

Research Article

Examination of Health Literacy, Cyberchondria Severity, and Related Factors Among University Students

Üniversite Öğrencilerinde Sağlık Okuryazarlığı, Siberkondri Ciddiyeti ve İlişkili Faktörlerin İncelenmesi

Emek BAKANNOĞLU KALKAVAN^a, Asude ÖZCAN^b, Buse ÇELEN^c, Hayriye Nur ACAR^b

^aLecturer, Doğuş University, School of Health Sciences, Department of Nursing, İstanbul, Türkiye

^bGraduate, İstanbul Gedik University, Faculty of Health Sciences, Department of Nursing, İstanbul, Türkiye

^cNurse, Koc University Hospital, Department of Medical Oncology, İstanbul, Türkiye

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ABSTRACT

Objective: This study was conducted to examine health literacy, cyberchondria severity, and related factors among university students.

Methods: This descriptive, cross-sectional study included 396 university students determined by 'Random Sampling Method'. Data were collected using the Personal Information Form, the Turkish Health Literacy Scale (THLS-32), and the Cyberchondria Severity Scale, through online and face-to-face methods. Data were analyzed using SPSS 26, and independent samples t-test and ANOVA were applied.

Results: The mean score of THLS-32 was 35.16±8.37, and the the Cyberchondria Severity Scale mean score was 80.78±22.54. The THLS-32 scores of the students who evaluated their health as very good were significantly higher than those who evaluated it as fair or good across variables including self-rated health status, initial health behaviour when ill, number of doctor/hospital visits in the last year, and use of e-health applications and health institution websites (p<0.05). Significant differences in cyberchondria were found according to initial health-seeking behavior, trust in online health information, non-prescription product use, medication use based on informal advice, and recommending drugs to others (p<0.05)

Conclusion: It is essential to reduce health anxiety by allowing university students to read, understand, and use health information through education.

Keywords: College Students, Cyberchondria, Health Literacy

ÖZ

Amaç: Araştırma, üniversite öğrencilerinde sağlık okuryazarlığı, siberkondri ciddiyeti ve ilişkili faktörlerin incelenmesi amacıyla yapılmıştır.

Yöntem: Araştırma tanımlayıcı ve kesitsel tipte olup, rastlantısal örnekleme yöntemiyle seçilen 396 öğrenci ile yürütülmüştür. Veriler, kişisel bilgi formu, Türkiye Sağlık Okuryazarlığı Ölçeği (TSOY-32) ve Siberkondri Ciddiyet Ölçeği kullanılarak çevrimiçi ve yüzyüze görüşme tekniği kullanılarak toplanmıştır. Analizler SPSS 26 programında, bağımsız gruplarda t testi ve ANOVA ile yapılmıştır.

Bulgular: TSOY-32 ortalaması 35,16±8,37, Siberkondri Ciddiyet Ölçeği ortalaması ise 80,78±22,54 bulunmuştur. Sağlık durumlarını "çok iyi" olarak değerlendiren öğrencilerin TSOY -32 puanları, kendi değerlendirmelerine göre sağlık durumu, hastalandıklarında sergiledikleri ilk sağlık davranışı, son bir yıl içindeki doktor/hastane ziyaret sayısı ve e-sağlık uygulamaları ile sağlık kurumlarının web sitelerinin kullanımı gibi değişkenler açısından, sağlık durumlarını "orta" veya "iyi" olarak değerlendiren öğrencilerin puanlarından istatistiksel olarak anlamlı derecede yüksekti (p<0,05). Siberkondri düzeyinde, ilk sağlık arama davranışı, çevrimiçi sağlık bilgilerine güven, reçetesiz ürün kullanımı, gayri resmi tavsiyelere dayalı ilaç kullanımı ve başkalarına ilaç önerme gibi faktörlere göre anlamlı farklılıklar saptanmıştır (p<0,05).

Sonuç: Üniversite öğrencilerine verilecek eğitimlerle sağlık bilgisini okuma, anlama ve kullanma yeteneği kazandırılarak sağlıkla ilgili anksiyetelerinin azaltılması oldukça önemlidir.

Anahtar Kelimeler: Sağlık Okuryazarlığı, Siberkondri, Üniversite Öğrencileri

ORCID IDs: EBK:0000-0002-1321-4337, AÖ:0009-0005-2556-0084, BÇ:0009-0008-5727-0622, HNA:0009-0009-8603-145X

Sorumlu yazar/Corresponding author: Lecturer, Emek BAKANOĞLU KALKAVAN, Doğus University, School of Health Sciences, Department of Nursing, İstanbul, Türkiye

e-posta/e-mail: emekkalkavan@gmail.com

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INTRODUCTION

Seeking, understanding, and using information is critical for health-related decision-making (Canal et al., 2020; Chen et al., 2018). Health information-seeking behavior is considered a conscious process to obtain information about a disease or general health condition and is a strategic approach to cope with the illness and reduce the current stress factors caused by it (Bahadır & Dündar, 2024; Sharot & Sunstein, 2020). Information on health problems, self-care, and disease prevention increases understanding of personal risk factors and preventive health behaviors. Accordingly, individuals' health outcomes can be improved. Moreover, it can help patients understand their diagnosis, decide on their treatment, predict the course of the disease, and cope with it (Canal et al., 2020; Chen et al., 2018). In this regard, health literacy is crucial for individuals to fully understand the health indicators related to their health and make the right decisions. Health literacy is defined by The World Health Organization (WHO) as “the social and cognitive skills that determine individuals' motivation and ability to access, use, and understand information in ways that promote and maintain health” (Manusco, 2009; Nutbeam et al., 2018; World Health Organization [WHO], 2009).

In a changing and developing world, with the rapid development of technology, the Internet has facilitated access to information, and it has become widespread for individuals to conduct online research on health problems. However, the inaccurate information obtained from the Internet as a diagnostic tool leads to increased health concerns among individuals. In this respect, cyberchondria has been introduced to highlight the negative consequences of seeking online health information. It is coined as “cyberchondriasis,” based on the concepts of “cyber” and “hypochondriasis,” and is expressed as cyberchondria. The term describes individuals with unfounded anxieties about specific symptoms associated with the Internet (Jungman & Witthöft, 2020; Starcevic, 2017).

Teenagers and young adults are the groups most frequently refer to the Internet and online health information due to health concerns. With their famous and interactive features, social networks make it easier for young people to access online health information sources. However, younger generations face challenges in finding, assessing, understanding, and using reliable online health information (Bahadır & Dündar, 2024; Martin et al., 2020; McKinnon et al., 2020; Patterson et al., 2019; Zakar et al., 2021). Given this focus group, universities are regarded as the ideal settings to start health education and health promotion programs. The importance of universities includes primary vocational teaching and the use of human and physical resources to promote the adoption of fundamental healthy lifestyle changes. Studies showed that many undergraduate students did not receive information about health issues in higher education institutions, and they expressed a need for that. Supporting the various dimensions of university students' health, such as biological, psychological, social, and reproductive health, through studies and education is very important (Okyay & Abacıgil, 2016).

University students are among the most active groups in seeking health information online. While this may enhance health literacy, it also increases the risk of cyberchondria. Examining health literacy, cyberchondria severity, and related factors is essential to support effective information use and to inform strategies that promote students' well-being. Therefore, this study investigated health literacy, cyberchondria severity, and related factors among university students.

Research Question

- 1- What is the level of health literacy among university students?
- 2- What is the level of cyberchondria among university students?
- 3- What is the relationship between students' health literacy and their level of cyberchondria?

METHODS

Research Design

This research was a descriptive and cross-sectional study.

Research Population and Sample

The study population consists of all university students living in Turkey. According to YÖK Information System records, the total number of students enrolled in the 2021-2022 academic year was 8.296.959 people. In the table developed by Yazıcıoğlu and Erdoğan in 2004, the sample size to be drawn from a specified population (1 million or more people) was presented as 384 individuals for $p=0.50$ and $q=0.50$ for a sampling error of 0.05. The research was conducted between February-June 2023 with 396 university students selected by random sampling method. (Yazıcıoğlu & Erdoğan, 2004). University students who volunteered and gave written and verbal consent were included in the study. Students who did not give consent and did not answer the questions completely were excluded.

Data Collection Tools

The data was collected using a Personal Information Form, the Turkish Health Literacy Scale (THLS-32), and the Cyberchondria Severity Scale, through online and face-to-face interviews.

The Personal Information Form: This form, which the researchers prepared by making use of the literature, consists of a total of 25 questions evaluating age, gender, income level, internet use, chronic diseases, medications used, health perceptions and behaviours (Bahadır & Dündar, 2024; Canal et al., 2020; Chen et al., 2018, Jungman & Witthöft, 2020; Martin et al., 2020; Starcevic, 2017).

The Turkish Health Literacy Scale (THLS-32): The Turkish Health Literacy Scale-32 (THLS-32) is a 32-item Likert-type scale for individuals aged 15 years and over, developed by Okyay and Abacıgil (2016). It is based on the European Health Literacy Survey (HLS-EU) model. Items are scored from 'very easy' (4 points) to 'very difficult' (1 point). The total score is converted to a range of 0-50: 0 indicates the lowest and 50 indicates the highest health literacy. According to the scores, literacy levels are categorised as follows: 0-25 inadequate, >25-33 limited, >33-42 adequate, >42-50 excellent. The scale is based on a 2x4 matrix model consisting of two dimensions, 'Health Care' and 'Disease Prevention/Health Promotion', and four process steps, 'access, understand, evaluate, apply' (Okyay & Abacıgil, 2016). The Cronbach's alpha coefficient of the scale was 0.927, and in this study, it was 0.958 in total and 0.912 and 0.932 for the sub-dimensions, respectively.

The Cyberchondria Severity Scale (CSS-33): The Cyberchondria Severity Scale (CSS-33) is a psychometric tool developed by McElroy and Shevlin (2014) for measuring individuals' levels of cyberchondria. The language equivalence and content validity and the Turkish validity and reliability of the Cyberchondria Severity Scale were conducted by Uzun and Zencir in 2016. The scale is a 5-point Likert-type scale (1-Never, 2-Seldom, 3-Sometimes, 4-Frequently, 5-Always) consisting of 33 items and five subdimensions: Compulsion as a result of behavioral interference in online searches in daily life (8 questions),

distress due to excessive anxiety (8 questions), excessiveness in repetitive internet searches for health information (8 questions), reassurance for seeking comfort through excessive searches for increased adverse effects (6 questions), and mistrust of medical professional based on information obtained during repeated online searches (3 questions). Cronbach's alpha coefficient on the scale was reported to be 0.89 (Uzun & Zencir, 2022). In our study, the Cronbach's alpha coefficient of the Cyberchondria Severity Scale was found to be 0.93, and the Cronbach's alpha coefficients of the subdimensions of Compulsion, Distress, Excessiveness, Reassurance and Mistrust of Medical Professional were 0.943, 0.887, 0.863, 0.824 and 0.702, respectively.

Data Collection

The researchers obtained data through online and face-to-face interviews. The first part of the questionnaire included a voluntary consent form presenting the purpose and scope of the study. The second part included questions for the Personal Information Form consisting of items related to individual characteristics, the Turkish Health Literacy Scale (THLS-32), and the Cyberchondria Severity Scale. The responses of the students who signed the voluntary consent form and answered the survey questions were evaluated.

Data Analysis

The IBM SPSS Statistics 26 package program was used for data analyses. While evaluating the study data, categorical variables were analyzed using frequencies (number, percentage), and numerical variables were assessed with descriptive statistics (mean, standard deviation). For the normality assumptions of numerical variables, skewness and kurtosis coefficients were evaluated, and since the coefficients fell within the ± 1.5 range, it was observed that the variables were normally distributed. The relationships between two independent numerical variables were analyzed using the Pearson correlation coefficient. Differences between the two independent groups were examined using the independent samples t-test. The One-Way analysis of variance (ANOVA) was used to determine the differences between more than two independent groups. The Tukey test was used for differences because of One-Way ANOVA to determine which group the difference originated from. Statistical significance was determined at 95% confidence interval and 0.05 level.

Ethical Considerations

Ethics committee approval (Date: 17/01/2023, No: E56365223-050.01.04-2023.137548.9-417) were obtained. Permission for THLS-32 and CCS-33 was obtained from the scale owners via email. University students were informed about the purpose and duration of the study and the confidentiality of the data, and verbal and written informed consents were obtained. The Declaration of Helsinki was adhered to throughout the study.

RESULTS

The mean age of the students was 20.66 ± 2.09 , and average body mass index (BMI) of the students was 22.84 ± 4.33 . Of the students, 76.5% were female, and 59.3% lived in metropolitan areas for most of their lives, 67.4% lived with their families, and 75.3% had social security. Of the students, 60.9% were the majors of health sciences, and 45.7% studied in the first year. The income of 61.1% was equal to their expenses, and 83.6% did not have a healthcare professional in their families (Table 1).

Table 1. Sociodemographic Features of the Students (N=396)

Variables	Mean	SD
Age	20.66	2.09
Weight	64.27	15.32
Height	167.13	8.57
Body Mass Index (BMI)	22.84	4.33
	Number	Percentage
Gender		
Female	303	76.5
Male	93	23.5
Most Common Place of Residence		
Village	19	4.8
District/Town	59	14.9
Province	83	21.0
Metropolitan	235	59.3
Place of Residence While Studying/Currently		
Dormitory	85	21.5
Family Residence	267	67.4
Shared Accommodation with Friends	30	7.6
Private Residence	14	3.5
Social Security		
Yes	298	75.3
No	98	24.7
Type of Social Security (n=298)		
SSI	266	89.3
Green Card	4	1.3
Private Health Insurance	28	9.4
Faculty		
Health Sciences	241	60.9
The Other Faculties	155	39.1
Grade		
Freshman	181	45.7
Sophomore	118	29.8
Junior	53	13.4
Senior	42	10.6
Fifth-Year Senior	2	0.5
Income Status of the Family/Student		
Income Less Than Expenses	86	21.7
Income Equal to Expenses	242	61.1
Income Greater Than Expenses	68	17.2
Chronic Disease in First-Degree Relatives		
No	273	68.9
Yes	123	31.1
Healthcare Professional in the Family		
No	331	83.6
Yes	65	16.4

Of the students, 49.7% assessed their health as good, 92.2% had no chronic illness, and 41.2% monitored themselves when ill. Of the students 86.6 % searched health information online, and 68.2% found the health information read on the Internet helpful. Of the students, 51% preferred public hospitals when sick, 96% consulted a doctor/hospital within the last year, 86.4% did not obtain medication/treatment products from places other than a pharmacy without a doctor's recommendation in the past year, and 62.4% did not use medication with the recommendation of relatives/neighbors/friends. Of the students, 58.6% did not have COVID-19 infection, and 88.1% were vaccinated against COVID-19. Of the students, 93.2% used e-health applications and web-based access sites of private/public healthcare institutions (Table 2).

Table 2. Health Status, Health Literacy and Cyberchondria Severity Related Characteristics (N=396)

Variables	Number	Percentage
Self-Rating of Health Status		
Very Poor	5	1.3
Poor	17	4.3
Fair	129	32.6
Good	197	49.7
Very good	48	12.1
Presence of Chronic Disease		
No	365	92.2
Yes	31	7.8
First Health Behavior When Ill		
I monitor myself	163	41.2
The Others (I do nothing, I check the Internet, I use the medicines present at home, I consult people around, I go to the pharmacy, I go to the hospital, I visit a doctor, I search on social media)	233	58.8
Searching Health Information on the Internet		
Yes	343	86.6
No	53	13.4
Finding Health Information Read on the Internet Helpful		
Yes	270	68.2
No	126	31.8
First Preferred Healthcare Institution		
Pharmacy	12	3.0
Family Health Center	129	32.6
Public Hospital	202	51.0
Private Hospital	38	9.6
University Hospital	15	3.8
Consulted a Doctor/Hospital Within the Last Year		
Yes	380	96.0
No	16	4.0
Number of Doctor/Hospital Visits in the Last Year (n=380)		
1-3	194	51.1
4-6	112	29.5
More than 6	74	19.5
Obtained Medication/Treatment Products from Places Other Than a Pharmacy Without a Doctor's Recommendation in the Past Year		
No	342	86.4
Yes	54	13.6
Using Medication with the Recommendation of Relatives, Neighbors, Friends		
Yes, often	8	2.0
Yes, rarely	141	35.6
No, never	247	62.4
Recommending Medication to Family and Friends		
Yes, often	8	2.0
Yes, rarely	151	38.1
No, never	237	59.8
COVID-19 Infection		
Yes	164	41.4
No	232	58.6
COVID-19 Vaccination		
Yes	349	88.1
No	47	11.9
Using E-Health Applications and Web-Based Access Sites of Private/Public Healthcare Institutions		
Yes	369	93.2
No	27	6.8
Using E-Health Applications and Web-Based Access Sites of Private/Public Healthcare Institutions		
Yes	369	93.2
No	27	6.8

The mean score of the THLS-32 was 35.16 ± 8.37 , and the mean score of the CSS-33 was 80.78 ± 22.54 . The mean scores of the subdimensions of THLS-32 were 3.13 ± 0.50 for Health Treatment and Service, 3.08 ± 0.56 for Disease Prevention/Health Promotion, 3.19 ± 0.52 for Accessing Health Information, 3.18 ± 0.53 for Understanding Health Information, 3.00 ± 0.57 for Assessing Health Information, and 3.07 ± 0.57 for Using/Implementing Health Information. The mean scores of the subdimensions of Cyberchondria Severity Scale were found to be 15.75 ± 7.97 for Compulsion, 19.12 ± 7.12 for Distress, 23.17 ± 6.93 for Excessiveness, 15.29 ± 5.47 for Reassurance, and 7.45 ± 3.48 for Mistrust of Medical Professional (Table 3).

Table 3. Descriptive Statistics Related to the THLS-32, the CSS-33, and Subdimension Scores

	Mean	SD	Min	Max
The Turkish Health Literacy Scale-32	35.16	8.37	3.13	50.00
Health Treatment and Service	3.13	0.50	1.19	4.00
Disease Prevention/Health Promotion	3.08	0.56	1.00	4.00
Accessing Health Information	3.19	0.52	1.38	4.00
Understanding Health Information	3.18	0.53	1.00	4.00
Assessing Health Information	3.00	0.57	1.00	4.00
Using/Implementing Health Information	3.07	0.57	1.00	4.00
The Cyberchondria Severity Scale	80.78	22.54	37.00	156.00
Compulsion	15.75	7.97	8.00	40.00
Distress	19.12	7.12	8.00	40.00
Excessiveness	23.17	6.93	8.00	40.00
Reassurance	15.29	5.47	6.00	30.00
Mistrust of Medical Professional	7.45	3.48	3.00	15.00

When Table 4 was examined, it was observed that there was no statistically significant relationship between the THLS-32 and the CSS-33 scores ($r=-0.036$). A statistically significant and weak negative relationship was found between Health Treatment and Service and Distress scores ($r=-0.102$), between Accessing Health Information and Mistrust of Medical Professional scores ($r=-0.118$), and between Understanding Health Information and the Mistrust of Medical Professional scores ($r=-0.115$).

Table 4. Examination of the Relationships between the THLS-32 and the CSS-33 and Their Subdimension Scores

		The Cyberchondria Severity Scale	Compulsion	Distress	Excessiveness	Reassurance	Mistrust of Medical Professional
THLS-32	r	-0.036	-0.038	-0.072	0.014	0.013	-0.051
	p	0.471	0.454	0.155	0.777	0.798	0.308
Health Treatment and Service	r	-0.079	-0.087	-.102*	0.004	-0.022	-0.073
	p	0.119	0.082	0.043	0.940	0.663	0.145
Disease Prevention/Health Promotion	r	0.005	0.011	-0.038	0.022	0.043	-0.027
	p	0.922	0.835	0.451	0.657	0.392	0.595
Accessing Health Information	r	-0.042	-0.083	-0.068	0.074	0.018	-.118*
	p	0.407	0.099	0.178	0.140	0.723	0.019
Understanding Health Information	r	-0.043	-0.097	-0.073	0.089	0.018	-.115*
	p	0.389	0.054	0.146	0.076	0.728	0.022
Assessing Health Information	r	-0.006	0.035	-0.057	-0.032	0.023	0.026
	p	0.910	0.483	0.255	0.531	0.650	0.602
Using/Implementing Health Information	r	-0.042	-0.007	-0.060	-0.056	-0.002	-0.014
	p	0.409	0.888	0.233	0.262	0.963	0.779

r: Pearson Correlation Coefficient * $p < 0.05$

The Turkish Health Literacy Scale-32 scores of the students did not show statistically significant differences for the variables of presence of chronic disease, searching health information on the Internet, finding health information read on the Internet helpful, first preferred healthcare institution, obtaining medication/treatment products from places other than a pharmacy without a doctor's recommendation in the past year, using medication with the recommendation of relatives/neighbors/friends, recommending medication to friends and family, COVID-19 infection, and COVID-19 vaccination ($p>0.05$). There was a statistically significant difference between the THLS-32 scores and the variables of self-rating of health status, the first health behavior when ill, number of doctor/hospital visits in the last year, and the use of e-health applications and web-based access sites of private/public healthcare institutions ($p<0.05$). Accordingly, the THLS-32 scores of participants who assessed their health as very good were statistically significantly higher than those who rated their health as fair and good. The Turkish Health Literacy Scale-32 scores of those who did nothing when they got sick were statistically significantly lower than those who monitored themselves and visited the hospital. The Turkish Health Literacy Scale-32 scores of the students who visited the hospital 4-6 times in the last year were statistically significantly higher than those who visited the hospital 1-3 times. Individuals who used e-health applications and web-based access sites of private/public healthcare institutions had statistically significantly higher scores on the THLS-32 than individuals who did not.

The Cyberchondria Severity Scale scores did not show statistically significant differences according to the variables of self-rating of health status, presence of chronic disease, searching for health information on the Internet, first preferred healthcare institution, number of doctor/hospital visits in the last year, COVID-19 infection, COVID-19 vaccination, using e-health applications and web-based access sites of private/public healthcare institutions ($p>0.05$). There was a statistically significant difference between the CSS-33 scores and the variables of first health behavior when sick, finding health information read on the Internet helpful, obtaining medication/treatment products from places other than a pharmacy without a doctor's recommendation in the past year, using medication with the recommendation of relatives/neighbors/friends, and recommending medication to family and friends ($p<0.05$). Respectively, the CSS-33 scores of students who checked the Internet when sick were statistically significantly higher than those who monitored themselves, did nothing, and used medicines present at home. The Cyberchondria Severity Scale scores of the participants who first exhibited other behaviors when they got sick were statistically significantly higher than those who used medicines present at home. Individuals who found health information read on the Internet helpful had statistically significantly higher CSS-33 scores than those who did not. Students who obtained medication/treatment products from places other than a pharmacy without a doctor's recommendation in the past year scored statistically significantly higher in CSS-33 than those who did not. The Cyberchondria Severity Scale scores of the participants who used medication with the recommendation of relatives/neighbors/friends were statistically significantly higher than those who did not. The Cyberchondria Severity Scale scores of the individuals who recommended medication to their family and friends were statistically significantly higher than those who did not.

Table 5. Differences in Health Literacy and Cyberchondria by Health Status

Variables	THLS-32 Mean±SD	Cyberchondria Severity Scale Mean±SD
Self-Rating of Health Status		
Very Poor/Poor (1)	36.50±8.61	84.14±15.60
Fair (2)	33.46±8.29	81.68±22.45
Good (3)	35.19±7.95	79.39±22.74
Very Good (4)	38.98±9.00	82.52±24.77
F;p	5.480;0.001*	0.576;0.631
Difference (Tukey)	4>2.3	-
Presence of Chronic Disease		
Yes	35.12±8.35	80.65±22.19
No	35.58±8.78	82.23±26.70
t;p	-0.289;0.773	-0.372;0.710
First Health Behavior When Ill		
I monitor myself (1)	36.06±7.51	78.75±23.19
I do nothing (2)	29.92±10.43	78.61±21.15
I check the Internet (3)	34.38±9.48	91.31±22.38
I use the medicines present at home (4)	34.76±7.50	73.35±17.00
I go to the hospital (5)	37.19±8.41	80.70±23.88
I visit a doctor (6)	34.15±9.46	79.77±19.96
Other (7)	35.38±5.62	92.65±20.84
F;p	3.260;0.004*	4.112;0.001*
Difference (Tukey)	2<1.5	3>1,2,4 7>4
Searching Health Information on the Internet		
Yes	35.47±8.13	81.57±22.56
No	33.15±9.61	75.66±21.94
t;p	1.887;0.060	1.781;0.076
Finding Health Information Read on the Internet Helpful		
Yes	35.32±8.26	82.64±22.77
No	34.82±8.62	76.78±21.58
t;p	0.552;0.581	2.427;0.016*
First Preferred Healthcare Institution		
Family Health Center	35.38±7.88	81.62±21.71
Public Hospital	35.45±8.28	80.10±23.05
Private Hospital	35.03±9.48	86.13±22.77
Other	32.08±9.50	74.26±21.44
F;p	1.336;0.190	1.595;0.190
Number of Doctor/Hospital Visits in the Last Year		
1-3	34.09±8.52	80.40±21.34
4-6	37.06±8.24	80.30±23.66
More than 6	35.14±7.19	84.16±23.87
F;p	4.649;0.010*	0.847;0.430
Difference (Tukey)	2>1	-
Obtained Medication/Treatment Products from Places Other than a Pharmacy Without a Doctor's Recommendation in the Past Year		
No	35.25±8.29	79.27±22.01
Yes	34.61±8.91	90.31±23.68
t;p	0.522;0.602	-3.390;0.001*
Using Medication with the Recommendation of Relatives, Neighbors, Friends		
Yes, often/rarely	34.35±7.92	84.60±22.19
No, never	35.65±8.61	78.47±22.48
t;p	-1.503;0.134	2.639;0.009*
Recommending Medication to Family and Friends		
Yes, often/rarely	34.84±8.24	84.44±23.26
No, never	35.38±8.47	78.32±21.75
t;p	-0.623;0.533	2.669;0.008*
COVID-19 Infection		
Yes	35.11±8.45	83.25±23.01
No	35.20±8.33	79.03±22.08
t;p	-0.100;0.921	1.841;0.066

t: Independent Sample T Test F: -Way Analysis of Variance (ANOVA) *p<0,05

Table 5. Differences in Health Literacy and Cyberchondria by Health Status (Continued)

Variables	THLS-32 Mean±SD	Cyberchondria Severity Scale Mean±SD
COVID-19 Vaccination		
Yes	35.03±8.25	80.98±22.88
No	36.16±9.26	79.26±19.94
t;p	-0.873;0.383	0.493;0.622
Using E-Health Applications and Web-Based Access Sites of Private/Public Healthcare Institutions		
Yes	35.38±8.49	81.28±22.77
No	32.22±5.80	73.96±18.05
t;p	2.625; 0.013*	1.631;0.104

t: Independent Sample T Test F: -Way Analysis of Variance (ANOVA) *p<0,05

DISCUSSION

This study used the Turkish Health Literacy-32 Scale and the Cyberchondria Severity Scale to determine university students' health literacy, cyberchondria severity, and related factors.

The Turkish Health Literacy Scale (THLS-32) scoring system is divided into four categories: 0-25 inadequate, >25-33 limited-problematic, >33-42 adequate, and >42-50 excellent health literacy. The mean THLS-32 score of the university students participating in the study was 35.16±8.37, and an adequate level of health literacy was found in the THLS-32 overall mean and subdimension scores.

In a study conducted with international university students residing in Japan, critical health literacy and e-health literacy were examined, and like our research results, health literacy and e-health literacy were found to be at a moderate level (Ahmad et al., 2024). In a study carried out with health sciences students in Singapore, moderate levels of health literacy were found (Cheong et al., 2024), and a study conducted with students from various medical and health education programs in Kazakhstan reported adequate levels of health literacy (Kayupova et al., 2024). Similarly, many studies indicated that university students have adequate health literacy (Dolezel et al., 2018; Ickes & Cottrell, 2010; Mas et al., 2014).

There are also studies contrasting our study findings. Ramezankhani et al. (2015) compared medical and non-medical students and found that 26.4% of medical students had inadequate health literacy, 31.2% had adequate health literacy, and 44.8% of non-medical students had inadequate health literacy. In the study published by Sukys et al. in 2017, which examined the relationship between health education and health literacy at university, an inadequate level of health literacy was reported. Factors such as the characteristics of the sample groups, the content of the training programmes, the health systems of the countries and the level of access to information may be effective in the emergence of these different results. In addition, differences in the structure and application methods of the scales used, students' interest in health issues and their ability to use digital health resources may also lead to variability in health literacy levels.

In the literature review on the sub-dimensions of the Turkish Health Literacy Scale, Okur et al. (2021) conducted a study with students at the Vocational School of Health Services and found that the sub-dimension scores were 37.21±6.28 for Health Treatment and Service and 34.75±6.51 for Disease Prevention and Health Promotion. Similar results were obtained in the study by Savkin et al. (2022) conducted with healthcare professionals. The subdimension scores were 37.76±7.98 for Health Treatment and Service and 36.50±8.46 for Disease Prevention and Health Promotion. The subdimension mean scores for Accessing Health Information, Understanding Health Information, Assessing Health Information, and Using/Implementing Health Information were 37.92±8.15, 38.13±8.63, 36.17±8.62, 36.24±8.27, respectively.

The study by Avcı Isik and Cagli (2023) on the relationship between the knowledge levels of cardiovascular disease risk factors and health literacy among nursing students indicated higher subdimension scores than our study. The Health Treatment and Service subdimension scored 51.00 ± 6.66 , while Disease Prevention and Health Promotion scored 48.00 ± 6.50 . The subdimension mean scores for Accessing Health Information, Understanding Health Information, Assessing Health Information, and Using/Implementing Health Information were observed to be lower than the findings of our study, with scores of 26.00 ± 3.18 , 26.00 ± 3.31 , 23.50 ± 4.19 , and 24.00 ± 3.39 , respectively (Avcı Isik & Cagli, 2023).

Considering the cyberchondria level of the university students participating in the study, it was seen that the mean score of CSS-33 was 80.78 ± 22.54 . In the study conducted by Uzun and Zencir (2022), who performed the Turkish validity and reliability study of the scale, the CSS-33 score was 71.1 ± 17.6 among employees of Pamukkale University; in the study by Bahadır and Dündar (2024) with non-medical university students, the CSS-33 score was 81.5 ± 21.5 ; in the study carried out by Elciyar and Tasci (2017), the CSS-33 score was 86 among students majoring in Communication Sciences; in the study by Aulia et al. (2020) with freshman medical students, the CSS score was 70.83 ± 16.289 . These results were found to be like the overall and subdimension mean scores of our study. Different results may be attributed to the differences in the field and grade levels of the sample groups, students' ability to access and use information, and changes in research methods and periods.

When examining the subdimensions, it was observed that students were affected by all five subdimensions because of their online research. The subdimension they were most affected by was Excessiveness and Distress, and the subdimension they were least affected by was Mistrust of Medical Professional. Compulsion negatively affects students' social, professional, and academic lives, and this subdimension score was 15.75 ± 7.97 . Distress, however, is considered more subjective and describes a feeling of distress related to online health searches. The score for this subdimension was 19.12 ± 7.12 . Excessiveness is associated with participants repeatedly searching for health symptoms on the Internet and was scored the highest with 23.17 ± 6.93 . The Reassurance subdimension is related to cyberchondriacs seeking confirmation from doctors for the online information they obtain and was found as 15.29 ± 5.47 . The Mistrust of Medical Professional is the last subdimension and is expressed by individuals with paranoia feeling uneasy even when they get information from medical experts. It was determined that the students participating in our study scored the lowest on this subdimension, with a score of 7.45 ± 3.48 . The overall and subdimension results of the study conducted by Aydın Kartal and Kaya (2021) with midwifery students were like ours. When reviewing research on these subjects, it was observed that many studies had findings like those of our study (Dagar et al., 2019; Shailaja et al., 2020; Tastan Gurkan et al., 2023; Uzun & Zencir, 2022).

This study found no significant correlation between THLS-32 and Cyberchondria Severity Scale scores ($r = -0.036$). However, weak negative correlations were observed between specific subdimensions: Health Treatment and Distress ($r = -0.102$), Accessing Health Information and Mistrust ($r = -0.118$), and Understanding Health Information and Mistrust ($r = -0.115$). These results indicate that as one variable increases, the other tends to decrease. Like our findings, Tastan Gurkan et al. (2023) also found no significant relationship, while Tarhan et al. (2021) reported a negative correlation, and Deniz (2020) found a weak positive correlation between e-health literacy and cyberchondria.

In our study, no significant differences were found between THLS-32 and Cyberchondria Severity Scale scores and variables such as age, weight, height, BMI, gender, place of residence, social security, faculty, grade, income level, presence of chronic illness, or having a healthcare professional in the family. Similarly, Deniz's study found no significant differences in e-health literacy and cyberchondria levels based on age, education, marital status, or employment; however, a significant

difference was observed in health literacy by gender and cyberchondria levels by education. Tugut et al. (2021) found significant relationships between health literacy and gender, health insurance, financial status, GPA, and smoking. Tarhan et al. (2021) reported no gender-based differences in cyberchondria, but women had higher health literacy. They also found significant relationships between cyberchondria and education/employment status. Tastan Gurkan et al. (2023) found no relationship between gender, grade, or daily internet use and cyberchondria. Doganyigit and Keceligil (2022) reported no significant difference in cyberchondria based on gender, age, education, marital or occupational status. Aulia et al. (2020) found no gender-based difference in cyberchondria scores, but did find slight behavioral differences online. Nayır (2023) found a significant difference by gender among nurses, but no differences based on other demographic or professional factors. Shailaja et al. (2020) reported higher cyberchondria levels among girls. Bati et al. (2018) found no significant differences based on gender, faculty, previous residence, parental education, or school type.

The Turkish Health Literacy Scale-32 scores of the students who participated in the study were statistically significantly different according to the variables of self-rating of health status, first health behavior when ill, number of doctor/hospital visits in the last year, and use of e-health applications and web-based access sites of private/public healthcare institutions ($p<0.05$). According to these results, the Turkish Health Literacy Scale-32 scores of the students who assessed their health as very good were statistically significantly higher than those who assessed their health as fair or good; the THLS-32 scores of the students who did nothing when they were ill were lower than those who monitored themselves and went to the hospital; the THLS-32 scores of the students who visited the hospital 4-6 times in the last year were higher compared to those who visited the hospital 1-3 times; the THLS-32 scores of the students who used e-health applications and web-based access sites of private/public healthcare institutions were higher than those who did not.

In the study by Tastan Gurkan et al. (2023), many students stated that they found the Internet helpful for accessing health information and online health resources. Similar studies also showed that the Internet is beneficial for obtaining health information and accessing health resources (Kaynak et al., 2019; Sharma et al., 2019; Turan et al., 2021; Yilmaz et al., 2020). In the study by Okur et al. (2021), no significant results were found between health literacy and emergency room visits in the last year. Teken (2023) reported that there was no significant relationship between social media use, using the Internet for hospital and doctor selection, researching the symptoms online, using medication without a doctor's recommendation, and requesting imaging techniques like CT, MRI, and ultrasound from a doctor and health literacy. However, a significant relationship was found between general health level and health literacy, and health literacy was higher in people who assessed their general health as better (Teken, 2023).

In our study, while Cyberchondria Severity Scale scores did not show statistically significant differences for the variables of self-rating of health status, presence of chronic disease, searching health information on the Internet, first preferred healthcare institution, number of doctor/hospital visits in the last year, COVID-19 infection, COVID-19 vaccination, and using e-health applications and web-based access sites of private/public healthcare institutions; however, a statistically significant difference was found for the variables of first health behavior when ill, finding health information read on the Internet helpful, obtaining medication/treatment products from places other than a pharmacy without a doctor's recommendation in the past year, using medication with the recommendation of relatives/neighbors/friends, and recommending medication to family and friends ($p<0.05$). In line with these results, the Cyberchondria Severity Scale scores of the students who checked the Internet when they got sick were statistically significantly higher than those who monitored themselves, did nothing, and used the medicines present at home; the CSS-33 scores of those who engaged in other health behaviors when ill was higher than those who used the medicines present at home; the CSS-33 scores of the students who

found health information read on the Internet helpful were higher than those who did not; the CSS-33 scores of those who obtained medication/treatment products from places other than a pharmacy without a doctor's recommendation in the past year were higher than those who did not; the CSS-33 scores of the participants who used medication with the recommendation of relatives/neighbors/friends were higher than those who did not; and the scores of those who recommended medication to friends and family were higher than those who did not.

Studies on this topic have yielded both similar and differing results. Aydın Kartal and Kaya (2021) found that variables such as grade, smoking, chronic illness, COVID-19 infection, and having an infected family member significantly affected CSS scores. Conversely, Nayır (2023) reported no significant associations with factors like chronic illness or online habits but found significant links with symptom searching before doctor visits and trust in online COVID-19 information. Bati et al. (2018) noted higher cyberchondria in students with health issues, while Shailaja et al. observed significant effects from infection fear, quality of life, contamination obsession, and appetite changes.

Limitations of the Study

Due to the online collection of the questionnaire form, the risk of misleading answers of the participants and the inability of some participants to send their answers are the limitations of the research. Our research has limitations in that cross-sectional studies cannot address changes over time.

CONCLUSION

It has been shown that healthy lifestyle behaviors acquired during university are associated with positive health outcomes in adulthood. In this regard, it is crucial to incorporate training such as peer education, courses, programs, seminars, and conferences related to health literacy, cyberchondria severity, and associated factors into university curricula and to impart health knowledge necessary both during university years and in adulthood and old age.

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