

Correlating Cyberchondria and Health Anxiety: Demographic Insights from Stable Asthma Patients

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ABSTRACT

Objective: With the increasing ubiquity of internet, the phenomenon of cyberchondria is becoming progressively widespread in today's digital society. This study investigates the correlation between health anxiety and cyberchondria severity and evaluates the influence of demographic factors in stable asthma patients.

Methods: This cross-sectional study incorporated a sample of 51 patients with stable asthma. Sociodemographic data were systematically documented, and participants completed the Health Anxiety Inventory (HAI) and Cyberchondria Severity Scale-12 (CSS-12). Data analyses were performed using IBM SPSS Statistics v.22, Pearson and Spearman correlation analyses were employed to investigate relationships between variables, and multivariate linear regression was used to identify potential predictors of health anxiety.

Results: The sample primarily consisted of female (76.5%) and married (74.5%) individuals with a mean age of 41.47 years (SD:12.92). Smokers reported higher median scores in health anxiety compared to non-smokers, with a significant difference ($p=0.023$), while no significant difference in cyberchondria severity was seen across smoking statuses ($p=0.380$). A moderate positive correlation between health anxiety and cyberchondria severity scores was also identified ($r=0.415$, $p=0.002$). The regression analysis indicated that together, cyberchondria severity, smoking status, and education level accounted for a significant proportion of the variance in health anxiety scores (Adjusted $R^2:0.374$, $p<0.001$).

Conclusion: The study establishes a connection between health anxiety and cyberchondria severity in patients with stable asthma. The results suggest that health interventions targeting modifiable factors could be beneficial in reducing health anxiety within this patient group.

Keywords: Cyberchondria, Health Anxiety, Asthma, Cyberchondriac

INTRODUCTION

Asthma is a common respiratory disease, characterized by chronic airway inflammation and reversible airway obstruction, with coughing, sensation of chest tightness, and wheezing being the most frequently observed symptoms [1]. Along with

environmental factors such as respiratory allergens, infections, and exposure to smoke, physical activities and psychological factors can also trigger asthma [2]. Additionally, psychological stress can affect our immune system, leading to an increase in airway inflammation [3]. Conditions such as depression and

anxiety are more prevalent in individuals with asthma compared to the general population and can disrupt asthma control and lead to exacerbations [4, 5].

The global spread of technological advancements and the increase in internet use are prompting individuals to seek more information about disease symptoms. Particularly with the widespread use of the internet and the ease of access to information, there is a notable surge in individuals' health information-seeking behavior. The ability to access information concerning disease symptoms enables people to become more conscious about their own health status and fosters a greater interest in health-related matters [6].

Cyberchondria was first described in 2001 in an article published by the British newspaper *The Independent* [7]. It is characterized by excessive or repeated online searches conducted by an individual to obtain information and reassurance about health and illness concerns [8]. Furthermore, this condition is also defined as the tendency of individuals to self-diagnose or self-treat by researching their perceived health problems on the internet [9]. Individuals referred to as cyberchondriacs experience distress and anxiety from researching symptoms that develop in their bodies on the internet, leading them to believe that they may have serious diseases that exhibit similar symptoms.

Health anxiety is a condition marked by an individual's persistent and excessive concern over their own health status. This anxiety

often manifests as a fear of having, or the belief that one has, a serious illness, even when medical examinations suggest otherwise. These individuals may continuously scrutinize their bodily functions, misinterpret normal physical sensations as signs of illness, and seek constant reassurances through doctor's visits or health-related research, which can significantly impact their quality of life. Exaggerating normal physical signs and symptoms to the point where it affects their daily life, the concern that they may have a serious illness can lead to repeated hospital visits [10]. In a study conducted by Tanış et al., it was shown that individuals with high health anxiety were less satisfied with doctor examinations and tended to seek more information via the internet [11]. As a result, individuals with health anxiety may engage in more internet research, which can ultimately affect their daily functional levels, lead to a significant waste of time, and disrupt social interactions [12].

In recent years, rapid advancements in technology have led to an increase in research on cyberchondria. During the Covid-19 pandemic, it has been confirmed through the literature that individuals with high health anxiety are more prone to exhibit cyberchondriac behaviors [13].

Given that asthma can be triggered by stress and is often accompanied by anxiety disorders, it is hypothesized that individuals with asthma may exhibit different levels of health anxiety and cyberchondria compared to healthy individuals. A review of the literature has identified a lack of clinical research on this topic. This study aims to investigate the relationship between health anxiety and cyberchondria severity in individuals with asthma during stable periods, as well as the impact of sociodemographic factors on these variables.

MATERIALS AND METHODS

This research is a cross-sectional clinical study conducted on asthma patients who are outpatient-followed at the chest diseases clinic, voluntarily willing to participate in the research, and who have completed the informed consent form. Inclusion criteria for the study include being between the ages of 18-65, being in the stable phase of asthma, and being literate. Exclusion criteria include being under 18 or over 65 years of age, having mental, neurological or any additional physical diseases apart from asthma, refusing to participate in the study, and being illiterate. Whether the patients were in the acute attack phase was evaluated by a chest diseases specialist through examination and application of the Asthma Control Test.

Main Points:

- The study reveals high prevalence of smoking among medical students, particularly among males, indicating a gender disparity in smoking habits.
- Smoking correlate with lower cognitive flexibility levels in medical students.
- While no significant difference in dyspnea symptoms was observed between smokers and non-smokers in the short term, further research is needed to assess long-term respiratory effects.
- The findings highlight the urgent need for more effective interventions targeting smoking addiction among medical students and underscore the importance of multidisciplinary approaches in addressing this public health concern.

Ethical approval for the study was obtained from the Hitit University Clinical Research Ethics Committee with the decision dated 26/12/2023 and number 2023-165. This study complied with the research and publication ethics and was carried out in accordance with the Helsinki Declaration.

Patients who were voluntarily willing to participate and met the inclusion criteria were asked to fill out a sociodemographic data form inquiring about their gender, age, work status, educational level, smoking status, and marital status, in addition to the Health Anxiety Inventory (HAI) and Cyberchondria Severity Scale-12 (CSS-12). The obtained data were analyzed with appropriate statistical methods.

Health Anxiety Inventory (HAI)

This specific scale, tailor-made for the Turkish demographic through the efforts of Aydemir et al. in 2013 [14], was originally conceived by Salkovskis et al. back in 2002 [15]. The comprehensive scale features an array of 18 items, with a subset of 14 probing into the respondents' mental states and an additional four that explore their mental outlook under the hypothetical premise of enduring a severe illness. Responses throughout the scale are rated from 0 to 3, with a grading system as follows (for instance, "The fear of having a severe illness does not plague me generally; occasionally, I am apprehensive about having a severe illness; a significant illness concern is frequently on my mind; a continuous fear of severe illness prevails"). A ceiling score of 54 on the scale heightens the marker for acute health anxiety. The Cronbach's alpha reliability coefficient for gauging health anxiety in this study was found to be .89 [14].

Cyberchondria Severity Scale-12 (CSS-12)

The tool for measuring cyberchondria, recognized as heightened anxiety prompted by extensive online health inquiries, was crafted by McElroy and associates in 2019 [16]. The Turkish adaptation, alongside an assessment of its reliability and validity, was conducted by Söyler and colleagues [17]. This evaluation tool takes the form of a five-point Likert-type scale comprising 12 questions, with individual item scoring ranging from 1 to 5, where a higher tally indicates increased severity of cyberchondria. Scores on this scale can range from a low of 12 to a high of 60. The Cronbach's alpha correlation coefficient of the Turkish version was found to be 0.862 [17].

Statistical Analysis

The statistical analysis of the data was performed using the IBM Statistical Package for the Social Sciences (SPSS) software, Version 22, which was developed by IBM Corporation in Armonk, NY, USA. For each of the variables under consideration, we computed the means and standard deviations to summarize numerical data, while categorical data were presented through frequency distribution tables. We employed the Kolmogorov-Smirnov test to evaluate the normality of the distribution for the numerical dataset. To comparing numerical data between two distinct groups within the study, we utilized the non-parametric Mann-Whitney U test for datasets that did not follow a normal distribution. Conversely, for those datasets that were normally distributed, the parametric Student's t-test was the chosen method of analysis. To examine the relationships between different variables, we calculated Pearson or Spearman correlation coefficients, depending on whether the data were normally or non-normally distributed, respectively. In scenarios where there were three or more independent groups to compare, the Kruskal-Wallis test served as an efficient tool to assess the differences in medians. For the analysis of categorical data across different groups, the Chi-square test remained the standard approach. Throughout the analysis, a p-value of less than 0.05 was regarded as the threshold for statistical significance, beyond which the results were considered to hold true within a conventional confidence level.

RESULTS

A total of 51 stable asthma patients were included in our study, and the sociodemographic data of the patients are shown in Table 1.

The relationship between the smoking status of the patients included in the study and their health anxiety and cyberchondria severity scores is presented in Table-2.

The data pertaining to the correlation relationships between variables are summarized in Table 3.

No significant difference was detected between HAI ($p:0.931$) and CSS-12 ($p:0.405$) scores among patients grouped according to marital status (Mann-Whitney U test was applied.).

No significant difference was detected between HAI ($p:0.228$) and CSS-12 ($p:0.962$) scores between the groups according to

working status (Mann-Whitney U test was applied.).

No significant difference was detected between HAI ($p:0.329$) and CSS-12 ($p:0.812$) scores between the groups according to education level (Kruskal-Wallis test was applied.).

According to the multivariate linear regression analysis, which examined the effects of gender, age, marital status, employment status, educational status, smoking and CSS-12 score variables in predicting health anxiety, a significant regression model with a predictive power of 37.4% (Adjusted $R^2:0.374$, $p<0.001$) has been detected. Regression analysis data is given in Table-4.

Table 1. Demographic Characteristics and Scale Scores of Participants

| | |
|------------------|--|
| Sex | Female: 39 (%76.5) Male: 12 (%23.5) |
| Age | Mean: 41.47 (SD:12.92) Min: 18 Max:67 |
| Illness Duration | Mean: 7.45 (SD:7.29) Min: 1 Max: 35 |
| Marital status | Married: 38 (%74.5) Single: 13 (%25.5) |
| Smoking status | Yes: 6 (%11.8) No: 45 (%88.2) |
| Working status | Employed: 23 (%45.1) Unemployed: 28 (%53.9) |
| Education level | Primary education: 24 (%47.1) Secondary education: 10 (%19.6) Higher education: 17 (%33.3) |
| HAI score | Mean: 19.53 (SD: 7.63) Min:4 Max:45 |
| CSS-12 score | Mean: 30.16 (SD: 9.01) Min:12 Max: 49 |

* For numerical variables, normal distribution was evaluated with the Kolmogorov-Smirnov test. Age, Health Anxiety Scale Score and Cyberchondria Scale Score data were normally distributed. Disease duration data were not normally distributed.

Table 2. Relationship between smoking status with Health Anxiety and Cyberchondria severity scores

| | Smoker (n:6) | Non-Smoker (n:45) |
|--------------|-------------------------|-------------------------|
| HAI score | Median:27.0 IQR:17.0 | Median:19.0 IQR:9.5 |
| CSS-12 score | Median:34.5 IQR:13.5 | Median:31.0 IQR:12.5 |

* Mann-Whitney U test was used. $p<0.05$ was accepted as significant.

Table 3. The correlations between numeric variables

| | HAI score | CSS-12 score | Age | Illness Duration |
|------------------|-----------------------|----------------------|----------------------|-----------------------|
| HAI score | r:1.000 p:- | r:0.415* p:0.002 | r:-0.021* p:0.886 | r:-0.081** p:0.570 |
| CSS-12 score | r:0.415* p:0.002 | r:1.000 p:- | r:-0.119* p:0.406 | r:0.070** p:0.623 |
| Age | r:-0.021* p:0.886 | r:-0.119* p:0.406 | r:1.000 p:- | r:0.245** p:0.083 |
| Illness Duration | r:-0.081** p:0.570 | r:0.070** p:0.623 | r:0.245** p:0.083 | r:1.000 p:- |

* Pearson Correlation Analysis was applied. **Spearman Correlation Analysis was applied. $p<0.05$ was accepted as significant.

Table 4. Effects of variables in predicting HAI score

| | β | Std.Error | Beta | t | p | %95 Confidence Interval | |
|------------------|---------|-----------|-------|--------|------|-------------------------|--------|
| | | | | | | Lower | Upper |
| Constant | 15,215 | 12,234 | | 1,244 | ,220 | -9,473 | 39,903 |
| Sex | 4,192 | 2,789 | ,235 | 1,503 | ,140 | -1,435 | 9,820 |
| Age | -,104 | ,090 | -,175 | -1,156 | ,254 | -,284 | ,077 |
| Marital status | -1,991 | 2,280 | -,115 | -,874 | ,387 | -6,592 | 2,609 |
| Working Status | -,587 | 2,397 | -,039 | -,245 | ,808 | -5,425 | 4,251 |
| Education Level | -4,927 | 1,584 | -,578 | -3,111 | ,003 | -8,123 | -1,731 |
| Illness Duration | -,205 | ,131 | -,196 | -1,560 | ,126 | -,470 | ,060 |
| Smoking | 7,816 | 2,771 | ,333 | 2,821 | ,007 | 2,224 | 13,408 |
| CSS-12 score | ,324 | ,104 | ,383 | 3,131 | ,003 | ,115 | ,534 |

* *Multivariate Linear Regression Analysis was applied. HAI Score was determined as the Dependent Variable. The Enter method is preferred. $p < 0.05$ was considered significant. ($R^2:0.474$, Adjusted $R^2:0.374$, $p < 0.001$)*

DISCUSSION

This study evaluated the demographic factors related to health anxiety and cyberchondria severity and determined the correlation between these two constructs among asthma patients. Key findings indicated a demographic majority of female and married patients, with a mean age in the early forties. The mean duration of illness among these asthma patients suggests the presence of long-term medical conditions. Significantly, health anxiety levels were greater among smokers compared to non-smokers, although cyberchondria scores did not show a significant variance between both groups. A moderate positive correlation between health anxiety and cyberchondria severity was observed. Variations in marital status, working status, and education levels did not show significant impacts on the health anxiety or cyberchondria severity. Notably, cyberchondria severity, smoking status, and education level were major predictors of health anxiety in the asthma patient group.

This study has provided important insights into how specific demographic factors relate to health anxiety and cyberchondria severity among patients with asthma. The predominance of female and married individuals within the cohort, coupled with a fairly broad age range (mean age of 41.47), correlates with the demographic profile generally observed in asthma populations [18, 19]. However, it is worth considering how gender and marital status may contribute to or influence the coping strategies and support mechanisms available to patients, potentially affecting their health anxiety levels.

The illness duration, with its average of 7.45 years, indicates a patient group that is likely acquainted with the long-term

management of their condition. Chronic illness is known to be a significant predictor of health anxiety, as patients need to navigate complex health information and make frequent health-related decisions [20]. These factors may contribute to a greater reliance on internet-based health resources, which can inform and also potentially amplify health-related concerns; this hypothesis is supported by our findings and relevant literature on the interplay between health anxiety and cyberchondria severity [20, 21].

The significant finding that smoking patients reported higher health Anxiety levels aligns with existing literature, which suggests that the perception of increased vulnerability to health complications can exacerbate anxiety in individuals with detrimental health habits like smoking [22-24]. Curiously, such a pattern was not repeated with cyberchondria severity. This lack of significant deviation may be indicative of the unique pathways through which health anxiety and cyberchondria develop and manifest; habits such as smoking might specifically trigger health anxiety due to the direct perceived risk they pose, whereas cyberchondria might be more closely aligned with information-seeking behavior and the resultant cognitive processes, regardless of smoking status.

The moderate positive correlation between health anxiety and cyberchondria severity ($r=0.415$, $p=0.002$) underscores a significant relationship worthy of further exploration. This link could be elucidated by the proposition that frequent online health information seeking, characteristic of cyberchondria, may not only reflect but also contribute to greater levels of health anxiety. Although the delineation of causality requires additional research, the correlation found in this study is in keeping with the

notion that seeking reassurance about health concerns online can lead to a cyclic pattern of anxiety. Positive correlations of varying degrees between these two variables have been identified in clinical studies conducted within different populations [12, 25]. Our research appears to be the first study specifically conducted among asthma patients.

Analyzing the patients' marital, working status, and education levels revealed no significant impact on health anxiety or cyberchondria severity. This could suggest a more complex interplay of individual psychological variables and the disease's characteristics, which overshadow the impact of these social and economic factors on the patients' psychological well-being [26]. Alternatively, this might reflect the homogeneity of the sample in terms of these variables, which could mask underlying trends.

In the regression analyses conducted, cyberchondria severity, smoking status, and education level were significant predictors of health anxiety levels, accounting for a considerable portion of the variance. The clear influence of education level emphasizes the importance of health literacy in managing health anxiety, aligning with previous research that has linked higher education levels with a better understanding and more effective management of chronic illness. The data compiled in Table -4 of the multivariate linear regression analysis further underscores the roles of these three major predictive factors, drawing attention to potential targets for intervention. There are numerous studies in the literature investigating the predictors of health anxiety, with results showing variability [27-29]. For instance, programs aimed at reducing smoking prevalence among asthma patients or educational initiatives designed to improve health literacy and promote critical evaluation of online health information could be beneficial in reducing health anxiety and mitigating the severity of cyberchondria.

In recent years, particularly due to the pandemic, disruptions in healthcare services have triggered cyberchondria and health anxiety, thereby accelerating academic research into these issues [13, 30, 31]. This study contributes to the growing body of literature on health anxiety and cyberchondria by highlighting specific predictors and correlates within a sample of asthma patients. It lays the groundwork for future research to develop more nuanced interventions tailored to the needs of this population, with an emphasis on modifiable lifestyle factors and the critical evaluation of health information in the digital age.

Limitations

The study on the relationship between health anxiety, cyberchondria severity, and demographic factors among asthma patients presents several limitations. The sample size is relatively small and demographically homogeneous, predominantly comprising women and married individuals, which may limit the generalizability of the findings to a broader population. The cross-sectional design prohibits the determination of causality and temporal relationships between the variables. The use of self-reported measures for health anxiety and cyberchondria severity could introduce response biases, and the lack of objective measures might affect the accuracy of the results. Additionally, the study does not account for other potentially influential unmeasured variables such as psychological traits, other comorbidities, and cultural factors that might impact health anxiety and cyberchondria. The influence of broader access to health information technology and the global digital divide also remain unexplored, presenting avenues for further research that should involve larger, more diverse samples and longitudinal study designs to validate and expand upon these findings.

CONCLUSION

In conclusion, this study enriches the existing literature by elucidating the intricate association between health anxiety and cyberchondria severity in asthma patients, while also factoring in demographic influences. Despite its limitations in size and scope, the research provides valuable insights into the predictive nature of cyberchondria severity, smoking status, and education level on health anxiety. These findings set the stage for future research to further explore these dynamics through larger, longitudinal studies that could offer more definitive information on causality and guide the development of targeted interventions. The study ultimately underscores the complex interplay between lifestyle factors, access to online health information, and the psychological well-being of individuals living with chronic health conditions.

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