Health Anxiety, Personality Traits, Emotional Regulation and Cyberchondria among University Students

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The advent of digital technology has a significant impact on people's ability to obtain health-related information, which has resulted in a rise in the prevalence of cyberchondria, especially among university students. The present investigation explores the complex relationships among health anxiety, personality factors, emotional regulation, and cyberchondria within a university setting. A correlational research design with a purposive sampling strategy was used. The sample comprised of *(N=100)* university students, comprising *(n=50)* boys and *(n=50)* girls. The age of the participants ranged from 18-25 years. The assessment measures included the Demographic Information Sheet, Short Health Anxiety Inventory (Salkovskis et al. (2002), TIPI (Gosling et al., 2003), Emotional Regulation Questionnaire (Gross & John, 2003) and Cyberchondria Severity Scale (McElroy & Shevlin, 2014). The findings of the study highlighted a significant positive correlation between health anxiety and cyberchondria *(r= .27**, p< .01).* The finding also showed a negative correlation between health anxiety and both facets of emotional regulation; cognitive reappraisal facet *(r= -.40**, p> .01)* and expressive suppression facet *(r= -.20*, p> .05).* Regression analysis showed that health anxiety significantly predicts cyberchondria [*R2=.07, F (2, 97) = 3.89, p< .01]*. Independent sample t-test showed that boys exhibit high levels of health anxiety compared to girls while girls exhibit more conscientiousness and cognitive reappraisal facet (emotional regulation) compared to boys. These findings have implications for developing interventions that may reduce the negative impacts of cyberchondria in students and improve their mental health in general.

Keywords: Health Anxiety, Personality Traits, Emotional Regulation, Cyberchondria

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Introduction

The Internet is now seeing a growing trend as a widely sought-after resource for health-related information. Due to the almost unlimited availability of the Internet, individuals are increasingly relying on online sources to get information on their health (Huberty et al., 2019). In addition to supplementing professional diagnoses, people are increasingly using the internet for self-diagnosis. Better access to information on health may yield positive effects in the sense that there will be an increase in health awareness. However, relying on internet information to diagnose one-self is dangerous and can lead to disturbing perceptions (Lopez-Fernandez, 2019). According to McElroy et al. (2019), the time taken in seeking health information causes discomfort and health anxiety when the individual is engaging in such activities.

According to Norr et al. (2015), cyberchondria is an abnormal behavior pattern involving an excessive online search are related to health. This activity interferes with everyday life and is rather unpleasant. The participants are worried about typical symptoms that might exacerbate their anxiousness. As a result, they devote more time to surfing the net in an endeavor to investigate learning content related to health (White & Horvitz, 2019).

Literature from Pakistan reflects that 23.3% of the respondents (N = 150, healthy adults) scored high on the cyberchondria scale, while 26.6% reported a low score (Akhtar & Fatima, 2020). Another study demonstrated that cyberchondria is not diagnosed as an independently diagnosable disorder; hence, potentially affected individuals are overlooked and left untreated. The findings of the study indicate that cyberchondria is a personality factor controlled by cognitive, metacognitive, and emotional mechanisms (Nasiri et al., 2023).

Online health information particularly appeals to university students as they navigate the complexities of higher education and the challenges of transitioning. Several factors, such as separation from family support networks, adjustment to foreign educational surroundings, new social ties, and financial limitations, influence young people's physical and emotional well-being (Salkovskis et al., 2023). However, in the wide reach of internet health information, the negative impacts cannot be overlooked, especially regarding the increase of health concerns of university students. The frantic and ceaseless efforts to find health information online usually lead to increased sorrow and worry, partly because of the enormous time committed to finding such information. These concerns are compounded by the specific pressures of life at university: academic competition and

uncertainty in readapting to new clinical situations. Health and somatic concerns appear to be more prevalent among students who attend university compared to students not attending universities, due to their continued exposure to medical knowledge in ways that can obscure natural healthy physical sensations and true illnesses (Bati et al., 2018).

A deep-seated fear of developing a severe mental or physical illness underpins health anxiety, characterized by irrational and compulsive concerns (Salkovskis et al., 2023). As defined by Asmundson et al. (2020), health anxiety involves misinterpreting minor or normal bodily or mental sensations as signs of a serious disease. One might say that healthy states of existence are most precious; after all, the value of health to any individual is unmatched (Kabene et al., 2006). Therefore, people who do not have a chronic illness can also be seen as worried about their physical and mental conditions (Morales et al., 2019). Conversely, when the anxiety turns pathological and continues even after some reassurance from specialists that no serious disease exists, it may be indicative of health anxiety at a high level (Lucock & Morley, 2019).

In Pakistan prevalence of health anxiety among students 47.3% and it has increased 10 percent over 4 years (Fang & Mushtaque, 2024). Another research found, 11% in Iran, 16.1 to 17.4% in Saudi Arabia (Abdel et al., 2023). Turkistani et al. (2020) reported that at least 75% of internet users have sought health-related information. Such searches usually cause unnecessary alarm about improbable medical conditions. Individuals with high ability to control their emotions can more easily regulate their health-related concerns and are unlikely to be engaged in pathological online health information-seeking behaviors. This emphasizes the intricate relationship between internet use and health anxiety, emphasizing the need for more research on the effects of cyberchondria on people's overall health and well-being.

The Conceptualizations of cyberchondria with health anxiety and anxiety-related pathologies were provided by meta-analysis and system reviews. Twenty-five studies were included in this review for qualitative synthesis and 3069 individuals were included for quantitative synthesis. A strong association between cyberchondria and health anxiety, as well as its subfacets were revealed through meta-analysis. Cyberchondria was found to be associated with intolerance of uncertainty, health anxiety, obsessive-compulsive symptoms, and anxiety sensitivity (Schenkel et al., 2021).

Reappraisal and suppression (mechanisms of emotional regulation) modulate link between cyberchondria and health anxiety. Emotional regulation is an attempt to change the emotions encountered via the

maintenance or stimulation of emotional experiences, as well as the modification of their intensity, frequency, or length (Fang & Mushtaque, 2024). Individuals who have weak emotional control capabilities often cannot deal with their concerns or worries, resulting in increased dependence on cyberchondria as a maladaptive coping strategy (Ziadni et al., 2018). Another argument comes from Caplan (2020), according to which the emergence of problematic internet use closely related to cyberchondria results from deficits in emotional regulation and impulsivity control (Bottesi et al., 2022).

Many studies have supported claims where dysfunctional emotional regulation strategies like catastrophizing and rumination are linked to the existence of health anxiety and cyberchondria symptoms (Görgen et al., 2014). Impersonal searches on the internet concerning medical information about a person's health issues attempt to temporarily reduce intrusive thinking and other maladaptive feelings (Fergus & Russell, 2019). Previous research demonstrates that cognitive and emotional patterns distinguish negative emotional states like health-related concerns or feelings of danger.

Salkovskis et al. (2023) suggest that negative cognitive schemas and dysfunctional emotional regulation related to health and illnesses can lead to the emergence and maintenance of health anxiety. These processes are connected with rumination and possess an automatic nature, making them challenging to recognize and regulate (Verplanken et al., 2007). These processes contribute to the extensive search for health-related risks in online forums. The presence of erroneous cognitive processes leads individuals to engage in a biased search for health-related information and then interpret this information in a manner that exacerbates feelings of worry (Lucock & Morley, 2019).

Personality traits that influence the perception of different emotions are deemed important in understanding the differences in health anxiety and cyberchondria amongst students (Vant Riet & Ruiter, 2013). These traits are indicators of fundamental features that distinguish individuals from one another (Matthews et al., 2020). Past research has shown a connection between the big five personality model and different psychopathologies (Kotov et al., 2020). Anxiety disorders, namely health anxiety, have a strong correlation with poor extraversion, high neuroticism, and low conscientiousness (McClure & Lilienfeld, 2021). Similarly, Bogg and Vo (2014) discovered a link between personality traits and actions linked to accessing medical and health information. Additionally, Kayiş et al. (2023) identified a connection between

personality traits and health issues induced by internet usage. The traits of conscientiousness and agreeableness were shown to have a negative correlation with problematic internet use, whereas neuroticism consistently showed positive relationships with cyberchondria. Some authors have found that it is associated with negative affect and neuroticism (Gibler et al., 2019; Norr et al., 2015).

The Health Belief Model could offer a comprehensive framework for investigating these dynamic complexities: health anxiety, personality characteristics, emotional regulation, and cyberchondria among university students. Personality qualities such as neuroticism and conscientiousness determine how people perceive health hazards and how emotionally those hazards respond to it. High levels of neuroticism may make individuals feel more vulnerable to health problems, which would raise health anxiety. This increased concern, along with weak emotional control abilities, may drive people to seek excessive health-related information online, a behavior known as cyberchondria (Kusnanto et al., 2018).

In addition, scholars have identified four dimensions associated with searching for medical information due to health-related fear: compulsion (searching that disrupts other online and offline activities), excessiveness (repeated searching), distress (negative emotional reactions during the search), and reassurance-seeking (consulting medical professionals). These aspects are reflected in an abbreviated version of the Cyberchondria Severity Scale (CSS-12) and are linked to obsessive-compulsive disorders, the category to which cyberchondria belongs (Vismara et al., 2020).

Cyberchondria is often referred to as the modern psychopathology of the twenty-first century (Starcevic & Aboujaoude, 2015). Various global studies suggest that approximately 40 to 80% of Internet users have sought information regarding their physical or mental well-being online (Maftei & Holman, 2020). Between 2006 and 2010, scientists conducted a comprehensive analysis of the literature on internet use. According to this assessment, internet users often utilize the internet to access health-related information. However, it is essential to note that cyberchondria is not directly associated with the development of regular exercise and a nutritious diet (Lemire et al., 2008).

Rationale

Engaging in cyberchondria may heap up unfavorable feelings like anxiety and insecurity which makes emotional regulation even more challenging. Health anxiety normally directs students to hunt for online health information. Certain personality traits are likely related to the advancement of health anxiety and cyberchondria. This forms a feedback

loop where health anxiety and emotional dysregulation equally reinforce one another. Therefore, health anxiety, personality traits, emotional regulation, and cyberchondria are important psychological factors that can have an impact on university students' overall health. This study aims to fill the gap by studying how these factors affect university students. Understanding how these elements interact might help design targeted treatments to encourage better coping methods and reduce cyberchondria's detrimental influence student's general health and academic performance.

Objectives of the Study

1. To find out the relationship between health anxiety, emotional regulation, personality traits and cyberchondria among students.
2. To find out the predictors of cyberchondria among students.

Hypotheses

- There would be a positive relationship between health anxiety, cyberchondria and conscientiousness.
- There would be a negative relationship between health anxiety and emotional regulation.
- Health anxiety and conscientiousness will likely predict cyberchondria among students.

Method

Research Design

A correlational research design was used.

Sample

The study used the convenient sampling strategy. The sample consisted of *(N=100)* participants, including boys *(n=50)* and girls *(n=50)* with ages ranging from *18 to 25 (M=22.37 & SD=5.82).* The sample was calculated using G-power software. Only undergraduate students were included. Data was gathered from two universities, the public *(49.25%)* and the private sector *(50.75%)* in Lahore.

Measures

Demographics of the Study Population

The demographic sheet includes information about the student's age, gender, education, and degree programme.

Short Health Anxiety Inventory (SHAI)

The Short Health Anxiety Inventory *(SHAI-18)* developed by Salkovskis et al.(2003) was used. This is an 18-item scale that uses behavioural, emotional, and cognitive domains to assess the degree of health anxiety. The health worry and the negative consequences of becoming ill are the two sub-factors included in this 4-point Likert scale. Scores consist of a total *(range = 0 to 54).* The higher scores will indicate

more health anxiety and beliefs of becoming ill. The Cronbach's alpha of SHAI is .87.

Ten- Item Personality Inventory (TIPI)

Ten- item Personality Inventory *(TIPI)* was used to measure personality traits which was developed by Gosling et al. (2003) and the scale consists of 10 items. It is a 7-point Likert scale ranging from 1 (disagree strongly) to 7 (agree strongly). It includes five sub-factors which include extraversion, conscientiousness, agreeableness, openness to experiences and neuroticism. The Cronbach alpha of TIPI is .72.

Cyberchondria Severity Scale (CSS)

McElroy and Shevlin (2014) developed Cyberchondria Severity Scale *(CSS).* This scale consists of 33 items on a 5-point Likert scale ranging from *1 (Never) to 5 (Always).* The scale comprised of 4 subscales: Excessiveness, Distress, Reassurance and Compulsion. Total score ranges from 12 to 60. Higher scores indicate excessive use of the internet. The Cronbach alpha of the scale is .75 to .95.

Emotional Regulation Questionnaire (ERQ)

This 10-item scale was developed by Gross and John (2003). It is a 7-point Likert scale. The scale includes two different dimensions, i.e. Cognitive Reappraisal and Expressive Suppression, with higher scores indicating higher usage of that strategy. The scale's reliability is .76 for cognitive reappraisal and .60 for expressive suppression.

Procedure

The Board of Studies *(BOS)* and the Internal Departmental Ethical Committee approved the objects, procedures, and materials used for this study. Participants were given a short explanation of the objectives of the study as an introduction before signing the consent form, showing their willingness to take part. The researcher assured participants of the confidentiality of their information. Participants were given the final protocol, which included a demographic sheet, the Short Health Anxiety Inventory, the Ten-Item Personality Inventory, the Cyberchondria Severity Scale, and the Emotional Regulation Questionnaire. Before data entry, all forms were thoroughly checked for completeness, and any forms lacking complete information were discarded. Each protocol was assigned a dummy number for reference and identification. Data was entered into a spreadsheet using *SPSS (Version 29).* Various statistical techniques were applied to test hypotheses.

Statistical Analysis

SPSS version 29 was used for data analysis. The methods applied included correlation analysis, linear regression, and mediation.

Results

This section presents the findings of the study. Reliability analysis was employed to measure the reliability of the instrument used in this study. To test the correlations, Pearson's Product Moment Correlations were used and for prediction, Linear Regression Analysis was performed. Last t-test was used to determine demographic differences in study variables.

Table 1

Correlation Matrix between Health Anxiety, Cyberchondria and Conscientiousness (N=100)

Variables	Health Anxiety	Cyberchondria	Conscientiousness	M	SD
Health Anxiety	_	.27**	-.094	19.87	9.24
Cyberchondria	_	_	-.023	33.31	9.17
Conscientiousness	_	_	_	2.81	2.81

*Note: **p< .01, *p< .05*

Table 1 presents the Pearson correlation between Health Anxiety, Cyberchondria and Conscientiousness. The findings demonstrate insignificant negative correlation of conscientiousness with both health anxiety (r= -.09, p> .05) and cyberchondria (r= -.02, p>.05). However, a significant positive association can be seen between health anxiety and cyberchondria (r= .27**, p< .01).

Table 2

Correlation Matrix between Health Anxiety and Emotional Regulation (N=100)

Variables	Health Anxiety	Cognitive Reappraisal facet	Expressive Suppression facet	*M*	*SD*
Health Anxiety	_	-.40**	-.20*	19.87	9.24
Cognitive Reappraisal facet	_	_	.45**	27.82	6.65
Expressive Suppression facet	_	_	_	18.04	4.51

*Note: **p< .01, *p< .05*

Table 2 presents the Pearson correlation between Health Anxiety and emotional regulation (expressive suppression and cognitive reappraisal). The findings demonstrate a significant negative correlation between health anxiety and both facets of emotional regulation; cognitive reappraisal facet (r= -.40**, p> .01) and expressive suppression facet (r= -.20*, p> .05).

Table 3

Linear Regression Coefficients Analysis of Health Anxiety and Conscientiousness for Cyberchondria (N=100)

						95% CI	
Predictors	*B*	*β*	R^2	ΔR^2	*F*	*LL*	*UL*
Constant	27.87		.07	.06	3.89	20.44	35.29
Health Anxiety	.27	.27**				.08	.46
Conscientiousness	.01	.00				-.63	.64

*Note: ***p< .001, **p< .01*

Table 3 shows the impact of health anxiety and conscientiousness on cyberchondria in university students. The R^2 value of .07 revealed that the predictor variables explained 7% of the variance in the outcome variable with F (2, 97) = 3.89, p< .01. The findings showed that health anxiety highly predicts cyberchondria (β= .27, p< .01)

Discussion

This study explores how health anxiety, personality traits, emotional regulation, and cyberchondria interact to affect individuals' mental health. Our findings underscore that health anxiety and personality traits, especially conscientiousness, play a crucial role in determining susceptibility to cyberchondria. The research reveals complex connections among health anxiety, conscientiousness (personality trait) and cyberchondria.

The current research explores a relationship among health anxiety, cyberchondria and conscientiousness (personality trait) among university students. The Pearson correlation showed insignificant negative association between cyberchondria and conscientiousness. However, significant positive correlation was seen between health anxiety and

cyberchondria. The results were consistent with the study conducted by McMullan et al. (2019) which showed a significant positive relationship between health anxiety and cyberchondria. A meta-regression indicated that the age of participants was an important factor in building the association between health anxiety and cyberchondria.

An investigation was carried out that both confirmed and extended earlier results about the relationship between cyberchondria and health worries. Four hundred and sixty-two members of the community were recruited. The findings suggested that health anxiety and cyberchondria were strongly associated, but also significantly different. Additionally, when taking into consideration overlap with cyberchondria, health anxiety was linked to higher functional impairment and higher healthcare utilization (Mathes et al., 2018). However, the findings were also consistent with the studies conducted (Abdelsattar et al., 2021; Blachnio et al., 2023). These researches showed that health anxiety is directly related to cyberchondria which means the more the health anxiety the more will be cyberchondria.

It was hypothesized that there was a negative association between health anxiety and emotional regulation. The Pearson correlation showed a significant negative association between health anxiety and emotional regulation. The findings were consistent with the study conducted by Jungmann & Witthöft (2020) which reveals a significant negative association between emotional regulation and health anxiety. The results were also consistent with the previous research conducted (Brown, 2020; Kolozsvári, et al., 2023; Young et al, 2019). Cultural context confirms the findings also. Different studies show emotional regulation is directly linked with health anxiety.(Saleem et al., 2019., Jillani, & Malik, 2022., Nadeem et al., 2022, Zafar et al., 2020). These studies confirm that health anxiety leads to maladaptive emotional regulation which means that there is an inverse relationship between health anxiety and emotional regulation.

It was also hypothesized that health anxiety and conscientiousness were likely to predict cyberchondria. The linear regression analysis showed that health anxiety strongly predicts cyberchondria. The result was consistent with the research conducted by Wu et al. (2021) which shows that person shows increased health anxiety during and after seeking online health-related information. However, regression analysis showed that conscientiousness insignificantly predicts cyberchondria. The result was consistent with the study conducted by Bordbar (2023) which shows that conscientiousness failed to increase the predicted value significantly.

A study focusing on nursing students in higher education indicated that conscientiousness and neuroticism were positively linked to cyberchondria. However, traits such as extraversion, agreeableness, and openness did not show a positive influence on cyberchondria (de la Cuesta et al., 2019). Individuals with poor conscientiousness, on the other hand, may undervalue the gravity of their health issues and lack the incentive to seek out credible health information. This inclination may worsen their health worry, leading individuals to rely significantly on internet sources for health-related information, contributing to cyberchondria (McDevitt-Petrovic & Kirby, 2020).

Conclusion

This study investigated relationships between health anxiety, personality traits, cyberchondria, and emotion regulation in a population of university students. The result shows a very good correlation among the variables, which brings out the dynamic effects on students' mental health and behaviours. High positive association of cyberchondria with Health anxiety; that means that students who have higher concentrations of health anxiety are most likely those who indulge regularly in online health information seeking, which amplifies their anxiety. Yet, there was an insignificant, negative association between health anxiety and conscientiousness (personality characteristic). Emotional regulation was also another important point made in the study about managing cyberchondria and health anxiety. In effect, successful emotional regulation strategies were found to be associated with lower degrees of health anxiety as well as a reduced tendency toward cyberchondria. On the other hand, low levels of emotional regulation were associated with higher levels of cyberchondria and health anxiety. Taken together, the study underlines personality characteristics and emotional regulation skills enhancement as important factors in reducing university students' health anxiety and cyberchondria. In general, the study lays down the groundwork for understanding psychological factors influencing university students and provides possible avenues of intervention.

Limitations

It is worth mentioning that the limitations of the present study should be considered before any generalization of the findings. First, the utilized self-report evaluation method to collect data from the present study is prone to social desirability. Second, the present research's cross-sectional design and correlational nature precluded conclusions regarding causal relationships. Longitudinal studies or controlled experiments are recommended to comprehensively determine a causal relationship between

personality traits, and emotional regulation with cyberchondria. Third, it should be borne in mind that the present study sample consisted mainly of highly educated individuals, which challenges the generalizability of its findings to other groups. Therefore, our findings require further analysis in more diverse samples.

Recommendations for Future Study

For further studies, the following recommendations can be made:

- A more extensive sample of university students from different institutions should be included in future research to increase the generalizability of findings.
- Conducting qualitative interviews or focus groups alongside quantitative methods would add more insight into complex relationships between health anxiety, personality traits, cyberchondria, and emotional regulation.
- University policies and health programs should address cyberchondria and health anxiety of course, integrating objective measures, like physiological assessment or behavioural observation and self-report questionnaires, could provide a more comprehensive understanding of the construct studied.

Implications

The present study's findings revealed that cyberchondria is a phenomenon rooted in personality factor, especially conscientiousness. Understanding the main factor affecting the formation and persistence of cyberchondria, in addition to increasing our awareness of this emerging phenomenon, can be a basis for the development of prevention and treatment approaches. The present study's findings can be notable in the field of clinical application. Clinicians may develop training programmes focusing on developing critical appraisal skills for evaluating online health information, distinguishing between reliable and unreliable sources, and applying this knowledge in clinical practice. In addition, training faculty members to recognize signs of cyberchondria and health anxiety in students can enable early intervention. Faculty can be prepared with strategies to support students in managing their anxieties and improving their health literacy. By implementing these strategies, students will improve academic experiences and prepare them to be more competent and confident healthcare professionals.

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