15.091	3.177		
PD	Yes	365	10.019	3.682	548	-.809
	No	185	10.287	3.619		
USS	Yes	365	30.288	8.516	548	-3.963***
	No	185	33.216	7.498		
NSE	Yes	365	23.373	7.417	548	-2.609**
	No	185	25.103	7.212		
NNF	Yes	365	11.956	4.326	548	-2.390*
	No	185	12.870	4.057		
PA	Yes	365	14.680	4.633	548	-2.091*
	No	185	15.557	4.680		

***p<.001; **p<.01; *p<.05

Table 5. Multiple regression results for stress

	B	SE	β	t	p
Constant	-3.155	1.617		-1.951	.052
IMS	0.040	0.068	.017	0.588	.557
DCD	-0.171	0.043	-.120	-3.995	.000
FD	0.068	0.059	.039	1.145	.253
PD	0.170	0.051	.105	3.318	.001
USS	0.115	0.040	.161	2.897	.004
NSE	0.286	0.046	.360	6.284	.000
NNF	0.072	0.080	.052	0.895	.371
PA	0.149	0.062	.118	2.398	.017
R=.748, R^2=.560, F(8,547)=87.084, p<.001					

When the analysis of predictors of stress (Table 5), another dependent variable of the study, was examined, it was found that all sub-dimensions of health cognition and four dimensions of intolerance to uncertainty together predicted the stress level (Table 4), R = .748, R2 = .560, F (8.547) = 87.084, p <. 001. In light of this finding, it can be stated that 56% of the variance related to stress can be explained by health cognition and intolerance to uncertainty. When examining which variable explains the variance in question, the difficulty in coping with illness (p <.001) and the probability of illness (p <.01), which are sub-dimensions of healthy cognition, are stressful and distressing (p <.01) due to intolerance to uncertainty. It was determined that

negative self-evaluations (p <.001) and uncertainty preventing action (p <.05) were significant predictors of stress. It was observed that other sub-dimensions were not significant predictors of stress level (p> .05).

Table 6. Multiple regression results for depression

	B	SE	β	t	p
Constant	-3.243	1.804		-1.798	.073
IMS	0.051	0.076	.021	0.674	.500
DCD	-0.173	0.048	-.118	-3.607	.000
FD	0.072	0.066	.040	1.084	.279
PD	0.205	0.057	.124	3.596	.000
USS	0.066	0.044	.091	1.505	.133
NSE	0.246	0.051	.301	4.835	.000
NNF	0.046	0.090	.032	0.515	.607
PA	0.254	0.069	.196	3.656	.000
$R=.694$, $R^2=.481$, $F(8,547)=63.425$, $p<.001$					

When Table 6 is examined, it was observed that the four dimensions of the IMS, DCD, FD, PD and intolerance to uncertainty were all predictors of depression, R = 694, R2 = .481, F (8.547) = 63.425, p <.001. It was found that 48% of the variance related to depression can be explained by health cognition and intolerance to uncertainty. Examining which variable explains the variance in question, it was determined that difficulty in coping with the disease, probability of illness, negative self-evaluations about uncertainty, and uncertainty preventing taking action were significant predictors of depression, p <.001. It was observed that other sub-dimensions were not significant predictors of depression, p> .05.

When the regression analysis was examined (Table 7), it was observed that all sub-dimensions of health cognition and four dimensions of intolerance to uncertainty together were predictors of anxiety, R = .657, R2 = .431, F (8.547) = 51.894, p <.001. It was found that 43% of the variance related to anxiety can be explained by health cognition and intolerance to uncertainty. When examining which variable explains the variance in question, difficulty in coping with the disease, disease probability, negative self-evaluations about uncertainty and uncertainty preventing action it was determined that anxiety is a significant predictor, p scores respectively p<.05, p<.01, p<.001, p<.01. It was observed that other sub-dimensions were not significant predictors of anxiety, p> .05.

Discussion and Conclusion

In the study, the effects of "depression", "stress" and "anxiety" levels on individuals' health cognition were investigated, depending on the uncertainty created by the COVID-19 pandemic situation. During the pandemic, an increase in anxiety, depression and stress levels of individuals were detected along with intolerance to uncertainty, whose intensity increased. It has been investigated whether intolerance to uncertainty differs between gender variables. Among the findings of the study, intolerance to the uncertainty created by the pandemic emphasized that the difficulty in coping with the disease was significantly higher in men. Broche-Pérez et al. (2020) found that female participants, on average, experienced significantly more fear of COVID-19 than male participants. This research has shown that there is a significant relationship between fear of the COVID-19 pandemic and negative self-assessments about anxiety, fear of illness, cognition of illness probability, and uncertainty. This finding is supported by the previous study by Bakioğlu, Korkmaz and Ercan (2020). Satici et al. (2020) found a positive relationship between intolerance to uncertainty and fear of the COVID-19 pandemic. In the study of Duman (2020), a positive significant relationship was found between intolerance to uncertainty and fear of the COVID-19 pandemic.

Participants stated that they did not find public service ads at a sufficient level. According to this, it was emphasized that depression and intolerance to uncertainty scores of the participants who do not find the public spot sufficient were higher. Gica, Kavaklı, Durduran and Ak (2020) found a relationship between the perceived COVID-19 risk of psychosomatic symptoms and intolerance to uncertainty.

The research emphasized that health cognition and intolerance to uncertainty are predictors of stress. Among the findings, it was emphasized that "negative self-evaluations about uncertainty" and "uncertainty preventing action" caused stress by intolerance to uncertainty. In a similar study, Havnen, Anyan, Hjemdal, Solem, Gurigard Riksfjord, and Hagen (2020) stated that exposure to stress due to fear of the COVID-19 pandemic was associated with depression symptoms and this relationship was mediated by anxiety. In the study, it was also emphasized that depression is a predictor of health cognitions and intolerance to uncertainty. In the study conducted by Simms, Fear and Greenberg (2020), it was stated that the perception of the individual not having sufficient health equipment is an important relationship between the globally deteriorating health system and emotional problems. In the study, it was emphasized that there is a significant relationship between depression and anxiety, negative self-evaluations about uncertainty and uncertainty preventing taking action. This finding has been reported previously by Carleton, Mulvogue, Thibodeau et al. (2012) and McEvoy and Mahoney (2012) found in their study that "intolerance to uncertainty increases the level of depression and anxiety". In the study, intolerance to uncertainty was emphasized as a predictor of anxiety during the COVID-19 pandemic process. In the study of Taha, Matheson, Cronin, and Anisman (2014), HINI (2009) found that the pandemic process was a factor that increased anxiety. This is similar to the work done. In the study, a significant relationship between the probability of illness as a predictor of anxiety was emphasized. Petzold, Bendau, Plag, Pyrkosch, Mascarell Maricic, Betzler, Rogoll, Große, and Ströhle (2020) stated that thinking about being infected increases anxiety level. The purpose of this study is to examine how the intolerance to the uncertainty created by the COVID-19 pandemic affects the levels of depression, stress and anxiety, and the health-related cognition of the individuals participating in the study.
The present study finding show that male participants scored significantly higher in coping with the disease than female participants. In addition, there is no significant difference was found among intolerance to uncertainty, health cognition, depression, anxiety and stress levels. All sub-dimensions of health cognition and four dimensions of intolerance to uncertainty together predicted the stress level. The four dimensions of the Health Cognition Survey and intolerance to uncertainty were all predictors of depression. Difficulty in coping with the disease, probability of illness, negative self-evaluations about uncertainty, and uncertainty preventing taking action were significant predictors of depression. The other result is that difficulty in coping with the disease, disease probability, negative self-evaluations about uncertainty and uncertainty preventing action it was determined that anxiety is a significant predictor.

Studies to analyze psychological problems with the COVID-19 pandemic have been a great importance for both application and research areas. During and post pandemic period caused significant psychological and social problem to whole population especially grown up individuals because lock-down and curfew changed the overall life style. Start working at home and do the house-work especially cause a burden for females. On the other hand, domestic violence cases increase drastically in that period again. The mentioned issues also change the psychological wellbeing of people. It is well known knowledge that pandemic increase the prevalence of mental disorders like obsessive-compulsive disorders, depressive disorders, sleep disorders and anxiety disorders. In line with the results of the study, it is recommended to prepare practices to protect the psychological health of individuals during the pandemic process. The above mentioned practices can be psycho-educational programs that can be reached via online participation, public announcement can be develop to inform different age groups including children and older aged individuals. Longitudinal studies to be conducted in the future will also shed light on the problems that may develop depending on the course of the pandemic process.

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