

An examination of cyberchondria's relationship with trait anxiety and psychological well-being in women of reproductive age

A cross-sectional study

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Abstract

Online environments have become the main sources of health-related information. However, if used incorrectly, this can decrease the level of well-being. Cyberchondria corresponds to the hypochondria in the digital age. We aimed to investigate the relationship between cyberchondria and trait anxiety, psychological well-being, and other factors in women of reproductive age.

This study used a descriptive cross-sectional design. Face-to-face questionnaires were administered to women aged 18 to 49. The sample size was formed and stratified according to the population of the 47 family health centers to reflect the entire population. The questionnaire included a sociodemographic information form, the Cyberchondria Severity Scale (CSS), the State-Trait Anxiety Inventory, and the Psychological Well-Being Scale (PWBS).

This study included 422 participants. The average daily use of the Internet was 2.14 ± 1.837 hours, while that of social media was 2.69 ± 2.027 hours. The mean CSS score was 89.42 ± 21.688 ; the mean trait anxiety score was 44.34 ± 8.791 , and the mean PWBS score was 324.26 ± 35.944 . Factors that interacted with the level of cyberchondria were the trait anxiety score, PWBS score, alcohol consumption, and average daily use of the internet and social media.

Increased online time, alcohol consumption, trait anxiety levels, and psychological well-being increase cyberchondria levels. Improvements must be made in the accuracy of online information, which is unsupervised and easily accessible to society as a source of information. Future studies should focus on the prevention, detection, and treatment of cyberchondriasis. Identifying and improving the factors affecting women's and mothers' cyberchondria will also increase the chances of providing primary protection against certain diseases.

Abbreviations: B = the unstandardized beta, CI = confidence interval, CSS = Cyberchondria Severity Scale, PWBS = Psychological Well-Being Scale, SE = the standard error for the unstandardized beta.

Keywords: anxiety disorders, cyberchondria, hypochondriasis, psychological factors, women's health

1. Introduction

Internet use is highest during childhood, adolescence, and young adulthood. This age group mainly used the Internet for social media, entertainment, health information, and professional development.^[1]

According to previous studies, 50% of Europeans and 72% of Americans used the Internet to search for health information in the previous year.^[2] According to data from the Organisation for Economic Cooperation and Development (OECD) countries, the proportion of online health-related searches more than doubled between 2008 and 2017.^[3]

In Türkiye, approximately 38% of the population is female in the age group of 18 to 49. Women's health is most at risk

physically, mentally, and socially in this age group, as they are in their reproductive years.^[4] Because of its widespread use, the Internet has become an indispensable source of information for women aged 18 to 49 who are considered the reproductive age group, and this can become a source of health risks.^[2] Healthy lifestyle behaviors of women have an impact on child health, family health, and their own health.^[5]

Searching for health information on the internet can have some benefits. This can lead to an increase in health knowledge and preventive health behaviors, improve self-management of health and well-being, early detection of serious problems, and provide a better understanding of disease management.^[6] Nevertheless, the risks of seeking health information on the internet are more serious. Misinformation can lead to delays in

Verbal informed consent was obtained before the interview.

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

The questionnaire and methodology used in this study were approved by the Scientific Research Ethics Committee of Trakya University (no. 2017/233) and the Ministry of Health General Directorate of Public Health in Türkiye (no. 49654233-604.02).

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the prevention, diagnosis, and treatment of diseases; increased costs; and increased anxiety due to incorrect information.^[7,8]

The concept of cyberchondria is used to describe a clinical phenomenon in which repeated internet searches for health information result in excessive concern about physical health. Given its origin, this corresponds to the hypochondria in the digital age.^[9,10] With the spread of concepts such as metaverse and digitalization, we can expect cyberchondria to increase, change in shape, and have serious consequences for psychological health in the coming years.

Psychological well-being has been defined as the evaluation of life as satisfaction with a high positive affect frequency and low negative affect frequency.^[11] Anxiety has been defined as “a nonobjective feeling of apprehension in the face of danger,” and it has negative effects on psychological well-being. Anxiety is divided into two as State anxiety and Trait Anxiety. State anxiety is anxiety that occurs when a dangerous, unwanted situation is encountered. Trait anxiety, on the other hand, is anxiety that exists even when there is no objective reason, and when there is such a reason, it is disproportionately prolonged and severe.^[12] Trait anxiety was also defined as the tendency to experience frequent, high-intensity anxiety and worry in stressful situations.^[13] Women are more prone to developing emotional disorders starting in adolescence and are 1.5 to 2 times more likely to have anxiety disorders than men.^[14]

Individuals with health concerns seek health-related information on the internet more frequently. However, the online health information they access can further increase their anxiety levels. This mutually interactive process can put cyberchondria patients into a vicious circle. However, websites created by reputable academic, medical, or scientific entities, which are non-profit, constantly updated, have known authors and provide

scientific evidence that can benefit people and reduce the level of cyberchondria.^[9,15,16]

This study examined the relationship between cyberchondria, trait anxiety, psychological well-being, and related factors in women aged 18 to 49.

2. Material and methods

2.1. Study design

Our study was conducted in 47 family health centers between January 01, 2018, and May 01, 2018, in Edirne/Turkiye. The study population consists of 46411 women between the ages of 18 to 49 living in the city center of Edirne. The sample size was calculated to be at least 384 using the Epi Info Statcalc program, with 5% type 1 error and 80% power. Individuals were categorized and stratified according to the female population aged 18 to 49 years and the 5-year age range in each family health center to reflect the entire universe. From the lowest population, the weighted numbers of participants from each family health center were calculated.

Being registered to a family health center in the center of Edirne, being a woman between the ages of 18 to 49, and being in the appropriate age group were taken as inclusion criteria. Women selected for inclusion in the study were contacted by phone, informed about the study, and asked to participate. Women who did not want to participate in the study were replaced with volunteers from the same region who met the specified criteria. A total of 550 women were included in the study, and 422 (76.72%) agreed to participate and completed the study (Fig. 1). Data were collected through face-to-face interviews with researchers in the living or working places of

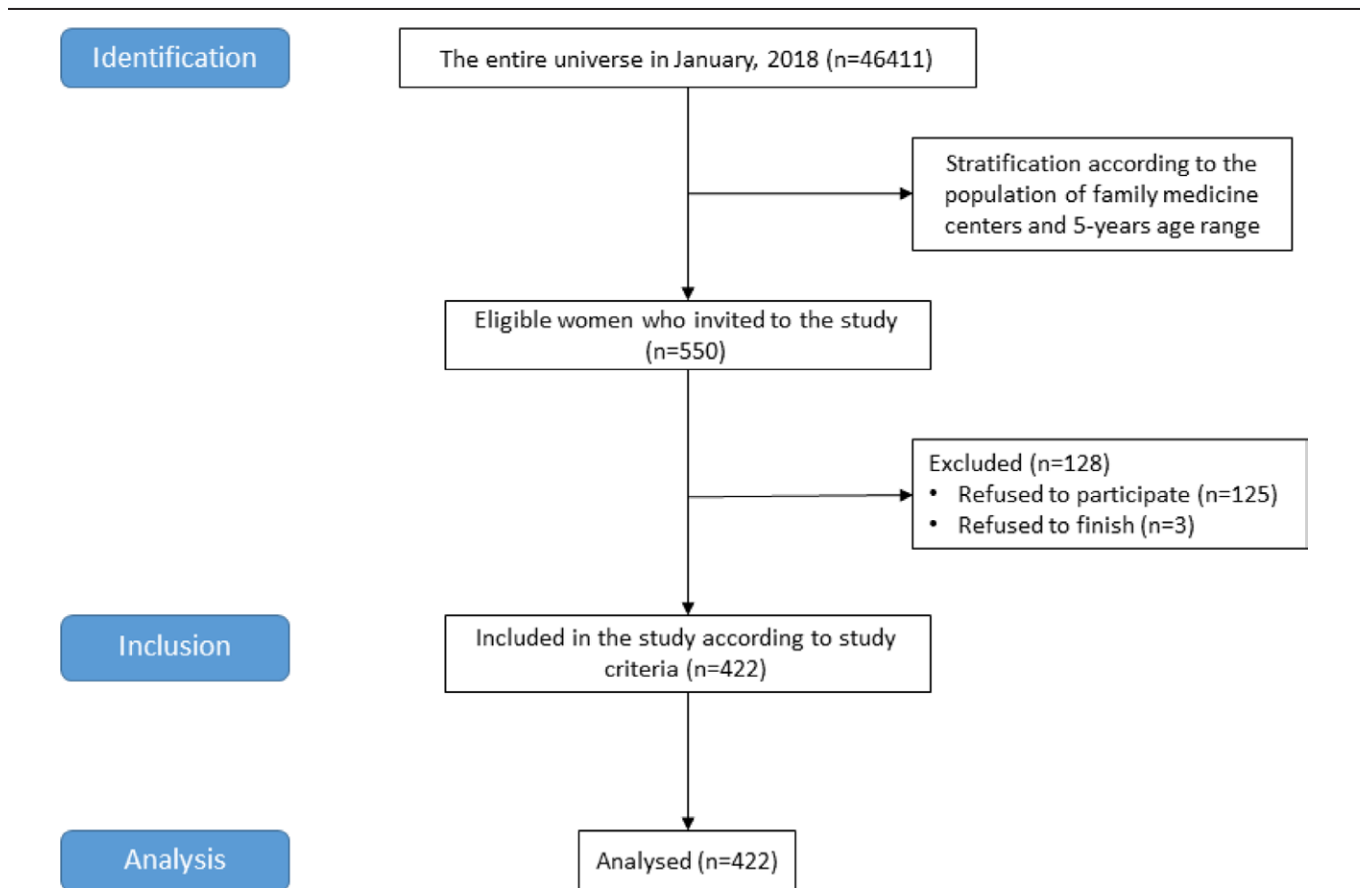


Figure 1. Study enrollment flow chart. STROBE = Strengthening the Reporting of Observational Studies in Epidemiology.

the volunteers. Informed verbal consent was obtained from all participants prior to data collection.

Data were collected using a questionnaire consisting of 179 questions. The questionnaire had 22 items on sociodemographic information including age, marital status, education, employment status and monthly income, chronic diseases, social security, internet and social media usage, hours of internet and social media usage per day, and smoking status. The information about easy access to health services, the annual number of applications to health institutions, and easy communication with doctors were also asked. The questionnaire also included Cyberchondria Severity Scale (CSS) (33 questions), State-Trait Anxiety Inventory (40 questions), and Psychological Well-Being Scale (PWBS) (84 questions).

Written informed consent was obtained from the Scientific Research Ethics Committee of Trakya University (no. 2017/233) and the Ministry of Health General Directorate of Public Health in Türkiye (no. 49654233-604.02).

2.2. Cyberchondria Severity Scale

The Cyberchondria Severity Scale was developed by McElroy and Shevlin in 2014 to assess cyberchondria status. Turkish validity and reliability were assessed by Uzun and Zencir, and Cronbach's alpha value of the Turkish version of CSS is 0.93.^[17] The scale consisted of 33 Likert-type questions and 5 sub-factors as compulsion (8 questions), distress (8 questions), excessiveness (8 questions), reassurance (6 questions), and mistrust of medical professionals (3 questions). The results from the scale and sub-factors are continuous and non-categorical, and there is no cutoff value. The total Cyberchondria score for each participant was calculated by summing the scores obtained from each question. The mistrust of medical professionals factor is reverse scored (e.g., "If my family doctor/specialist tells me to 'ignore' the information I get from the internet, my concern goes away."; "I trust the diagnosis made by my family doctor/specialist more than the diagnosis made by myself on the internet."). The total CSS score was used in our study. A higher score indicated a higher level of cyberchondria.

2.3. State-trait anxiety inventory

The State-Trait Anxiety Inventory is a Likert-type scale developed by Spielberger et al (1970) and adapted to Turkish society by Öner and Le Compte (1985).^[18] It consists of 40 questions, that measure state and trait anxiety levels separately with 20 questions, some of which are negatively scored. In the reliability analysis, Cronbach's alpha internal consistency coefficient was between 0.83 and 0.87 for the State Anxiety Scale, and between 0.94 and 0.96 for the Trait Anxiety Scale. The scores on both the state anxiety and trait anxiety scales range from 20 to 80. High scores indicated high anxiety levels and low scores indicated low anxiety levels. In this study, only the trait anxiety levels of the participants were evaluated.

2.4. Psychological Well-Being Scale

The Psychological Well-Being Scale is a Likert-type scale developed by Ryff and adapted to Turkish by Akın, with 84 items. The Cronbach's alpha value of the Turkish version of PWBS is 0.93.^[19] The lowest score that can be obtained from the scale is 84, and the highest is 504. There were no cutoff values. An increase in the total score indicates an increase in psychological well-being.

2.5. Statistical analysis

All data analyses were performed using the SPSS software (SPSS Inc., Chicago, IL). The Shapiro-Wilk test was used to assess the normality of the distribution. Descriptive statistics and

chi-square, Kruska-Wallis, Mann-Whitney U, and Spearman correlation analyses were used as statistical methods. Then, multiple linear regression analysis was conducted for CSS scores by including the independent variables that were found to be statistically significant. The statistical significance level (*P*) is shown together with the related tests and was considered significant when *P* < .05, and insignificant when *P* ≥ .05.

3. Results

After the stratification by population and age, 550 women were invited to the study until the required number was reached. The study included 422 women (76.72% of responses). The mean age of the participants was 33.72 ± 10.057 (minimum:18; maximum: 49) years. The mean CSS score was 89.42 ± 21.69 . Table 1 shows the relationship between CSS and participants' sociodemographic characteristics and their answers to questions about health services.

Among those with chronic diseases, seven people had three diseases, ten people had two diseases, and 96 people had one disease. Hypothyroidism and asthma are the most common conditions. When we asked the participants about the health services they received, 55.68% (*n* = 235) had easy access to health services, 31.75% (*n* = 134) applied to health institutions four or more times a year, 47.63% (*n* = 201) easily provided their doctors with the information they needed, and 56.63% (*n* = 239) felt comfortable asking questions to their doctors.

The average daily Internet use of the participants, excluding social media, was 2.14 ± 1.837 hours, and the average use of social media was 2.69 ± 2.027 hours. Cyberchondria levels increased as internet use increased for both social ($r = 0.292$; $P < .001$) and excluding social media ($r = 0.285$; $P < .001$) purposes.

Table 2 shows CSS, trait anxiety scores, and PWBS scores. We found a significant positive correlation between CSS scores and psychological well-being ($r = 0.238$; $P < .001$) and trait anxiety levels ($r = 0.262$; $P < .001$).

As the level of cyberchondria increased, the average number of family applications to health institutions for families also increased ($r = 0.218$, $P = .003$). Additionally, the level of cyberchondria increased when physicians provided more information about health or diseases ($\chi^2 = 9.242$; $P = .026$). Cyberchondria levels were higher in alcohol users than in non-users ($Z = -3.237$; $P = .001$).

According to the results of our analysis, there was no significant difference between the level of cyberchondria and age ($r = -0.018$; $P = .717$).

Table 3 shows the multiple linear regression analysis of CSS scores and significant data.

As the duration of daily internet use increases for both social media and excluding social media, cyberchondria increases ($P = .003$ and $P = .036$, respectively). Every hour spent online on social media increases the CSS scores by 1.586 points; every hour spent online on the Internet excluding social media increases the CSS scores by 1.220 points. Alcohol use increases CSS levels (the unstandardized beta [B = 6.483]; $P = .015$; 95% CI: 1.252–11.713). As trait anxiety (B = 0.365; $P < .001$; 95% CI: 0.195–0.534), and PWBS (B = 0.107; $P < .001$; 95% CI: 0.052–0.162) scores increase, CSS scores also increase.

4. Discussion

In our study, we examined the relationship between Internet use and anxiety and found that 26.1% of the participants discontinued prescribed medicine because of the information they read on the Internet. Gökçe et al^[20] reported a similar rate of 19.4%. The increased number of health-related websites providing false and incomplete information increased anxiety levels in people with health concerns and low health literacy, which prevented

Table 1

The relationship between Cyberchondria Severity Scale and participants' sociodemographic characteristics and their answers to questions about health services.

	n		Mean CSS scores	P
All participants	422	100%		
Age, mean		33.72 ± 10.057		
Age, median (range)		35 (18–49)		
Marital status				
Single	180	42.65%	88.78 ± 21.79	.546
Married	242	57.35%	89.89 ± 21.64	
Income status [*]				
Hunger line	17	4.03%	87.23 ± 22.60	.714
Poverty line	271	64.22%	88.79 ± 20.99	
Middle income	134	31.75%	90.96 ± 23.00	
Education				
Literate	5	1.19%	84.20 ± 35.59	.178
Primary school	22	5.21%	82.68 ± 25.18	
Secondary school	9	2.13%	75.33 ± 14.22	
High school	190	45.02%	89.58 ± 21.15	
University or higher	196	46.45%	90.80 ± 21.50	
Employment status				
Yes	201	47.63%	89.35 ± 22.96	.992
No	221	52.37%	89.48 ± 20.51	
Self-perceived health status				
Good	350	82.94%	89.94 ± 21.49	.644
Moderate	66	15.64%	86.60 ± 22.29	
Poor	6	1.42%	90.00 ± 27.97	
Chronic disease				
Yes	113	26.78%	88.02 ± 23.13	.481
No	309	73.22%	89.93 ± 21.15	
Regular medication use				
Yes	81	19.19%	85.54 ± 20.98	.073
No	341	80.81%	90.34 ± 21.78	
Regular health examinations				
Yes	150	35.55%	91.48 ± 22.79	.091
No	272	64.45%	88.28 ± 21.00	
Smoking				
Yes	68	16.11%	91.52 ± 21.56	.451
No	354	83.89%	89.01 ± 21.71	
Alcohol consumption				
Yes	72	17.06%	96.68 ± 21.28	.001
No	350	82.94%	87.92 ± 21.49	
Using the Internet before visiting a doctor				
Yes	279	66.11%	90.84 ± 20.85	.110
No	143	33.89%	86.63 ± 23.05	
Easy access to health services				
Yes	369	87.44%	89.45 ± 21.95	.766
No	53	12.56%	89.18 ± 19.89	
Easy communication with the doctor				
Yes	381	90.28%	89.70 ± 21.50	.496
No	41	9.72%	86.80 ± 23.46	
Discontinued the prescribed medicine after Internet search				
Yes	110	26.07%	94.95 ± 19.77	.004
No	312	73.93%	87.47 ± 22.02	

CSS = Cyberchondria Severity Scale, n = number.

^{*}According to 2018 data from the Confederation of Turkish Trade Unions.

Table 2

Mean Cyberchondria Severity Scale, trait anxiety, and Psychological Well-Being Scale scores of the participants.

	CSS	Trait anxiety	PWBS
Mean score	89.42 ± 21.69	44.34 ± 8.79	324.26 ± 35.94
Maximum score	143	66	448
Minimum score	33	30	204
High	52.4%	47.4%	53.3%
Low	47.6%	52.6%	46.7%

CSS = Cyberchondria Severity Scale, PWBS = Psychological Well-Being Scale.

Table 3
Multiple linear regression analysis for Cyberchondria Severity Scale.

	B	SE	β	t	P	95% CI
The average daily Internet use of the participants (excluding social media)	1.220	0.581	0.103	2.101	.036	0.079–2.361
The average daily use of social media	1.586	0.528	0.148	3.003	.003	0.548–2.624
The average number of applications to health institutions	0.579	0.546	0.049	1.060	.290	–0.495 to 1.652
Alcohol use	6.483	2.661	0.113	2.436	.015	1.252–11.713
Trait anxiety score	0.365	0.086	0.194	4.231	<.001	0.195–0.534
PWBS	0.107	0.028	0.176	3.800	<.001	0.052–0.162

B = unstandardized beta, CI = confidence interval, PWBS = Psychological Well-Being Scale, SE = standard error, β = standardized coefficients beta.

patients from using the medicines prescribed to them.^[21,22] As health literacy is insufficient, there must be strict supervision mechanisms on websites or their owners claiming to provide online health information. We believe that imposing legal sanctions on those who injure public and individual health by providing false information can provide solutions to this problem.

We found that the rate of discontinuation of prescribed medicines was higher in participants with high cyberchondria levels. The conflict between the information on the Internet and the information given by physicians and the resulting confusion has become a serious problem, especially for people with low health literacy. These individuals are at risk because they have difficulty recognizing medical facts and can be misdiagnosed. In our opinion, sparing some time on this issue during patient-physician meetings would be useful in preventing patients from discontinuing treatment.

We found that as the level of cyberchondria increased, the demand for information from physicians also increased. When people search on the Internet, their anxiety increases, and they demand more information. When physicians provide the necessary information, they encourage the patient to ask more questions. However, providing excessive medical information to individuals without medical education can increase anxiety. These individuals can perform more web searches and have higher anxiety levels. We should keep in mind that if the physician does not provide sufficient information about the prescribed medicine, the patient can access the internet to obtain information and discontinue the medicine. It is essential to inform patients about the treatment stages, drug use, and potential risks and benefits to facilitate correct decision-making.

In our study, the average daily internet use of the participants, excluding social media, was 2.14 ± 1.837 hours. The study by Uzun et al on cyberchondria found that it was 3.4 ± 2.5 hours a day.^[23] In the study by Gökçe et al on cyberchondria in Manisa/Turkiye, it was more than 2 hours per day.^[20] The study by Escoferry et al^[21] reported an average of 2.49 hours a day. In the multiple regression analysis, we found that every extra hour spent on Internet, excluding social media, increases the cyberchondria score by 1.58 points. The increased dissemination of health information on the Internet results in more searches, and the level of cyberchondria increases because of the lack of evidence-based information.^[22] Such websites share information that they think is interesting without questioning or checking its accuracy in order to attract more users and increase their popularity. In addition to legal sanctions, training specially educated individuals/groups and increasing cybersecurity supervision can help to prevent this situation. Moreover, educational programs such as cybersecurity can be expanded to universities in the near future.

We found that the average daily use of social media of participants was 2.69 ± 2.027 hours. The study by Mano on online health services was similar to our study.^[24] We found that as the duration of social media usage increased, the level of cyberchondria also increased. The increasing use of social media has many negative consequences such as anxiety among young users, making people feel worse, and

oversharing bad possibilities that are not told by physicians. Sharing opinions on health-related issues, most of which are not based on medical evidence, enhances loneliness, suicidal ideas, peer pressure, and depression, thus increasing the level of cyberchondria.^[22,24–27]

Social media is commonly used for information purposes and is an important source of reference for health-related issues. Unfortunately, it also becomes a source of risk because of incompetent pages and patients. In the multiple regression analysis, we found that every extra hour spent on social media increases the cyberchondria score by 1.22 points. We believe that social media can be an effective tool for improving women's health; therefore, health professionals, media, and legislators play important roles in supporting the correct use of social media and increasing the quality and accuracy of health information on social media.

We found that 17.1% of participants consumed alcohol. According to the 2019 Turkish Statistical Institute data, the rate of alcohol consumption in Turkiye was 24.1%.^[28] In our study, the reason for the low rate of alcohol consumption was that it included only women, and the rate of alcohol consumption was generally lower in women.^[29,30] We found that the level of cyberchondria was higher in individuals who consumed alcohol. According to previous studies, the motive for alcohol consumption includes the desire to avoid fear experienced by people due to health anxiety or the negative health consequences of health anxiety.^[30,31] As cyberchondria increases alcohol consumption, alcohol-related health problems occur more frequently in people with cyberchondria. This situation must be carefully evaluated during patient-physician meetings.

The mean cyberchondria score of the participants was 89.42 ± 21.688 in our study. It was 74.0 ± 18.0 in the study by Gökçe et al on adults and 79.4 ± 16.9 in the study by Uzun et al on senior university students.^[20,23] The mean cyberchondria score was higher in this study. As women aged 18 to 49 experienced more mental health problems, they performed more searches on health websites.^[2] Seeking information about diseases, medical treatments, diets, vitamins, and nutritional supplements often leads to a higher prevalence of anxiety disorders in women, a significant increase in health-related internet use, and a high cyberchondria score.^[19,26] Our study was conducted on women aged 18 to 49 and in Turkish society, and searches could be made without revealing any identifying information. When we consider these facts in terms of privacy, we believe that they may have contributed to the higher cyberchondria score.

We found that the level of cyberchondria increased in parallel with participants' trait anxiety levels. Online environments containing a large amount of negative information that is not based on evidence can further increase anxiety in individuals with high anxiety levels. These people search the Internet excessively for health information to reassure themselves that their ailments are benign and harmless; therefore, high levels of trait anxiety and cyberchondria are expected.

In our study, psychological well-being increased with the level of cyberchondria. We believe that the search for diseases on the Internet reduces psychological stress and increases psychological

well-being. With competent sources, the internet can be used as a tool for psychological well-being.

Family physicians must be careful with patients who have anxiety and seek information on the internet. Therefore, it is important to understand factors that increase anxiety. Individuals can use the Internet not only to manage their health conditions and get support for their diseases but also to prevent diseases and get preventive help. Training materials that provide accurate information on certain subjects and guide patients can be provided on the internet. They must be supervised by health care professionals.

4.1. Limitations

This study was conducted in Edirne city center. Therefore, sociocultural differences exist throughout the country and do not reflect the entire Türkiye population. Some of our questions, such as the annual average number of visits to health institutions, and the average daily use of the Internet and social media are based on personal statements and cannot be considered as exact values. Although we asked about the time spent online, not only health information is searched on the internet and the results may differ if only health-related search is considered.

5. Conclusion

In our study, we found that increased online time, alcohol consumption, increased trait anxiety increase cyberchondria levels. Also, psychological well-being increases the level of cyberchondria. Our results indicate that the internet is an effective channel for behaviors related to the use of health services. Increasing health anxiety owing to unreliable information obtained from the Internet has become a serious threat because of the rapidly growing interest in Internet sources. Therefore, it is necessary to examine cyberchondria at different socioeconomic levels. We believe that improvements must be made in the accuracy of information on the Internet, which is easily accessible to society as a source of information but is unsupervised. Additionally, more support is needed to define cyberchondria as a disease that can create a significant health burden. Future studies should focus on the prevention, detection, and treatment of Cyberchondria. We believe that identifying and improving sociocultural factors affecting women's cyberchondria, anxiety, and psychological states will improve their chances of providing primary protection against certain diseases.

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