Research Article

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The effect of cyberchondria in neurosurgical outpatient care: a cross-sectional study

Nöroşirürji poliklinik bakımında siberkondrinin etkisi: kesitsel bir çalışma

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Abstract

Purpose: The digital age has made health information widely accessible but also fueled cyberchondria, where individuals excessively search symptoms online, increasing health anxiety. This is critical in neurosurgery, where common complaints like headaches or back pain are linked to serious conditions. This study investigates the impact of cyberchondria on neurosurgical outpatients, considering psychiatric history, gender, and socioeconomic status.

Material and methods: This prospective observational study included 90 new patients from two randomly selected neurosurgery clinics at a tertiary care hospital. Data on demographics, medical history, prior healthcare interactions, and online research behaviors were collected. The Depression Anxiety Stress Scale (DASS-21) measured cyberchondria, depression, anxiety, and stress. Statistical analysis used chi-square, Fisher's exact, and Spearman's correlation tests.

Results: Of 90 patients, 55 (61.1%) were women and 35 (38.9%) were men. Forty percent reported researching symptoms online before their visit. Women and patients with psychiatric history scored significantly higher on all psychological measures. Pre-visit internet use correlated with elevated cyberchondria, anxiety, depression, and stress. Lower-income patients had higher cyberchondria scores. Cyberchondria is strongly correlated with increased anxiety and stress levels.

Conclusion: Cyberchondria significantly contributes to health anxiety in neurosurgical clinics, leading to unnecessary referrals. Gender, psychiatric history, and lower income levels are associated with higher susceptibility. Patient education, psychological support, and improved doctor-patient communication may help reduce its impact and enhance healthcare efficiency.

Keywords: Cyberchondria, health anxiety, neurosurgery outpatient clinic, online health information, psychological factors.

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Öz

Amaç: Dijital çağ sağlık bilgilerini geniş ölçüde erişilebilir hale getirmiş, ancak aynı zamanda bireylerin semptomları çevrim içi aşırı derecede araştırarak sağlık kaygısını artırdığı siberkondriyi de körüklemiştir. Bu durum, baş ağrısı veya bel ağrısı gibi yaygın şikâyetlerin ciddi rahatsızlıklarla ilişkili olduğu nöroşirürjide kritik öneme sahiptir. Bu çalışma, psikiyatrik öykü, cinsiyet ve sosyoekonomik durumu dikkate alarak siberkondrinin nöroşirürji poliklinik hastaları üzerindeki etkisini araştırmaktadır.

Gereç ve yöntem: Bu prospektif gözlemsel çalışmaya, üçüncü basamak bir hastanedeki rastgele seçilmiş iki nöroşirürji polikliniğinden 90 yeni hasta dahil edildi. Demografik veriler, tıbbi öykü, önceki sağlık hizmeti etkileşimleri ve çevrim içi araştırma davranışları toplandı. Depresyon Anksiyete Stres Ölçeği (DASS-21), siberkondriyi, depresyonu, anksiyeteyi ve stresi ölçmek için kullanıldı. İstatistiksel analizde ki-kare, Fisher'ın kesin testi ve Spearman korelasyon testleri kullanıldı.

Bulgular: 90 hastanın 55'i (%61,1) kadın, 35'i (%38,9) erkekti. Hastaların %40'ı, ziyaretlerinden önce semptomlarını çevrim içi araştırdığını bildirdi. Kadınlar ve psikiyatrik öyküsü olan hastalar, tüm psikolojik ölçümlerde anlamlı derecede daha yüksek puanlar aldı. Ziyaret öncesi internet kullanımı, artmış siberkondri, anksiyete, depresyon ve stres ile korele bulundu. Daha düşük gelirli hastalar daha yüksek siberkondri puanlarına sahipti. Siberkondri, artmış anksiyete ve stres düzeyleriyle güçlü bir şekilde ilişkilendirildi.

Sonuç: Siberkondri, nöroşirürji polikliniklerinde sağlık kaygısına önemli ölçüde katkıda bulunarak gereksiz yönlendirmelere yol açmaktadır. Cinsiyet, psikiyatrik öykü ve düşük gelir düzeyleri daha yüksek duyarlılıkla ilişkilidir. Hasta eğitimi, psikolojik destek ve geliştirilmiş doktor-hasta iletişimi, etkisini azaltmaya ve sağlık hizmeti verimliliğini artırmaya yardımcı olabilir.

Anahtar kelimeler: Siberkondri, sağlık kaygısı, nöroşirürji polikliniği, çevrim içi sağlık bilgisi, psikolojik faktörler.

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Introduction

The digital age refers to a period in which computers and internet-based technologies are integrated into every aspect of life. Today, the fact that the internet has become available on mobile devices with internet connections has radically changed the way individuals access health information. While this provides freedom of access to health information, it can also lead to unjustified health worries due to inaccurate or incomplete information.

Cyberchondria is a phenomenon characterized by individuals researching simple health symptoms on the internet and believing them to be serious and fatal diseases [1, 2].In neurosurgical outpatient clinics, where patients with common symptoms such as headache or numbness are frequently seen, these complaints are often misinterpreted as signs of serious brain or nervous system pathologies after a superficial internet search [3]. Such false concerns lead patients to make unnecessary referrals to specialties such as neurosurgery, placing an increasing burden on the healthcare system [4].

Because even simple symptoms such as numbness or headache are often associated by patients with serious conditions like brain tumors or hemorrhage, neurosurgery becomes one of the most frequently consulted specialties [5-9]. In countries without a mandatory referral or triage system, patients can directly present to neurosurgical outpatient clinics, which leads to an increased clinical burden with cases that might otherwise have been filtered at earlier stages of care. Neurosurgeons who frequently encounter overly anxious patients may experience difficulties in diagnosis and treatment processes under this stress. As a result, outpatient clinic performance may decrease, diagnosis and treatment processes may be impaired, and even the patient-physician relationship may be negatively affected [10].

Cyberchondria is generally considered in the literature not as an independent disease but as a component of hypochondriasis, generalized anxiety disorder or obsessive-compulsive disorder [11-13]. Although this is primarily an individual disorder, its consequences disrupt clinical workflow and constitute a public health problem [14].

In this study, the effect of cyberchondria on patients admitted to the neurosurgery outpatient clinic was examined, and the relationship of this phenomenon with parameters such as specific psychiatric disorders, gender, and socioeconomic level was aimed to be demonstrated.

Materials and methods

This observational study was conducted after obtaining approval from the Ankara Etlik City Hospital Institutional Ethics Board with AEŞH-BADEK-2025-0142 number 30.04.2025. Permission to use the questionnaire applied in this study was obtained from the participants. The study included 90 patients who presented to the neurosurgery outpatient clinic on a single day.

The study design was structured as follows:

1. Patient Selection: From the selected two outpatient clinics, all scheduled and walk-in appointments were reviewed. Follow-up visits were excluded, and only new patient visits were selected.

2. Informed of Patient: Selected new patients were approached on a voluntary basis and provided with informed consent before inclusion in the study.

3. Randomization: Patients were selected without consideration of age, gender, race, income level, or symptom differences to ensure unbiased sampling.

Data were collected on the following parameters:

Demographic Characteristics: Gender, age, education level, occupation, marital status, and income level (categorized as ≤$400, $400–$800, $800–$1500, and ≥$1500).

Medical History: Presence of chronic illnesses and current psychiatric conditions.

Previous Healthcare Interactions: Patients were questioned about any prior consultations for similar complaints with the same or different medical specialties.

Pre-Visit Research Behavior: The nature of any research conducted prior to the outpatient clinic visit was assessed. The categories included no research, internet-based research, consultation with a recognized healthcare professional, and seeking information from a friend.

Exclusion criteria: Patients who had already received a specific diagnosis during another consultation and presented to the outpatient clinic for purposes such as follow-up or further investigations were excluded from the study. In addition, follow-up patients were not included.

Depression, anxiety, and stress levels of the patients were measured using the Depression Anxiety Stress Scale-21 (DASS-21) [15]. Patients' levels of cyberchondria were assessed using the Cyberchondria Severity Scale-12 (CSS-12) [16].

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics (version 23.0). The Shapiro Wilk test was used to evaluate the distribution of continuous variables. Based on the results of the normality tests for all continuous variables, nonparametric tests were used. The Mann-Whitney U test was used to compare two independent groups. The Kruskal-Wallis test was used to compare more than two groups, and post-hoc analyses were performed when necessary. Based on the frequency of the data, either the chi-square test or Fisher's exact test was used to analyze categorical variables. Spearman's correlation test was used to evaluate the relationships between continuous variables. Since continuous variables did not exhibit a normal distribution, median [IQR Q1-Q3] values are presented, and mean ± SD values are also shown as additional information. Statistical significance was set at $p<0.05$.

Results

During the study period, 24 patients who presented to the outpatient clinic with a previously established diagnosis from another consultation and were admitted for follow-up were excluded from the study. Ninety patients were included in the study, comprising 55 women (61.1%) and 35 men (38.9%). Of the patients, 58 (64.4%) were employed and 32 (35.6%) were unemployed or retired. The average age of the participants was 38.03±13.92 years, and the total years of education was 11.40±4.54. Of the 90 patients included in the study, 36 (40.0%) presented with low back pain, 13 (14.4%) with neck pain, 14 (15.6%) with numbness in various parts of the body, 16 (17.8%) with headache, 5 (5.6%) with vertigo, and 6 (6.7%) with non-specific symptoms unrelated to neurosurgery. Regarding pre-visit research behavior, 40 patients (44.4%) reported that they researched their condition on the internet, 17 patients (18.9%) reported that they consulted both the internet and another medical professional, 11 patients (12.2%) only received advice from another medical professional, 5 patients (5.6%) asked a friend, and 17 patients (18.9%) did not do any research on their condition (Table 1).

Table 1 provides a detailed description of the patients' occupations, marital status, history of psychiatric treatment, other chronic diseases, consultation rates with another clinic or neurosurgeon, monthly income levels, and DASS-21 scores for cyberchondria, depression, anxiety, and stress.

When comparing the scores for cyberchondria, depression, anxiety, and stress between genders, it was found that women had significantly higher scores in all categories, indicating higher levels of distress (*p*-values: 0.030, 0.011, <0.001, and 0.039, respectively) (Table 2). When the relationship between cyberchondria, depression, anxiety, and stress levels and a history of psychiatric treatment was examined, all scores were found to be significantly higher in individuals with a history of psychiatric illness (*p*-values: 0.039, 0.031, 0.010, and 0.047, respectively) (Table 3).

Table 1. Demographic, Socioeconomic, and Clinical Characteristics of the Study Population (n=90)

Characteristics (n=90)	Number (n)	Percentage (%)
Gender		
Male	35	38.9
Female	55	61.1
Ages	Mean= 38.03±13.92, Median= 35.00 (Min-Max= 19-92)	
Total of Education	Mean= 11.40±4.54, Median= 12.00 (Min-Max= 0-20)	
Research		
Internet	40	44.4
I did not research	17	18.9
Internet and known medical professional	17	18.9
Known medical professional	11	12.2
Friend	5	5.6
Examination in another department	10	11.1
Examination in another neurosurgeon	22	24.4
Work status		
Still working	58	64.4
Not working	32	35.6
Occupation		
Housewife	20	22.2
Secretary	8	8.9
Retired	7	7.8
Government official	6	6.7
Worker	5	5.6
Freelance	5	5.6
Cook	4	4.4
Technician	4	4.4
Teacher	3	3.3
Student	3	3.3
Other*	25	27.8
Marital status		
Single	33	36.7
Married	53	58.9
Divorced	4	4.4
Receiving psychiatric treatment	5	5.6
Psychiatric treatment time	Mean= 33±266.29, Median= 0 (Min-Max= 0-2520)	

Table 1. Demographic, Socioeconomic, and Clinical Characteristics of the Study Population (n=90) (continued)

Characteristics (n=90)	Number (n)	Percentage (%)
Chronic illnesses**		
Hypertension	4	4.4
Diabetes	3	3.3
Hypercholesterolemia	1	1.1
Celiac disease	1	1.1
Cerebral palsy	1	1.1
Hashimato disease	1	1.1
Coronary disease	1	1.1
Receiving medical drug	6	6.7
Income		
≤400 $	27	30.0
400-800 $	24	26.7
800-1200 $	21	23.3
≥1200 $	18	20.0
	DASS-21 Score	
Cyberchondria	Mean= 27.86±9.16, Median= 29.00 (Min-Max= 12-50)	
Depression	Mean= 5.17±4.93, Median= 4.00 (Min-Max= 0-18)	
Anxiety	Mean= 6.22±4.08, Median= 6.00 (Min-Max= 0-19)	
Stress	Mean= 6.54±4.69, Median= 5.00 (Min-Max= 0-21)	

Engineer (n=2), caregiver (n=1), anthropologist (n=1), lab assistant (n=2), nurse (n=2), security guard (n=2), manager (n=1), masseuse (n=1), organizer (n=1), attorney (n=1), industrial designer (n=1), chauffeur (n=1), human resources (n=1), academician (n=1), chemist (n=1), police (n=1)

Table 2. Comparisons of cyberchondria, depression, anxiety and stress scores according to gender

		Cyberchondria		
Gender	**Mean±SD**	**Median (Min-Max)**	***U Value***	***p***
Male (n=35)	25.46±8.97	26 (12-49)	700.0	0.030*
Female (n=55)	29.38±9.03	30 (12-50)		
		Depression		
Male (n=35)	3.66±4.28	2 (0-14)	656.6	0.011*
Female (n=55)	6.13±5.10	5 (0-18)		
		Anxiety		
Male (n=35)	4.23±3.41	4 (0-14)	498.0	0.000*
Female (n=55)	7.49±3.99	7 (0-19)		
		Stress		
Male (n=35)	5.03±3.33	4 (0-14)	713.5	0.039*
Female (n=55)	7.51±5.17	7 (1-21)		

Note: Data are presented as Mean ± SD and Median (Min - Max), U, and p values. Comparisons between two independent groups (male and female) were performed using the Mann Whitney U test due to non-normal distribution (Shapiro Wilk test, $p<0.05$). * indicates statistically significant differences at $p<0.05$

Table 3. Comparisons of cyberchondria, depression, anxiety and stress scores according to psychiatric treatment

Psychiatric treatment	Cyberchondria			
	Mean±SD	**Median (Min-Max)**	***U Value***	***p***
Yes (n=5)	39.00±10.51	39 (28-50)	95.5	0.039*
No (n=85)	27.20±8.71	29 (12-44)		
		Depression		
Yes (n=5)	12.00±7.07	14 (0-18)	90.5	0.031*
No (n=85)	4.76±4.51	4 (0-18)		
		Anxiety		
Yes (n=5)	12.20±5.17	13 (5-19)	60.00	0.010*
No (n=85)	5.87±3.75	5 (0-19)		
		Stress		
Yes (n=5)	11.40±5.37	14 (2-15)	100.0	0.047*
No (n=85)	6.26±4.52	5 (0-21)		

Note: Data are presented as Mean ± SD and Median [IQR; Q1–Q3], U, and p values due to non-normal distribution of the variables (Shapiro Wilk test, $p<0.05$). Comparisons were made using the Mann Whitney U test between participants who did and did not receive psychiatric treatment.
* indicates statistically significant differences at $p<0.05$.

When the patients' cyberchondria, depression, anxiety, and stress scores were compared with the types of inquiries they made prior to their visit, a significant association was found with all four conditions and the type of research conducted (p-values: <0.001, 0.013, <0.001, and 0.011, respectively) (Table 4). No significant relationships were found between these four conditions and prior visits to a different neurosurgeon with similar complaints, visits to a different department, occupation status, marital status, chronic illnesses, or medication use.

For cyberchondria, pairwise comparisons showed a significant difference between the "I did not research" group and the "Internet" group (p=0.013) and between the "I did not research" group and the "Both Internet and Medical Professional" group (p=0.002) (Table 4).

For depression scores, pairwise comparison revealed a difference between the "I did not research" group and the "Internet" and "Medical Professional" groups (p=0.011) (Table 4).

For anxiety scores, pairwise comparisons showed differences between the "I did not research" and "Internet" groups (p<0.001), the "I did not research" and "Medical Professional" groups (p=0.003), and the "I did not research" and "Both Internet and Medical Professional" groups (p<0.001) (Table 4).

For stress scores, pairwise comparison revealed a significant difference between the "I did not research" group and the "Both Internet and Medical Professional" group (p=0.016) (Table 4).

When cyberchondria was compared with monthly income levels, it was observed that as income decreased, the cyberchondria score increased (p=0.037) (Table 5).

When stress and anxiety levels were compared between genders, it was observed that women had more severe levels of both anxiety and stress (p values: <0.001 and 0.041, respectively) (Table 6).

When comparing depression, anxiety, and stress levels with the history of psychiatric treatment, it was shown that those who received treatment had more severe scores (p values were 0.001, 0.018, and 0.016, respectively) (Table 7).

Table 4. Comparisons of cyberchondria, depression, anxiety and stress scores according to research types

Research	Mean±SD	Median (Min-Max)	*H Value*	*p*
		Cyberchondria		
Internet (n=40)	29.95±8.84	30 (12-50)		
Known medical professional (n=11)	26.91±8.17	25 (14-42)		
Friend (n=5)	18.40±9.56	14 (12-35)	20.87	0.000*
I did not research (n=17)	21.00±7.64	20 (12-35)		
Internet and known medical professional (n=17)	33.18±5.83	33 (22-42)		
		Depression		
Internet (n=40)	5.68±5.33	5 (0-18)		
Known medical professional (n=11)	5.55±4.25	5 (0-13)		
Friend (n=5)	3.20±4.49	1 (0-13)	12.62	0.013*
I did not research (n=17)	2.35±3.52	1 (0-13)		
Internet and known medical professional (n=17)	7.12±4.74	7 (0-18)		
		Anxiety		
Internet (n=40)	7.20±4.03	6 (0-19)		
Known medical professional (n=11)	7.55±4.76	7 (2-19)		
Friend (n=5)	4.40±0.55	4 (4-5)	29.75	0.000*
I did not research (n=17)	2.12±2.57	2 (0-10)		
Internet and known medical professional (n=17)	7.71±2.66	7 (4-14)		
		Stress		
Internet	6.65±4.74	5 (1-17)		
Known medical professional (n=11)	6.64±4.32	6 (2-16)		
Friend (n=5)	3.20±1.79	3 (1-5)	13.00	0.011*
I did not research (n=17)	4.53±3.96	4 (0-13)		
Internet and known medical professional (n=17)	9.24±4.87	8 (4-21)		

Note: Data are presented as Mean ± SD and Median (Min - Max), H and p values due to non-normal distribution as assessed by the Shapiro Wilk test ($p<0.05$). Comparisons between more than two independent groups (research type categories) were conducted using the Kruskal–Wallis H test. * indicates statistically significant differences at $p<0.05$.

Table 5. Comparisons of cyberchondria scores according to income

		Cyberchondria		
Income	**Mean±SD**	**Median (Min-Max)**	***H Value***	***p***
<400 $ (n=27)	30.70±11.17	32 (12-50)	8.48	0.037*
400-800 $ (n=24)	28.92±8.82	31 (12-41)		
800-1200 $ (n=21)	26.33±6.91	28 (12-39)		
>1200 $ (n=18)	23.94±7.33	24 (12-40)		

Note. Data are presented as Mean ± SD and Median (Min - Max), H and p values due to non-normal distribution (Shapiro Wilk test, $p<0.05$). The Kruskal Wallis test was used to compare cyberchondria scores across income groups. * indicates statistically significant differences at $p<0.05$

Table 6. Comparisons of anxiety and stress groups according to gender

			Anxiety group				
Gender	**Normal (0-3)**	**Mild (4-5)**	**Moderate (6-7)**	**Severe (8-9)**	**Extremely severe (10 and >10)**	**Chi-square**	***p***
Male	16 (45.7%)	8 (22.9%)	6 (17.1%)	1 (2.9%)	4 (11.4%)		
Female	5 (9.1%)	15 (27.3%)	10 (18.2%)	11 (20.0%)	14 (25.5%)	19.29	0.000*
Total	21 (23.3%)	23 (25.6%)	16 (17.8%)	12 (13.3%)	18 (20.0%)		
			Stress group				
	Normal (0-7)	**Mild (8-9)**	**Moderate (10-12)**	**Severe (13-16)**	**Extremely severe (17 and >17)**	**Chi-square**	***p***
Male	28 (80.0%)	2 (5.7%)	4 (11.4%)	1 (2.9%)	-		
Female	30 (54.5%)	9 (16.4%)	4 (7.3%)	9 (16.4%)	3 (5.5%)	-	0.041*
Total	58 (64.4%)	11 (12.2%)	8 (8.9%)	10 (11.1%)	3 (3.3%)		

Note. Data are presented as frequencies and percentages within sex groups. For the comparison of anxiety score severity levels between sexes, a Chi-Square test was used. For the stress score severity levels, due to expected cell counts less than 5, the Fisher's Exact test was used. * indicates statistically significant differences at $p<0.05$.

Table 7. Comparisons of depression, anxiety and stress group according to psychiatric treatment

			Depression group			
Psychiatric treatment	**Normal (0-4)**	**Mild (5-6)**	**Moderate (7-10)**	**Severe (11-13)**	**Extremely severe (14 and >14)**	***p***
Yes	1 (20.0%)	-	-	1 (20.0%)	3 (60.0%)	
No	46 (54.1%)	11 (12.9%)	15 (17.6%)	11 (12.9%)	2 (2.4%)	0.001*
Total	47 (52.2%)	11 (12.2%)	15 (16.7%)	12 (13.3%)	5 (5.6%)	
			Anxiety group			
	Normal (0-3)	**Mild (4-5)**	**Moderate (6-7)**	**Severe (8-9)**	**Extremely severe (10 and >10)**	
Yes	-	1 (20.0%)	-	-	4 (80.0%)	
No	21 (24.7%)	22 (25.9%)	16 (18.8%)	12 (14.1%)	14 (16.5%)	0.016*
Total	21 (23.3%)	23 (25.6%)	16 (17.8%)	12 (13.3%)	18 (20.0%)	
			Stress group			
	Normal (0-7)	**Mild (8-9)**	**Moderate (10-12)**	**Severe (13-16)**	**Extremely severe (17 and >17)**	
Yes	1 (20.0%)	-	1 (20.0%)	3 (60.0%)	-	
No	57 (67.1%)	11 (12.9%)	7 (8.2%)	7 (8.2%)	3 (3.5%)	0.018*
Total	58 (64.1%)	11 (12.2%)	8 (8.9%)	10 (11.1%)	3 (3.3%)	

Note. Data are presented as n (%). Associations between psychiatric treatment and severity levels in depression, anxiety, and stress groups were assessed using Fisher's Exact Test. * indicates statistical significance at $p<0.05$

The correlation between total education duration, age, cyberchondria, depression, anxiety, and stress scores revealed several key findings. As age increased, total education duration decreased (p<0.001), and depression scores also decreased with age (p=0.027). On the other hand, as total education duration decreased, anxiety scores increased (p=0.036). Additionally, higher cyberchondria scores were associated with increased levels of depression, anxiety, and stress (p values were 0.002, <0.001, and 0.003, respectively). Furthermore, higher depression scores were linked to increased anxiety and stress (p values were <0.001 for both), and higher anxiety scores were associated with higher stress scores (p<0.001) (Table 8).

Table 8. Correlation analysis between age, total of education years, cyberchondria, depression, anxiety and stress

	Total of Education (years)	Cyberchondria	Depression	Anxiety	Stress
Age (r)	-0.45	-0.18	-0.23	-0.059	-0.149
p	0.000	0.099	0.027	0.584	0.162
Total of Education (years) (r)		-0.11	-0.15	-0.22	-0.10
p		0.308	0.162	0.036	0.34
Cyberchondria (r)			0.32	0.57	0.31
p			0.002	0.000	0.003
Depression (r)				0.57	0.64
p				0.000	0.000
Anxiety (r)					0.57
p					0.000

Note: Spearman's rank-order correlation test was used due to non-parametric data. Reported values are Spearman's rho (r) and exact p-values. Age and Education: r =−0.45, p=0.000; Age and Depression: r=−0.23, p=0.027; Education and Anxiety: r=−0.22, p=0.036; Cyberchondria and Depression: r=0.32, p=0.002; Cyberchondria and Anxiety: r=0.57, p=0.000; Cyberchondria and Stress: r=0.31, p=0.003; Depression and Anxiety: r=0.57, p=0.000; Depression and Stress: r=0.64, p=0.000; Anxiety & Stress: r=0.57, p=0.000. * indicates statistical significance at p<0.05.

Discussion

Cyberchondria is a disorder that significantly affects healthcare delivery. In our study, we showed that this condition clearly impacts neurosurgical services. Also, the findings of this study show that there is a significant relationship between cyberchondria, depression, anxiety, and stress levels among patients admitted to the neurosurgery outpatient clinic. Online health research was found to increase health anxiety symptoms in patients, leading to higher cyberchondria scores. Women experienced higher levels of anxiety and stress than men on all these psychological parameters, while patients with a psychiatric history also showed higher depression, anxiety, and stress scores. It was also observed that cyberchondria scores increased as income level decreased. This study demonstrates that cyberchondria, though often overlooked, causes a considerable loss of efficiency even in a high-intensity specialty such as neurosurgery.

In the literature, various studies have shown that general anxiety and especially health anxiety are more common in women [17-19]. In addition, a study by Shahani et al. [20] showed that cyberchondria has a more pronounced effect on female individuals. Our study supports these findings and confirms that health anxiety and cyberchondria have a higher prevalence in the female population. Cyberchondria and anxiety disorders are associated with other psychiatric disorders and are often seen simultaneously [21-23]. In our study, in line with the literature, cyberchondria scores were significantly higher in individuals with a history of psychiatric illness.

These findings have important implications for neurosurgical practice and the healthcare system. Previous studies have shown that such patients present more frequently to primary care, whereas in countries without a mandatory referral system, they directly present to neurosurgery. For this reason, our findings are particularly important for neurosurgical practice [24]. Cyberchondria may lead to unnecessary admission of patients, increasing admissions in neurosurgical clinics [25, 26]. It should also be noted that following online health searches, patients may report additional pseudo-symptoms, further complicating the diagnostic evaluation and clinical decision-making process. This may create an additional burden, especially in neurosurgical outpatient clinics where emergency and complex cases are frequently seen [26, 27]. Dealing with overly anxious patients can challenge surgeons' diagnostic and therapeutic processes, negatively affect clinical performance, and lead to tensions in patient-physician relationships [28, 29]. Furthermore, cyberchondria may lead to unnecessary treatment and diagnostic procedures, which may result in additional costs for both the healthcare system and patients [30]. This may hinder the efficient use of health resources and cause patients to undergo unnecessary medical procedures [31].

A deeper examination of the role of socioeconomic status and psychiatric history on cyberchondria and health anxiety reveals that lower income levels and psychiatric treatment history are associated with higher cyberchondria and health anxiety scores [32-34]. Limited access to health services for low-income individuals may lead to increased health concerns. This may lead to reinforcement of concerns based on misinformation through research on the internet instead of seeking medical help. Furthermore, patients with a psychiatric history, especially when they experience conditions such as anxiety or depression, may combine this with information from the internet to exacerbate health anxiety [35]. Psychologically, these patients may be more prone to negative thoughts and worries about health, which, combined with internet-based research, can lead to higher levels of health anxiety [36].

It is important to provide practical recommendations for the management of cyberchondria in neurosurgical outpatient clinics, especially considering the special challenges in this field [37]. Primarily, it is important to keep in mind that neurosurgical patients may incorrectly assume serious neurological diseases by doing internet research on simple symptoms [38, 39]. Therefore, informing patients about the potential harms of self-diagnosis will be an important step in managing cyberchondria. In a field such as neurosurgery, where high anxiety and stress are common, it may also be beneficial to offer psychological assessment or consultation services for patients who show signs of excessive anxiety or cyberchondria. Such patients may make unnecessary admissions with false concerns, which may negatively impact the effectiveness of surgery and clinical performance. Finally, strengthening doctor-patient communication will help to effectively address fears and concerns in neurosurgery outpatient clinics and prevent unnecessary admissions. This approach will both improve patient safety and reduce the burden on the healthcare system.

Limitation: This study was based on single-day, single-center convenience sampling from a specific neurosurgical patient population, relying on self-reported data, which may introduce selection bias; moreover, the cross-sectional design precludes causal inference, thereby limiting the generalizability of the findings.

Strengths: According to our knowledge, this is the first study to specifically screen for cyberchondria among neurosurgery outpatient clinic patients.

Consequently, this study shows that cyberchondria and health anxiety pose a significant problem in neurosurgery patients. Factors such as female gender, low income, and psychiatric history were found to increase these concerns. In neurosurgery clinics, being aware of this disorder and being aware of patients' anxiety levels can facilitate medical management. When management within neurosurgical practice is insufficient, psychiatric consultation and appropriate treatment interventions may play an important role in addressing the underlying anxiety and improving overall patient outcomes.

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