The effect of alexithymic characteristics on perceived stress and health anxiety during the COVID-19 pandemic

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Abstract. – **OBJECTIVE:** The anxiety of life that comes with the pandemic process increases the health anxiety and the level of perceived stress. However, there are uncertainties about which individuals are more sensitive. This study aims to investigate the effects of alexithymic characteristics on health anxiety and perceived stress.

MATERIALS AND METHODS: The authors invited the participants to study via social media and e-mail. The data of 793 individuals, aged 18-65, collected over the internet (Google Forms) between November and December 2020 were statistically evaluated. Evaluations were made with the sociodemographic data form, the General Health Questionnaire-12 (GHQ-12), the Health Anxiety Scale (HAS), the Toronto Alexithymia Scale (TAS-20), and the Perceived Stress Scale (PSS).

RESULTS: In mediation analyzes between TAS subscales and HAS, Difficulty in Identifying Feelings (DIF) most strongly predicted HAS (B=0.469, p<0.001) and indirectly affected HAS only through GHQ (CS: 0.08, B=0.108, SE:0.021, CI: 0.070, 0.153). However, both PSS (CS: 0.0128, B=0.084, SE:0.027, CI: 0.032, 0.139) and GHQ (CS: 0.02, B=0.139, SE:0.028, CI: 0.090, 0.198) played a mediating role between Difficulty Describing Feelings (DDF) and HAS.

CONCLUSIONS: The present study suggests that individuals with alexithymic features are more sensitive to stress during periods of health-related increased stress, such as pandemics, and that individuals with alexithymic features should be given priority in psychotherapeutic interventions.

Key Words:
   Alexithymia, Anxiety, Covidien, Pandemics.

Introduction

After the declaration of COVID-19 infection as a pandemic by the World Health Organization (WHO) in March 2020, various restrictions were imposed in our country in order to slow down the spread of the infection. During the pandemic process, many people lost their jobs or their financial income decreased, and most of the people tried to adapt to an isolated life away from school-work-social life. In previous studies[1,2] conducted in epidemics and pandemics caused by H1N1, Ebola, and SARS revealed that worry or anxiety was reported by 50% of the participants. Also, the health-life anxiety brought about by the COVID-19 pandemic has further increased the impact of the stress faced by the people.

Health anxiety is a kind of anxiety that is expected to emerge in disease-related stress conditions such as pandemics. It is a state of fear by the negative interpretation of both ordinary and extraordinary sensations. The probability of getting ill, the perceived fear of the disease, the perceived inability to cope with the disease, and the perceived inadequacy in medical resources determine the level of health anxiety[3]. People with high health anxiety tend to show maladaptive safety-seeking behaviors. In these individuals, excessive hand washing, social withdrawal, and panic buying can be observed, and these behaviors can reach extremes that may have negative consequences for the individual and society[4].

Alexithymia is the limited ability to understand, interpret and express one's feelings and those of others[5]. It is known that individuals with alexithymia have limited imagination, have a concrete mindset, and have difficulties in the regulation of emotions in relationships and stress management[6]. Knowing that alexithymia accompanies many psychiatric disorders (depression, anxiety disorder, alcohol addiction, etc.)[7], it is also accepted that it is a permanent personality trait, not a condition that develops secondary to a clini-

cal disorder[8,9]. Besides, alexithymia has been related to interpersonal problems, social isolation[10], insecure attachment[11], and maladaptive stress-coping mechanisms[12]. The importance of identifying and understanding one's emotions in managing stress is undeniable[13]. The studies[14,15] have also revealed that one of the factors that increase the individual's perceived stress is alexithymic characteristics.

Health anxiety, worries, and anxiety caused by a perceived threat to health are conceptualized as dimensional structures that can vary from inadequate health awareness to pathological health anxiety or hypochondriasis[16,17]. It is known that a person with health anxiety has an increased sensitivity to somatic sensations and is often under the influence of environmental factors in interpreting somatic sensations. The level of health anxiety may increase during the pandemic, with the increase of environmental factors such as daily media news, announcements made to increase public awareness, and infection of one's relatives. Besides, in the current study, it was expected that in alexithymia as a trait, the tendency to concentrate on physical sensations would increase the health anxiety[18], because it is known that the physical sensations concentrated in alexithymia are often misinterpreted as a disease or a medical problem[19].

In addition to the unique characteristics of the pandemic and the environmental factors increased in relation, individual characteristics such as alexithymia could also be a factor that increased health anxiety under stress conditions. The current study was planned to compare the perceived stress and health anxiety levels of people aged 18-65 years and their alexithymic characteristics during the pandemic. We aimed to evaluate the direct effects of the relationship between alexithymia and health anxiety and its indirect effects through perceived stress. It is believed that the data obtained from the study results will contribute to the literature on controlling the anxiety experienced during the pandemic process, early detection of individuals who are prone to anxiety, and the development of psychotherapeutic interventions for these individuals.

Materials and Methods

The current study was approved by the Turkish Ministry of Health on 29.10.2020 and the Ethics Committee approval was obtained from the Afyonkarahisar University of Health Sciences Clinical Research Ethics Committee on 06.11.2020.

An online survey on Google was developed by the researchers, and the link was sent to the students, academicians, and other people via e-mail and social media. The study data were collected by the snowball method by asking the participants to send the form to their circles. The data of the survey were collected between 15.11.2020 and 15.12.2020. The purpose of the study was explained on the first page of the link to the participants, and it was stated that if they gave their informed consent, reporting the name was not required, while e-mail information was required to prevent duplicate entries. The participants who gave consent were asked to fill in the sociodemographic data form and 4 scales online.

Evaluation Tools

Sociodemographic Form

The form was created by the researchers to obtain information about the sociodemographic characteristics of the participants. In the form, data of the participants including age, gender, education and marital status, occupation, and monthly income were questioned.

General Health Questionnaire-12 (GHQ-12)

The General Health Questionnaire is used to evaluate the general psychopathology in the population and non-psychiatric health care areas and to screen possible cases[20]. This scale, with 12 items, is in a four-point Likert structure. The total scale score ranges from 0 to 12, and above 2 points indicates possible psychopathology. Turkish validity and reliability were performed by Kılıç et al[21]. In the present study, Cronbach's alpha coefficient for the GHQ-12 was 0.84.

Health Anxiety Scale (HAS)

The first 14 items of the 18-item scale include quadruple sequential answers that question the mental status of the patients, while the last 4 items question the mental status of the patients with the assumption of having a serious illness. The scale was developed by Salkovskis et al[22], the Turkish validity and reliability of the scale were made by Aydemir et al[23]. In the present study, the Turkish version of HAS was used to examine health anxiety, and the Cronbach's alpha coefficient for the HAS was 0.91.

Toronto Alexithymia Scale (TAS-20)

The scale was developed by Bagby et al[24], and the Turkish validity and reliability study was per-

formed by Güleç et al[25]. The scale, with 20 items in the type of five-point Likert-type scale, has three subscales: difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externally oriented thinking (EOT). Although ≥ 51 points are defined as the alexithymic by Gulec et al[25] group, it is recommended to include ≥ 59 points if it is desired to work with the pure alexithymic group[26]. The Cronbach's alpha coefficient was 0.78 for the total scale, 0.80 for the DIF, 0.57 for the DDF, and 0.63 for the EOT26 in the internal consistency analysis of the scale and its subscales[25].

Perceived Stress Scale (PSS)

It is a scale developed by Cohen et al[27] to evaluate the levels of stress perceived by the person in some situations in one's life. The total score of the 5-point Likert-type scale, which was adapted into Turkish by Eskin et al[28], indicates the stress level of the person. In this study, the short form of the scale with 4-question was used. The total score of the scale ranges from 0 to 16. Cronbach's alpha coefficient for the 4 questioned the form of PSS was 0.66.

Statistical Analysis

The data were evaluated with the SPSS version 25 package program (SPSS Inc., IBM, Armonk, NY, USA). The distribution of the data was evaluated with Skewness-Kurtosis values, and Student's *t*-test was used to compare two groups with normally distributed data. The data were expressed in mean ± standard deviation for continuous variables, and frequency and percentages were used for categorical variables. Pearson's correlation test was used to evaluate the continuous relationship between variables. The results were evaluated within the 95% confidence interval, and *p* levels < 0.05 were considered statistically significant.

Hayes' Process tool in SPSS v3.4[29] (using model 4) was used for mediation analysis to test whether Toronto Alexithymia Scale (TAS) was associated with Health Anxiety Scale (HAS) and whether this relationship was mediated by the Perceived Stress Scale (PSS) and General Health Questionnaire (GHQ). Bootstrapping, a non-parametric sampling procedure does not impose the normality of the sampling distribution of the indirect effect. Therefore, it is considered to be more powerful than the Sobel test for mediation analysis[29]. The fully standardized effect size (CS) is reported as an index of effect size. The significance of the indirect effects was examined by excluding zero in the confidence intervals (CI

95%) obtained by the bootstrapping method with 5000 resamplings. An alpha level of 0.05 (bilateral) was used to evaluate the significance of other statistical tests.

Results

A total of 874 people completed the online survey. However, after the approval of individuals for participation in the study, it was determined that 81 data from the requested personal e-mail addresses were sent repeatedly. As a result, statistical analysis was completed with 793 valid data. It was observed that 66.83% of the participants were women, and 66.20% were married. The mean age of the participants was 35.33±10.62 years.

There was a statistically significant relationship between TAS-20 and age (*p* = 0.002), gender (*p* = 0.041), marital status (*p* < 0.001) and monthly income level (*p* = 0.003). The mean TAS-20 was higher in males (48.81±9.45), single (49.97±10.38), and those with a monthly income level of minimum wage or below (49.97±9.79). Also, a weak inverse correlation was found between the TAS-20 score and age (r = -0.106).

When the cut-off point for TAS-20 was accepted as 51, 62.5% of the participants did not show alexithymic features, while 37.45% were in the alexithymic group. The participants were divided into two groups, and their sociodemographic data and the results of the scales are presented in Table I.

Pearson correlation coefficient was used to examine the potential relationships between variables. A moderately significant correlation was found between TAS-20 and GHQ-12 (r = 0.303), PSS (r = 0.417), and HAS (r = 0.260). There was also a moderate correlation between PSS and HAS (r = 0.322). It was observed that DIF and DDF scores, which are sub-dimensions of TAS-20, showed more significant correlations with PSS and HAE rather than EOT (Table II).

A linear regression analysis (TAS as predictor and HAS as outcome), adjusted for age and gender, showed that TAS was significantly associated with HAS (β = 0.26, t = 7.583, *p* < 0.001), with 7% variance, R2 = 0.068 (not shown). A Parallel mediation analysis was run with PSS and GHQ as mediators of the relationship between TAS and HAS with age and gender as covariates. The effect of TAS on PSS was significant (B = 0.136, *p* < 0.001), with higher TAS associated with higher levels of PSS. There was also a relationship between higher levels of PSS and higher levels of HAS

Table I. Sociodemographic variables and GHQ-12, PSS, HAS and TAS-20 mean scores of groups.

		Non-alexithmic group n=496 (n/column n%)	Alexithmic group n=297 (n/column n%)	p (t-test)
Age	(mean±sd)	35.76±10.26	34.62±11.16	0.145
Gender	female	344 (69.4%)	186 (62.6%)	0.052
	male	152 (30.6%)	111 (37.4%)	
Marital status	single/divorced	147 (29.6%)	121 (40.7%)	0.001*
	married	349 (70.4%)	176 (59.3%)	
Level of education	primary-secondary school graduate	21 (4.2%)	19 (6.4%)	0.002*
	high school graduate	69 (13.9%)	65 (21.9%)	
	university graduate	406 (81.9%)	213 (71.7%)	
Employment status	student	65 (13.1%)	54 (18.2%)	0.326
	employed	367 (74.0%)	201 (67.7%)	
	unemployed/retired	64 (12.9%)	42 (14.1%)	
Monthly income	0-3000 (minimum wage)TL	108 (21.8%)	88 (29.6%)	0.014*
	3000-6000 TL	165 (33.3%)	92 (31.0%)	
	6000-9000 TL	85 (17.1%)	54 (18.2%)	
	higher than 9000 TL	138 (27.8%)	63 (21.2%)	
	no	222 (44.8%)	130 (43.8%)	
General Health Questionnaire	(mean±sd)	3.24±3.09	4.85±3.48	<0.001**
Perceived Stress Scale	(mean±sd)	6.40±3.14	8.64±2.84	<0.001**
Health Anxiety Scale	(mean±sd)	13.86±6.72	16.60±7.36	<0.001**
Toronto Alexithymia Scale	(mean±sd)	41.96±5.73	57.67±6.12	<0.001**

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

(B = 0.218, p = 0.01). TAS was also associated with GHQ (B = 0.106, p < 0.001), in turn, GHQ was associated with higher levels of HAS (B= 0.568, p < 0.001). The total effect of TAS on HAS (path c) was significant (B = 0.196, p<0.001), with the addition of mediators to the model, the direct effect of TAS on HAS (path c') was also significant (B = 0.106, p = 0.001). There was a significant indirect effect of TAS on HAS through PSS and GHQ, indicating partially mediation, as TAS becomes more levels, PSS and GHQ increase, which in turn increase HAS independently (for

PSS: CS: 0.04, B=0.03, SE:0.012, CI: 0.007, 0.053; for GHQ: CS: 0.08, B=0.06, SE:0.012, CI: 0.039, 0.084) (Table III) (Figure 1).

In mediation analyzes between TAS subscales and HAS, Difficulty in Identifying Feelings (DIF) most strongly predicted HAS (B = 0.469, p < 0.001) and indirectly affected HAS only through GHQ (CS: 0.08, B=0.108, SE:0.021, CI: 0.070, 0.153). However, both PSS (CS: 0.0128, B=0.084, SE:0.027, CI: 0.032, 0.139) and GHQ (CS: 0.02, B=0.139, SE:0.028, CI: 0.090, 0.198) played a mediating role between Difficulty Describing Fe-

Table II. Pearson correlations between psychological variables.

Pearson Correlation	General Health Questionnaire	Perceived Stress Scale	Health Anxiety Scale	Difficulty Identifying Feelings	Difficulty Describing Feelings	Externally-Oriented Thinking	Toronto Alexithymia Scale
General Health Questionnaire	1						
Perceived Stress Scale	.512**	1					
Health Anxiety Scale	.387**	.322**	1				
Difficulty Identifying Feelings	.339**	.430**	.359**	1			
Difficulty Describing Feelings	.265**	.363**	.207**	.650**	1		
Externally-Oriented Thinking	.046	.119**	-.039	.155**	.295**	1	
Toronto Alexithymia Scale	.303**	.417**	.260**	.852**	.845**	.571**	1

**Correlation is significant at the 0.01 level (2-tailed).

Table III. Summary of statistical mediation analyses (using Process) between TAS and HAS through PSS and GHQ (Path estimates).

Path	B	S.E	95% Confidence Interval
Total Effect			
TAS→HAS	.196	.025	.147 to .245
Direct Effect			
TAS →HAS	.0106	.026	.542 to .157
Indirect Effects			
Total	.090	.015	**.062 to .120**
TAS→PSS→HAS	.030	.012	**.007 to .053**
TAS →GHQ→HAS	.060	.012	**.039 to .084**

TAS= Toronto Alexithymia Scale, HAS= Health Anxiety Scale, PSS= Perceived Stress Scale, GHQ= General Health Questionnaire
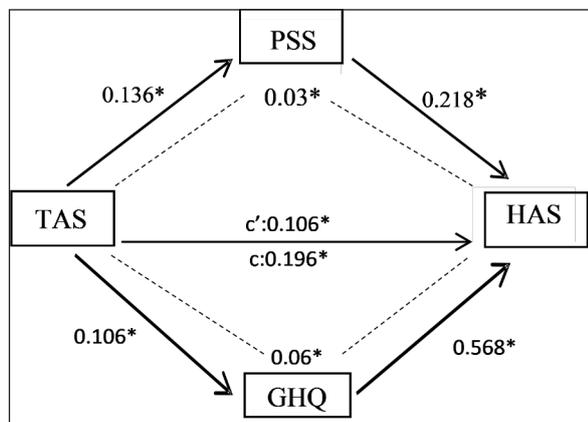

Figure 1. Mediation model for Alexithymia (TAS) and Health Anxiety (HAS) through Perceived Stress (PSS) and General Health (GHQ). Shown are unstandardized path coefficients (n=793).TAS= Toronto Alexithymia Scale, HAS= Health Anxiety Scale, PSS= Perceived Stress Scale, GHQ= General Health Questionnaire.

elings (DDF) and HAS (Table IV). In contrast, there was no significant relationship between Externally-Oriented Thinking (EOT) and HAS (B = 0.001, $p > 0.05$) (not shown).

Discussion

The factors underlying the psychological impact of the COVID-19 pandemic on society have not been completely revealed yet. Alexithymic characteristics were determined as an effective factor in increasing perceived stress and health anxiety as a result of this cross-sectional study. It was observed that alexithymic features had a direct effect on increasing health anxiety, as well as increasing health anxiety through perceived stress and general psychopathology indirectly. While the results showed that the direct effect of DIF as one of the sub-dimensions of alexithymia on health anxiety was stronger than its indirect effect, the opposite of this condition was observed in DDF. It was also determined that EOT was not associated with health anxiety.

As a result of the study, it was observed that DIF came to the forefront in the direct effect of alexithymia on health anxiety. The results showed that the lack of identifying feelings causes an increase in response to somatic stimuli, and this situation causes health anxiety because of misinterpretation. Consistent with the results of our study, in the studies by Shahidi et al[30] and Zhang et al[31], it was emphasized that alexithymia, especially the difficulty in identifying feelings, was an important factor in increasing health anxiety. Our results were coherent with the study[32], which stated that there was no relationship between EOT and exaggerating somatic sensations, however, there was a significant relationship between DIF and DDF. It was also understood that increased perception of autonomic stimuli played an active role in increasing health anxiety.

Because the inability to describe feelings in alexithymia will prevent emotional regulation, the ability to adapt to stress will decreases[33]. As a result of this condition, immature coping strategies such as behavioral withdrawal are more common in alexithymic individuals[34]. Sim et al[35] suggested that individuals who adopted an avoidance-type defense mechanism had higher levels of stress. Therefore, our hypothesis, carried out with the thought that alexithymic features would increase the perceived stress more, was confirmed and

Table IV. Summary of statistical mediation analyses (using Process) between subscales of TAS and HAS through PSS and GHQ (Path estimates).

Path	B	S.E	95% Confidence Interval
Total Effect			
DDF→HAS	.393	.067	.262 to .525
DIF→HAS	.469	.045	.381 to .555
Direct Effect			
DDF →HAS	.171	.068	.038 to .304
DIF →HAS	.322	.048	.229 to .415
Indirect Effects			
Total (DDF on HAS)	.223	.036	.155 to .295
DDF→PSS→HAS	.084	.027	.032 to .139
DDF →GHQ→HAS	.139	.028	.090 to .198
Total (DIF on HAS)	.146	.025	.100 to .198
DIF→PSS→HAS	.038	.020	-.001 to .079
DIF →GHQ→HAS	.108	.021	.070 to .153

TAS= Toronto Alexithymia Scale, HAS= Health Anxiety Scale, PSS= Perceived Stress Scale, GHQ= General Health Questionnaire, DDF=Difficulty Describing Feelings (DDF), DIF=Difficulty Identifying Feelings

a moderate correlation was found between the TAS-20 score and the perceived level of stress. DIF and DDF, the sub-dimensions of alexithymia, were also correlated with perceived stress, and this finding was interpreted as the difficulty in identifying and describing feelings reduced the ability to cope with stress, thus increasing the perceived stress more. Contrary to the study[36] that reported higher EOT levels played a protective role for stress, in our study it was observed that there was a weaker but still positive correlation between the EOT score and the perceived stress levels compared to the other sub-dimensions. This result, which is also compatible with the results of the study by Alfasi et al[37], showed us that although extroverted thinking style helped to avoid negative feelings, it was not a successful defense mechanism in reducing the perceived stress.

There are limited studies[38,39] in the literature on the relationship between perceived stress and health anxiety. Shayani et al[38] suggested that the individuals with high health anxiety levels also had higher levels of perceived stress. The findings were also confirmed by another study conducted during the COVID-19 pandemic[39]. Supporting the studies as mentioned above, in this study, it was observed that there was a moderate correlation between perceived stress and health anxiety. In addition, as well as directly increasing health anxiety, alexithymia also indirectly increased health anxiety by increasing the perceived stress.

When the sub-dimensions of alexithymia were examined one by one, an important finding was encountered. While the effect of difficulty in identifying feelings directly increasing health anxiety is more significant, the evident effect of difficulty in describing feelings on health anxiety is indirect through perceived stress. In other words, while difficulty in identifying feelings causes a direct increase in health anxiety by increasing the focus on physical stimuli, difficulty in describing feelings causes an increase in health anxiety by increasing the perceived stress of the individual.

It is a well-known fact that alexithymia is often seen together with disorders such as anxiety and depression. However, it is known that not all sub-dimensions of alexithymia but the difficulty of identifying and describing feelings often show comorbidity with depression and anxiety[40,41]. Consistent with the literature, it was determined that the DIF and DDF sub-dimensions showed a correlation with the GHQ scale scores used as an anxiety and depression screening scale, and these two sub-dimensions contributed to the increase in health anxiety through anxiety and depression symptoms. This result seems consistent with the idea that the inability to distinguish emotions from somatic sensations and difficulties in distinguishing and regulating emotions is more effective in causing psychological problems[36] and increasing stress[42]. The fact that EOT not being related to GHQ and HAS, supports the idea that

extroverted thinking is a personality trait that is not easily affected by mood[40].

Our results showed that alexithymia is an important mediator in the increase of health anxiety, which is an important health problem during the pandemic, where more stress than normal is experienced. Alexithymic features can increase health anxiety directly, as well as indirectly increase health anxiety through perceived stress. As the level of health anxiety increases, inappropriate safety-seeking behaviors and visits to health facilities unnecessarily increase. Also, in cases of necessity to admit to a health facility, refusal to admission can be encountered[4]. Therefore, during periods of health-related increased stress such as pandemics, early diagnosis of individuals with high health anxiety and who are prone to increased health anxiety and initiation of necessary psychotherapeutic processes are important for public health.

One of our limitations is that it is a cross-sectional study, and the pre-pandemic health anxiety levels of individuals are not known. The second is that alexithymia was evaluated through an individual reporting scale and face-to-face clinical evaluation could not be performed. In order to make the best assessment in a process dominated by restrictions, the TAS-20 scale was preferred, which was proven effective in the evaluation of alexithymia. Larger scale cohort studies will provide the clarification of the subject and recognition of the vulnerable individuals in stress processes.

Conclusions

Alexithymia is an essential mediator in the increase of health anxiety. Recognizing alexithymic individuals and providing psychosocial support during periods of high health-related stress such as a pandemic will reduce health anxiety.

Conflict of Interest

The Authors declare that they have no conflict of interests.

Author Contributions

Betül Kurtses Gürsoy: Conceptualization, Methodology, Formal Analysis, Investigation, Data collection, Writing - Original Draft
Nihan Çakaloğulları: Methodology, Investigation, Data collection, Writing - Original Draft
Ahmet Üzer: Formal Analysis, Investigation, Data collection, Writing - Original Draft

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