

# Levels of Cyberchondria in Anxiety Disorder and Depressive Disorder

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## ABSTRACT

**Background:** Cyberchondria refers to an abnormal behavioral pattern in which excessive or repeated online searches for health-related information are distressing or anxiety-provoking. In this study, we aimed to compare the levels of cyberchondria and health anxiety in depressive disorder (DD), anxiety disorder (AD) and healthy volunteers.

**Methods:** 64 patients with AD, 95 patients with DD and 157 healthy volunteers were included according to the DSM-5 diagnostic criteria. A semi-structured sociodemographic data form, Cyberchondria Severity Scale (CSS), and the Short Health Anxiety Inventory (SHAI) were administered to all participants.

**Results:** The mean age was 36.65±13.40 years in the AD group, 37.74±12.59 years in the DD group, and 35.64±10.56 years in healthy volunteers ( $p=0.546$ ); 56.6% ( $n=179$ ) of all participants were female. No significant difference was found among the CSS mean scores of the groups ( $p=0.655$ ), but there was a significant difference among the total SHAI score averages ( $p<0.001$ ). SHAI scores were found to be significantly higher in the AD group and the DD group (respectively  $p<0.001$ ,  $p<0.001$ ) than among healthy volunteers. SHAI scores were similar in the DD and AD groups ( $p=0.181$ ). Significant positive correlations were found between CSS and SHAI, and between CSS and time spent on the internet (respectively  $p=0.001$ ,  $p=0.001$ ).

**Conclusions:** No difference was found in cyberchondria levels among the groups, and health anxiety was found to be higher in the AD and DD groups than in healthy volunteers in our study. Cyberchondria was found to be associated with health anxiety and the time spent on the internet. Our findings suggest that although cyberchondria and health anxiety have overlapping aspects, they may be two different conditions.

## INTRODUCTION

The use of the internet has been increasing rapidly in recent years. As per the 2020 World Internet Usage and Social Media Statistics Report published by We Are Social and Hootsuite, there are approximately 4.54 billion internet users, which corresponds to 59% of the world's population. According to the same report, it was reported that approximately 74% of the population, that is, approximately 62 million people, are internet users in Turkey. With the increase in technology and internet use, health-related information has become more accessible to people (1). In the U.S.A. in 2012, approximately 70% of adults reported that they had searched for health-related information online, and approximately 35% reported that they used the internet as a diagnostic tool (2). According to the 2020 Household Information Technologies Usage Survey of the Turkish Statistical Institute (TUIK), the rate of internet use was reported as 79% in the 16-74 age group in 2020. This rate was 75.3% in the previous year. According to the same research, 65.4% of individuals using the internet searched for health-related information (injury, illness, nutrition, etc.) (3).

## Conflicts of Interest and Source of Funding

The authors declare that they have no conflict of interest. The authors declare that they have not received any financial support from any institution or person for this study.

## Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Statement of Ethics

The study was approved by the Akdeniz University Faculty of Medicine Clinical Research Ethics Committee, decision number KAEK-23. All procedures performed in studies involving human participants followed the ethical standards of the institutional and/or national research committee and the Declaration of Helsinki and its later amendments. Written informed consent was obtained from all participants before conducting the study.

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With the increasing use of the internet, new definitions have begun to enter the medical literature. One of these, cyberchondria, is defined as an excessive or repeated online health information search associated with increased levels of health anxiety or distress (4, 5). Cyberchondria refers to an abnormal behavior pattern and emotional state. Various definitions of cyberchondria have been proposed, and all involve excessive or repeated online searches for health information and health anxiety (6). On the other hand, health anxiety is the worry about results from a perceived threat to one's health. That is, it can be defined as a multifaceted trait characterized primarily by a fear of or preoccupation with severe disease. Health anxiety is conceptualized as a dimensional construct that can range from daily health concerns to pathological health anxiety or hypochondriasis (7).

In the literature, the relationship between cyberchondria and health anxiety has been investigated, and it has been reported that there are positive and significant relationships between health anxiety and searching for health information online, and between health anxiety and cyberchondria (8, 9). Studies examining the relationship between depressive disorder (DD) and anxiety disorder (AD) and cyberchondria are limited. In a study by Starcevic et al. (6), the severity of health anxiety, obsessive-compulsive disorder symptoms, intolerance of uncertainty, problematic internet use, anxiety, depression, somatic symptoms, and cyberchondria were evaluated. Cyberchondria has been shown to be a relatively specific syndrome-like structure, composed of inter-related symptoms and distinct from all related structures. Cyberchondria has been reported to be associated only with problematic internet use and health anxiety (10).

The hypothesis of our study is that cyberchondria is associated with AD and the levels of cyberchondria will be higher in the AD group than in the DD group and healthy controls. We think that our study will contribute to the existing literature for a better understanding of the concept of cyberchondria. This study aims to compare the levels of cyberchondria and health anxiety among DD patients, AD patients, and healthy volunteers and to reveal the relationships among these levels.

## MATERIALS AND METHODS

### SOURCE OF DATA AND SAMPLING

Our study is cross-sectional, conducted with 159 patients who applied to Akdeniz University Faculty of Medicine Department of Psychiatry between January 2021 and April 2021, followed up with the diagnosis of AD and DD accord-

ing to DSM-5 diagnostic criteria, and who were in remission. Remission was evaluated with the Hamilton Depression Rating Scale in the DD group and with the Hamilton Anxiety Rating Scale in the AD group. One hundred and fifty-seven healthy volunteers with similar sociodemographic characteristics were recruited; all participants were informed in detail about the study and their written consent was obtained. Inclusion criteria in the AD group comprised: to be followed in our polyclinic with the diagnosis of generalized anxiety disorder, to be in remission, to be between the ages of 18-65, to be at least a primary school graduate, not having any physical illness, and to be using the internet. Inclusion criteria in the DD group comprised: to be followed in our polyclinic with the diagnosis of DD, to be in remission, to be between the ages of 18-65, to be at least a primary school graduate, not having any physical illness, and to be using the internet. Inclusion criteria for healthy volunteers comprised: according to DSM-5 diagnostic criteria, not having any psychiatric disease, being between 18-65 years old, being at least a primary school graduate, not having any physical illness, and to be using the internet. Exclusion criteria from the study comprised the presence of a history of psychiatric illness in healthy volunteers, the presence of comorbid psychiatric disease other than generalized anxiety disorder in the AD group, and the presence of comorbid psychiatric disease other than DD in the DD group. A face-to-face psychiatric interview was conducted with all participants, and a semi-structured sociodemographic data form, Cyberchondria Severity Scale (CSS) (11) and the Short Health Anxiety Inventory (SHAI) (12) were administered to all participants. Written ethics committee approval with the decision number KAEK-23 was obtained from the Clinical Research Ethics Committee of Akdeniz University Faculty of Medicine for the study. Our study was carried out in accordance with the Declaration of Helsinki.

### CYBERCHONDRIA SEVERITY SCALE (CSS)

CSS is a psychometric scale developed by McElroy and Shevlin (11) in 2014 to measure cyberchondria. CSS is a 5-point Likert-type scale consisting of 33 questions. CSS is a continuous scale, not a categorical one. There is no cutoff score. The total cyberchondria score of the person is calculated by totaling the scores obtained from each question. The higher the score, the higher the level of cyberchondria.

### THE SHORT HEALTH ANXIETY INVENTORY (SHAI)

It was developed by Salkovskis et al. (12) in 2002 to assess health anxiety. SHAI consists of 18 items. The first 14 items consist of questions about the mental state of the patients.

In the last four questions, patients are asked to speculate about their mental state in the event of a hypothetical serious illness. It is a 4-point Likert scale. There is no cutoff score. High scores indicate the severity of health anxiety.

### STATISTICAL ANALYSIS

SPSS 23 (Statistical Package for Social Sciences) program was used to evaluate the data. Whether the data fit the normal distribution was tested using the Kolmogorov-Smirnov analysis method. Continuous variables were given as mean and standard deviation. Categorical variables were given as numbers and percentages. The Kruskal Wallis test was used to compare the three groups. The Mann Whitney U test was used for post-hoc analysis of the variables with significant test results. The Chi-square test was used to compare categorical variables. The Spearman correlation analysis was used for correlation analysis. Statistical significance was set at  $p < 0.05$ .

### RESULTS

A total of 316 participants, including 64 AD patients, 95 DD patients, and 157 healthy volunteers, partici-

pated in our study. The mean age was  $36.65 \pm 13.40$  years in the AD group,  $37.74 \pm 12.59$  years in the DD group, and  $35.64 \pm 10.56$  years in healthy volunteers ( $p=0.546$ ). Female participants constituted 56.6% ( $n=179$ ) of all participants, and sociodemographic characteristics are summarized in Table 1.

When the situations of the groups regarding the use of internet and health services are examined, the rate of drug use without the recommendation of a physician was 35.7% ( $n=56$ ) in healthy volunteers, 17.2% ( $n=11$ ) in the AD group, and 17.9% ( $n=17$ ) in the DD group ( $p=0.001$ ). The data on other internet and health service usage are summarized in Table 2.

The mean CSS score was  $76.06 \pm 22.88$  in the DD group,  $80.31 \pm 22.75$  in the AD group, and  $78.13 \pm 20.21$  in healthy volunteers, and no significant difference was found among the groups ( $p=0.655$ ). Participants' mean SHAI total score was  $19.63 \pm 9.60$  in the DD group,  $23.00 \pm 10.67$  in the AD group, and  $14.16 \pm 7.12$  in healthy volunteers ( $p < 0.001$ ). In the paired comparisons, the mean total score of SHAI was found to be significantly higher in the AD group and DD group than in healthy volunteers (respectively;  $p < 0.001$ ,  $p < 0.001$ ). SHAI total score averages were found to be similar between the DD and AD groups ( $p=0.181$ ). The mean Short Health Anxiety Inventory Illness Likelihood subscale (SHAI-IL) score was  $15.69 \pm 7.68$  in the DD group,  $18.56 \pm 8.57$  in the AD group, and  $11.14 \pm 5.55$  in healthy volunteers, with a significant difference between the groups ( $p < 0.001$ ). In pairwise comparisons, the mean SHAI-IL score was found to be significantly higher than healthy volunteers in the AD group and DD group (respectively;  $p < 0.001$ ,  $p < 0.001$ ). SHAI-IL score averages were found to be similar between the DD and AD groups ( $p=0.149$ ). The mean Short Health Anxiety Inventory Negative Consequences subscale (SHAI-NC) score was  $3.83 \pm 2.94$  in the DD group,  $4.38 \pm 3.08$  in the AD group, and  $3.09 \pm 2.59$  in healthy volunteers, with a significant difference among the groups ( $p=0.009$ ). In the paired comparisons, the mean SHAI-NC score was found to be significantly higher in the AD group than in healthy volunteers ( $p=0.011$ ). The mean SHAI-NC score was found to be similar between the DD group and healthy volunteers, and between the DD group and the AD group (respectively;  $p=0.162$ ,  $p=0.805$ ) (Table 3). No difference was found between the CSS scores of male and female participants and the

**Table 1.** Comparison of groups in terms of sociodemographic characteristics

		Anxiety Disorder (n=64)		Depressive Disorder (n=95)		Healthy volunteer (n=157)		p
		%	n	%	n	%	n	
Gender	Female	42	65.6	69	72.6	68	43.3	<0.001
	Male	22	34.4	26	27.4	89	56.7	
Marital status	Married	30	46.9	40	42.1	89	56.7	0.008
	Single	30	46.9	38	40.0	59	37.6	
	Divorced/Separate	4	6.2	17	17.9	9	5.7	
Educational status	Primary school	14	20.8	25	26.3	11	7.1	
	High school	25	39.1	34	35.8	55	35.5	
	University	20	31.3	31	32.6	67	43.2	
	Master's/PhD	5	7.8	5	5.3	22	14.2	
Monthly income (Turkish Lira)	2000 and below	33	51.6	39	41.0	16	10.3	<0.001
	2001-5000	20	31.3	41	43.1	90	57.7	
	5001 and above	11	17.1	15	15.7	50	32.0	
Chronic internal disease in the family	No	27	42.1	33	34.7	80	50.9	0.040
	Yes	37	57.9	62	65.3	77	49.1	
Patient in need of care at home	No	56	87.5	86	90.5	148	94.3	0.219
	Yes	8	12.5	9	9.5	9	5.7	
Healthcare relative in the family	No	53	82.8	71	74.7	107	68.2	0.076
	Yes	11	17.2	24	25.3	50	31.8	
Age (years) (mean $\pm$ SD)		36.65 $\pm$ 13.40		37.74 $\pm$ 12.59		35.64 $\pm$ 10.56		0.546

**Table 2.** Comparison of the characteristics of the groups regarding internet and health service use

		Anxiety Disorder (n=64)		Depressive Disorder (n=95)		Healthy volunteer (n=157)		p
		n	%	n	%	n	%	
Daily time spent on the internet	<1h.	18	28.1	18	18.9	19	12.1	0.042
	1-6 h.	38	59.4	68	71.6	124	79.0	
	>6h.	8	12.5	9	9.5	14	8.9	
Seeking scientific publications related to health	Never	13	20.3	22	23.1	36	22.9	0.836
	Rarely	19	29.7	26	27.4	44	28.1	
	Sometimes	24	37.5	29	30.5	57	36.4	
	Often	6	9.4	7	7.4	14	8.9	
	Continuously	2	3.1	11	11.6	6	3.7	
Seeking health-related broadcasts on television or social media	Never	8	12.5	19	20.0	31	19.7	0.137
	Rarely	17	26.6	21	22.2	51	32.5	
	Sometimes	28	43.8	33	34.7	59	37.6	
	Often	6	9.4	14	14.7	12	7.6	
	Continuously	5	7.8	8	8.4	4	2.6	
Trust for the healthcare professionals s/he took service	I trust	57	89.1	88	92.6	140	89.2	0.633
	I don't trust	7	10.9	7	7.4	17	10.8	
Participation in health meetings in the last 1 year	No	59	92.2	80	84.2	124	79.0	0.153
	Yes	5	7.8	15	15.8	33	21.0	
Examination other than the physician recommendation	I did	20	31.3	24	25.3	41	26.1	0.672
	I did not	44	68.7	71	74.7	116	73.9	
Medication other than the physician recommendation	I used	11	17.2	17	17.9	56	35.7	0.001
	I did not use	53	82.8	78	82.1	101	64.3	

**Table 3.** Comparison of cyberchondria and health anxiety scale scores of the groups

	Anxiety Disorder (n=64)	Depressive Disorder (n=95)	Healthy volunteer (n=157)	p
Cyberchondria Severity Scale (mean±SD)	80.31±27.25	76.06±22.88	78.13±20.21	0.655
Short Health Anxiety Inventory Illness Likelihood subscale (mean±SD)	18.56±8.57	15.69±7.68	11.14±5.55	<0.001
Short Health Anxiety Inventory Negative Consequences subscale (mean±SD)	4.38±3.08	3.83±2.94	3.09±2.59	0.009
Health Anxiety Scale-total score (mean±SD)	23.00±10.67	19.63±9.60	14.16±7.12	<0.001

time they spent on the internet (respectively;  $p=0.565$ ,  $p=0.751$ ).

In the correlation analysis, time spent on the internet decreased significantly as age increased ( $r=-.419$ ,  $p<0.001$ ). As the CSS scores increased, the time spent on the internet increased significantly ( $r=.190$ ,  $p=0.001$ ). No significant correlation was found between SHAI-IL, SHAI-NC and SHAI-total scores and time spent on the internet (respectively:  $r=.016$ ,  $p=0.774$ ;  $r=.001$ ,  $p=0.986$ ;

**Table 4.** Correlations between age, cyberchondria severity scale score and short health anxiety inventory scores

	Age	CSS*	SHAI-IL*	SHAI-NC*	SHAI-total*
Age		$r = -.103$ $p = 0.067$	$r = .034$ $p = 0.547$	$r = .032$ $p = 0.571$	$r = .021$ $p = 0.705$
CSS*	$r = -.103$ $p = 0.067$		$r = .272$ $p < 0.001$	$r = .246$ $p < 0.001$	$r = .293$ $p = 0.001$
SHAI-IL*	$r = .034$ $p = 0.547$	$r = .272$ $p < 0.001$		$r = .478$ $p < 0.001$	$r = .943$ $p < 0.001$
SHAI-NC*	$r = .032$ $p = 0.571$	$r = .246$ $p < 0.001$	$r = .478$ $p < 0.001$		$r = .717$ $p < 0.001$
HAS-total*	$r = .021$ $p = 0.705$	$r = .293$ $p < 0.001$	$r = .943$ $p < 0.001$	$r = .717$ $p < 0.001$	

\* CSS: Cyberchondria Severity Scale, SHAI-IL: Short Health Anxiety Inventory Illness Likelihood subscale, SHAI-NC: Short Health Anxiety Inventory Negative Consequences subscale, SHAI-total: Short Health Anxiety Inventory-total score

$r=.018$ ,  $p=0.748$ ). It was determined that as the CSS scores increased, the SHAI-IL, SHAI-NC and SHAI total scores increased significantly (Table 4).

## DISCUSSION

In our study, no significant difference was found in cyberchondria levels among patients with DD, patients with AD, and healthy volunteers. SHAI total score and

subscale scores were found to be significantly higher in patients with AD than healthy volunteers. SHAI total and SHAI-IL subscale scores were found to be significantly higher in patients with DD than in healthy volunteers. The SHAI-NC subscale was found to be similar in patients with DD and healthy volunteers. SHAI total and subscale scores were found to be similar in patients with DD and patients with AD.

In a study of 247 women (13), the predictive role of perceived loneliness, general anxiety, depression and stress on cyberchondria was investigated. The direct effects of loneliness, depression, and stress have only been partially confirmed, and general anxiety has been reported to strongly predict cyberchondria symptoms. In a study by Starcevic et al., conducted with 751 participants who browsed for health information on the internet in the last three months, questionnaires evaluating cyberchondria, health anxiety, obsessive compulsive disorder, intolerance of uncertainty, problematic internet use, anxiety, depression and somatic symptoms were administered to the participants. As a result of this study, it was concluded that cyberchondria is a relatively specific syndrome consisting of interrelated symptoms distinct from all these conditions. It was reported that cyberchondria has the strongest associations only with problematic internet use and health anxiety (10). In our study, cyberchondria levels were found to be similar among DD patients, AD patients, and healthy volunteers. This may be related to the fact that cyberchondria is a different condition independent of general anxiety and depression. In addition, our study was conducted in the period of Coronavirus Disease 2019 (COVID-19) where it was reported that cyberchondria severity is positively correlated with COVID-19 anxiety. A high perception of threat and fear of a newly identified and poorly understood disease, difficulty in coping with the uncertainty associated with the pandemic, difficulty in dealing with the abundance of often confusing, contradictory, unverified and constantly updated information may explain the hypothetical rise of cyberchondria during the COVID-19 pandemic (14, 15). The lack of difference in the severity of cyberchondria among all three groups in our study also suggested that the levels of cyberchondria associated with the pandemic may have increased in the general population during the COVID-19 pandemic.

In our study, SHAI total scores were found to be significantly higher in AD and DD patients than in healthy volunteers, and similar in AD and DD patients. In health anxiety, types of health information such as bodily sensations and test results can be interpreted as indicators of

severe physical disease causing distress. It was reported that health anxiety can occur in a spectrum ranging from mild anxiety associated with seeking appropriate care to pathological anxiety associated with constant distress. Although health anxiety is not a diagnostic category, it is closely related to psychiatric diagnoses such as hypochondriasis and AD (16, 17). The fact that health anxiety was significantly higher in both disease groups than in healthy volunteers may be related to the relationship between health anxiety and these diseases.

It was reported that cyberchondria is associated with health anxiety (6). In a meta-analysis of 20 studies with a total of 7,373 participants, a strong correlation was reported between health anxiety and cyberchondria (8). Although cyberchondria and health anxiety are closely related, it is reported that they have different structures (18, 19). Consistent with these data, positive correlations were found between cyberchondria levels and health anxiety in our study. While there was a significant difference between healthy volunteers and patient groups in terms of health anxiety, no significant difference was found between cyberchondria levels. This supports the view that although there are strong relationships between cyberchondria and health anxiety, they have different aspects from each other.

In our study, no relationship was found among gender and age and levels of cyberchondria, and it was determined that the time spent on the internet was positively associated with cyberchondria. Similarly, in another study (20), while cyberchondria was strongly associated with problematic internet use, this relationship could not be explained by age and gender. In a further study (21) conducted with 874 students, the scores of cyberchondria increased significantly as the frequency of internet browsing increased. Studies evaluating the link between cyberchondria and problematic internet use have reported that cyberchondria is strongly associated with compulsive internet use, independent of factors such as negative affect or health anxiety (22). The findings of our study support the relationship between the time spent on the internet and the levels of cyberchondria.

It can be said that the limitations of our study are that it is cross-sectional and the measurement tools are based on self-report. Our study is one of the limited number of studies in the literature comparing the levels of cyberchondria in clinical groups with healthy volunteers, and, in this respect, it may contribute to the literature in the agreement about the concept of cyberchondria. The advantage of our study compared to other studies is

that it is the first study in the literature to evaluate DD, AD and healthy volunteers in terms of cyberchondria and health anxiety. In addition, the fact that we evaluated the patients in the remission period significantly excluded the effect of the symptoms in the attack period on cyberchondria and health anxiety.

## CONCLUSIONS

In our study, the levels of cyberchondria were similar among the groups, and the levels of health anxiety were found to be higher in the AD and DD groups than among healthy volunteers. The lack of significant difference in cyberchondria scores among the groups supports the view that cyberchondria is a specific syndrome that includes different types of symptoms from these diseases. In our study, cyberchondria levels were found to be significantly associated with health anxiety. Our findings support the view that although cyberchondria and health anxiety are overlapping areas, they are two different conditions. We think that cyberchondria is related to the duration of internet use and that professionals should be aware of cyberchondria, which is a potential health threat with rapidly developing technology. Our recommendations for future studies are to carry out prospective studies, to reach a much larger sample size, and to conduct multicenter studies. In addition, we suggest that patients in remission and in the attack period should be evaluated together. These are needed to reveal the etiology of cyberchondria more clearly.

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