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Original Article

The Mediating Role of Illness Anxiety in the Relationship between Self-esteem and Cyberchondria in Students

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Abstract

Cyberchondria, illness anxiety, and self-esteem are three seemingly unrelated concepts that are quite intertwined. This research investigates the mediating role of illness anxiety in the relationship between self-esteem and cyberchondria in students. The current research design is descriptive and correlational. The population studied in the current research included the students of Azarbaijan Shahid Madani University, 262 people were selected by multi-stage cluster random sampling. McElroy and Shulin's cyberchondria questionnaire, Salkoskis and Warwick's health anxiety questionnaire, and Rosenberg's self-esteem questionnaire were used to collect the data. The data analysis was done using SPSS 24 and Lisrel 8 software. The results showed that self-esteem has a direct effect on cyberchondria (β= -0.08) and illness anxiety (β= -0.44). Also, illness anxiety is related to cyberchondria (β= 0.73). Further, the results showed that illness anxiety can indirectly mediate the relationship between self-esteem and cyberchondria (β= -0.32). The evaluation of the hypothetical model of the research using fit indices showed that the hypothetical model fits with the measurement model. The results showed that illness anxiety can mediate the relationship between self-esteem and cyberchondria. Cognitive behavioral techniques (CBT) including cognitive restructuring and exposure therapy can help people to challenge their irrational thoughts and manage their anxiety.

Keywords

Cyberchondria
Illness anxiety
Self-esteem

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Introduction

The Internet has become a common source for people to search for health-related information (Manika et al., 2021; Zheng, 2022). In recent surveys of the general population, up to 90% of participants used the Internet for this purpose (AlMuammar et al., 2021). In Germany, about 46% (Marstedt, 2018), and in China, about 57.7% (Zheng et al., 2023) of respondents stated that they regularly search the Internet for health information. Although there appears to be no written research on the search volume for these topics in Iran, searches for health and disease-related keywords have increased significantly among Iranian users in recent years (Afshari et al., 2019). It can be said that the Internet makes it easy and affordable for people to access this information and allows people to search for this information anonymously (Vismara et al., 2020). Given that the use of the Internet and digital devices is deeply integrated into people's daily routines, cyberchondria can be considered an emerging health risk in the information age (Afrin et al., 2022; Bajcar, Babiak, 2021) which can negatively affect the quality of life and psychosocial functioning of the affected person (Bajcar, Babiak, 2021; Rahme et al., 2021). As an immune behavior, cyberchondria may amplify psychological vulnerabilities (Vismara et al., 2020). This suggests a strong relationship between illness anxiety and cyberchondria (Ahmadi et al., 2024).

Cyberchondria is closely related, yet distinct, to health anxiety (Schenkel et al., 2021; Starcevic et al., 2019), characterized by excessive concerns about physical health in the absence of organic pathology (Mathes et al., 2018; Tyrer & Tyrer, 2019; Basharpoor & Zardi, 2019). Cyberchondria exacerbates anxiety due to the vagueness of online health information and the difficulty in screening, evaluating, and obtaining accurate information (Boyce et al., 2022). In its pathological form, health anxiety was previously thought of as hypochondriasis according to DSM-IV (APA, 2022). In DSM-5, hypochondriasis as a diagnostic category has been re-

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examined and divided into somatic symptom disorder or illness anxiety disorder (APA, 2022), the latter being more similar in content to the psychological construct of health anxiety (Starcevic, 2014). Some authors ((Bailer et al., 2016) have found evidence that patients with somatic symptom disorder and illness anxiety disorder do not differ significantly in terms of health anxiety or illness-related behavior.

Those with anxiety traits are more likely to adopt a threatening perspective to perceive benign symptoms or external dangers. This presented fear and anxiety may lead to compulsively searching for health information online (Wang et al., 2021).

Illness anxiety is a common problem affecting up to 6% of the general population during their lifetime and up to 20% of medical outpatients (Tyrer & Tyrer, 2019). Those with illness anxiety show persistent worry about contracting severe or fatal illnesses (Mufassery et al., 2023; Mahdavifar et al., 2023). Previous experimental studies have also proven this concept (Kobori & Salkovskis, 2013; Starcevic et al., 2019). A cross-sectional study presented a two-way model confirming that individuals with illness anxiety research medical conditions via the Internet to obtain reassurance and psychological comfort (Bajcar & Babiak, 2021). However, although this search gives short-term reassurance to the individual, it is ultimately associated with the intensification of illness anxiety (Kobori & Salkovskis, 2013). Individuals with high illness anxiety report higher levels of anxiety during and after online health-related searches and report more frequent and longer online searches than individuals with lower levels of illness anxiety (Starcevic et al., 2020). Experiencing some Illness anxiety can be normal and adaptive, but when health anxiety is persistent, excessive, and preoccupying, it can hurt the individual, their loved ones, health professionals (Tyrer & Tyrer, 2019), and society (Bobevski et al., 2018).

It can be said that self-esteem is related to anxiety (AliBabaei-Khamene & Hashemi., 2024) and also to disease anxiety. It can be said that people with low self-esteem tend to have a negative view of themselves, including physical health, and often confuse physical symptoms with real and serious physical illness (Rizwan & Ahmad, 2015). Preoccupation with worries about being ill may undermine self-confidence and negatively affect a person's overall self-perception. People with low self-esteem often experience dysfunctional cognitions such as catastrophizing interpretations of intrusive thoughts, exaggerated feelings of responsibility for harm, and compulsive behaviors (Salkovskis, 1999), which In turn, increases the anxiety of the disease.

New results show that low self-esteem indicates higher cyberchondria and is among the factors that protect cyberchondria (Bajcar & Babiak, 2021). Low self-esteem is a risk factor for Internet-related problems, such as difficulty controlling Internet use (Widyanto & Griffiths, 2011), pathological Internet use (Sideli et al., 2017). Even though most studies have focused on the overlapping features between cyberchondria and illness anxiety, the strength of this relationship is still a matter of debate (Mathes et al., 2018). Research suggests they may be considered distinct constructs (Menon et al., 2020; S. K. Schenkel et al., 2021). In general, based on what was presented, the aim of this research was the mediating effect of illness anxiety on the relationship between self-esteem and cyberchondria in students.

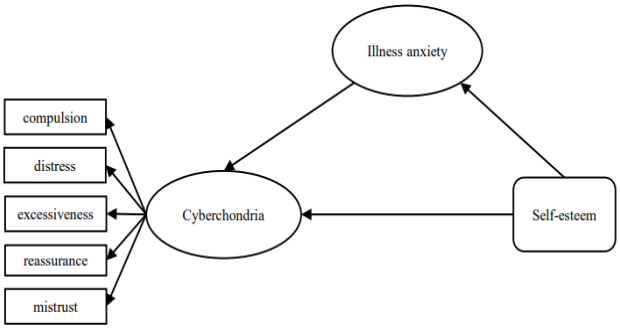

Figure 1. The proposed model of the present study

Method

Participants

The research method of the current study is based on the research objectives and based on the process of data collection, it is a descriptive/correlational study (structural equations). The population of the research is all Azarbaijan Shahid Madani University of Azerbaijan students in 1402. The sample was selected using a multi-stage cluster to collect the data in the current study.

Instrument

Cyberchondria Severity Scale (CSS):

This questionnaire was designed by McElroy and Shulin in 2014. This scale is a self-reporting tool with 33 items that measure 5 components of cyberchondria, namely (compulsion), (distress), (excessiveness), (reassurance), and (mistrust). Subjects declare their level of agreement with each item in the form of options designed on a Likert scale and include 1 (never) to 4 (always). The internal consistency (α=0.91) of the entire questionnaire and its subscales has been reported as very appropriate (Fergus & Russell, 2016). Of course, some experts have removed the mistrust factor from this tool, and therefore, Cyberchondria components into 4 factors (Fergus, 2014). This survey was conducted in Iran by Sarafraz et al. (2020). The results showed that the psychometric properties were as expected and as the original version of the questionnaire, and there was a positive and significant correlation between all the extracted factors. Meanwhile, the correlation coefficient of distress and coercion has been stronger (r = 0/62).

Health Anxiety Questionnaire:

Its form was developed by Salkovskis et al. (2002) and consists of 18 questions with 4 options, which are considered 0 points for all statements (a) and 3 points

for option (d). This questionnaire measures two factors, the probability of contracting the disease and the negative consequences of the disease. The first 14 questions are related to the likelihood of contracting the disease, and the last 4 questions of the questionnaire are related to the negative consequences of the disease. The range of scores for this test is between 0 and 54. A high score on this test indicates Illness anxiety. Salkovskis et al. (2002) obtained the test-retest reliability of this questionnaire at 0.90 and reported Cronbach's alpha coefficient from 0.70 to 0.82. Abramowitz et al. (2007) calculated its validity coefficient of 0.94. This questionnaire was examined in Iran and the research of Nargesi et al. (2017). In their research, the validity of Cronbach's alpha method for the entire questionnaire was 0.75. Hedman et al. (2015) determined the optimal cut-off point for the short form of the health anxiety questionnaire as 14.

self-esteem questionnaire (RSES):

Rosenberg (1965) designed this scale to measure general self-esteem and personal worth. The Rosenberg Self-Esteem Scale (RSES) is one of the most common self-esteem measurement scales. This questionnaire was created to provide a general picture of positive and negative attitudes about oneself (Burnett & Wright, 2002). The scoring of this questionnaire is such that a positive answer to each of the statements from 1 to 5 receives a positive score of one and a negative answer to each of the statements from 1 to 5 gets a negative score of one. Also, a negative score of one will be given to a positive answer to each of the statements from 6 to 10, and a positive score of one will be given to each negative answer to each of the statements from 6 to 10. Rosenberg has reported the reproducibility of the scale as 0/9 and its scalability as 0/7. Cronbach's alpha coefficients for this scale were calculated at 0.87 for men 0.86 for women in the first round 0.88 for men and 0.87 for women in the second round (Mäkikangas et al., 2004). The retest correlation is in the range of 0.82-0.88 and the internal consistency coefficient or Cronbach's alpha is in the range of 0.77 - 0.88.

Procedure

The population of this research is all the students of Azarbaijan Shahid Madani University. Using the cluster sampling method, two psychology and technical engineering faculties were randomly selected from different faculties, and four classes were randomly selected from each field. After determining the sample, the researcher, in coordination with the university officials, informed the clients about the importance and necessity of the research and emphasized that participation in the study is completely optional. Also, after receiving informed consent, the researcher distributed the data collection tools, and finally, 262 questionnaires out of 267 were analyzed by SPSS version 24 and Lisrel version 8 tools.

Results

The frequency of participants in the research showed that out of a total of 262 people, 45.8% were men (120 people) and 54.2% were women (142 people). Also, the age frequency of the subjects is 18 to 19 years (15.3%), 20 to 21 years (45.4%), 22 to 23 years (28.2%), 24 to 25 years (6.1%), and also the age group of 26 years and above is about It forms five percent. The level of education of the participants is as follows: 89.7% of bachelor's degree, 9.2% of master's degree, and 1.1% of doctorate.

Table 1. Descriptive indices of variables

Variable	Mean	standard deviation	skewness	kurtosis
Compulsion	16.57	5.73	0.20	-0.27
Distress	19.20	6.22	0.36	-0.34
Excessiveness	22.58	5.49	0.06	-0.11
Reassurance	16.06	4.33	-0.02	-0.23
Mistrust	6.79	2.51	0.11	-0.62
Cyberchondria	81.23	17.79	0.05	-0.10
The Possibility of Disease	13.71	5.45	0.03	-0.23
Negative consequences	4.40	1.94	0.26	-0.04
Illness anxiety	18.12	6.49	-0.07	-0.48
Self-esteem	5.27	3	-0.06	-0.82

Descriptive indices of variables including mean, standard deviation, skewness, and kurtosis are presented in Table (1). The mean of cyberchondria, self-esteem, and disease anxiety are 81.23, 5.27, and 18.12 respectively.

The values of skewness and kurtosis can be used to check the normality of the data. Chou and Bentler (1995) state that the skewness and kurtosis of the variables are in the range of -3 and +3 and are suitable. Also, for the normality of the data, the Kolmogorov-Smirnov one-sample non the linear test was used, and the result of the distribution of the variables calculated in the variables at the alpha level smaller than 0.05 is not significant. Also, for the independence of errors, the Durbin-Watson statistic (DW = 1.68) was used, and the results showed that this hypothesis was established because the value of the Durbin-Watson test is more than 1.5 and less than 2.5. Also, the sample size

adequacy index (0.76) and Bartlett's sphericity index (df=78 and p < 0.01) indicated that the necessary criteria for modeling structural equations have been met.

Table 2. Correlation coefficients of research variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Compulsion	1									
2. Distress	0.61**	1								
3. Excessiveness	0.30**	0.47**	1							
4. Reassurance	0.47**	0.54**	0.65**	1						
5. Mistrust	0.24**	-0.03**	-0.16**	-0.20**	1					
6. Cyberchondria	0.79**	0.83**	0.71**	0.75**	0.12*	1				
7. The possibility of disease	0.44**	0.46**	0.42**	0.46**	-0.01	0.56**	1			
8. Negative consequences	0.38**	0.38**	0.26**	0.32**	0.00	0.43**	0.41**	1		
9. Illness anxiety	0.47**	0.49**	0.43**	0.47**	-0.01	0.59**	0.96**	0.64**	1	
10. Self-esteem	-0.36**	-0.30**	-0.24**	-0.27**	-0.04	-0.39**	-0. 36**	-0.19**	-0.36**	1

**P<0/01 ,*P<0/05

Table (2) shows the correlation between the components of cyberchondria, Illness anxiety, and self-esteem. As shown in Table 2, most of the correlation coefficients obtained for the relationships between research variables and their subscales were significant (p < 0.001 and p < 0.05). In other words, the components of cyberchondria were related to the components of Illness anxiety and self-esteem (p < 0.001), except for the component of mistrust. The table shows the highest correlation between Illness anxiety and the disease probability component (r = 0.96). And then it is between Cyberchondria and Distress component (r = 0.83).

Table 3. Fit indices for the measurement model

Proportional index	X2	d.f	X2/df	RMSEA	GFI	AGFI	CFI	NFI
Value	147.13	61	2.41	0.07	0.96	0.89	0.96	0.95

Table (3) shows the fit indices of the model. According to the following fit indices, it can be said that the model is favorable: χ^2/df = 2.41, CFI= 0/96, AGFI = 0.89, GFI = 0.96, normed fit index (NFI) = 0.95 and RMSER = 0.07.

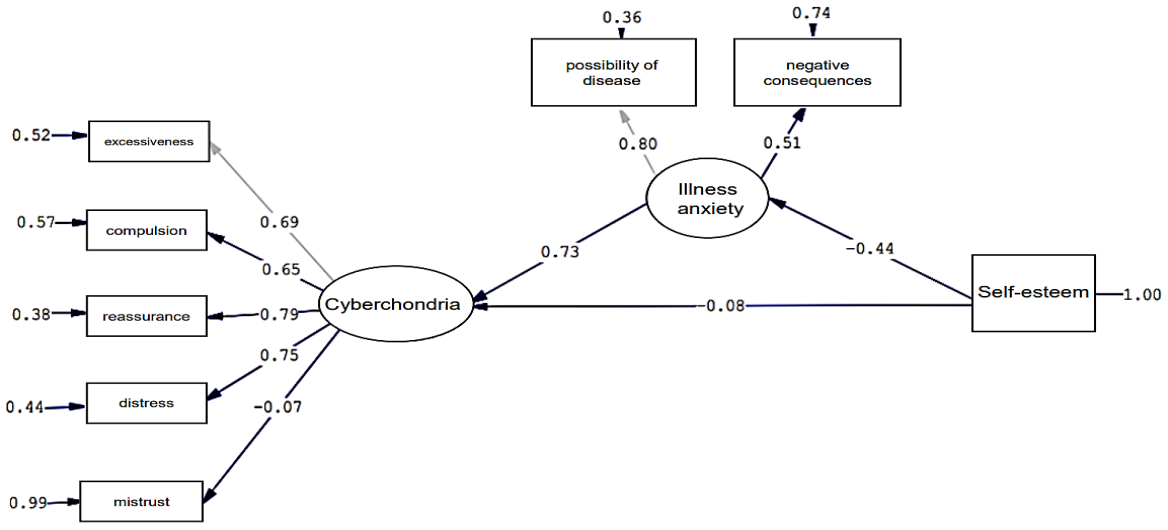

Figure 2. Fit of the final model

The conceptual structural model is displayed in Figure (2).

Table 4. Standard coefficients of the model with the mediation of illness anxiety on self-esteem and cyberchondria

Variable	Standard coefficient	Impact factor	Standard error	P
Self-esteem → Illness anxiety	-0.44	-2.90	-0.032	0.00
Self-esteem → cyberchondria	-0.08	-4.02	0.012	0.01
Illness anxiety → cyberchondria	0.73	9.70	0.020	0.00

The standard coefficients of the model are listed in Table 4. Standard coefficients of self-esteem and Illness anxiety (t values= -2.90), self-esteem and cyberchondria (t values = -4.02), Illness anxiety and cyberchondria (t values = 9.70). Given that in the structural model, the significance of the path coefficient is determined using

T-value. If the value (T) is more than 1.96, the relationship between the two constructs is significant. Therefore, all paths are meaningful. The indirect effect coefficient of self-esteem on cyberchondria through the mediating role of illness anxiety (β = -0.32, P = 0.001) was significant. According to the bootstrap results, the indirect path of the model was confirmed. As a result, illness anxiety was partially able to mediate meaningfully between predictor and criterion variables.

Table 5. The results of the bootstrap test of the indirect effect of disease anxiety on the relationship between self-esteem and cyberchondria

Variable	Indirect effect	Lower limit	Upper limit	S.E.	P
Self-esteem → Illness anxiety → Cyberchondria	-0.32	-0.151	-0.397	0.062	0.001

According to Table (5), the indirect effect coefficient of self-esteem on cyberchondria through the mediating role of Illness anxiety (β= -0.32, P=0.001) was significant. As a result, it can be said that illness anxiety was partially able to mediate meaningfully between predictor and criterion variables.

Discussion

The results showed that there is a relationship between self-esteem and cyberchondria. This result is in agreement with the research of Bajcar and Babiak (2021), who stated that low self-esteem may intensify people's fear of getting sick and lead to disturbing thoughts and uncontrollable actions. This may lead to excessive use of the Internet to search for potentially comforting health-related information.

Fergus and Dolan (2014) stated that people with negative self-beliefs consider anonymous online medical consultations as a psychologically more convenient way to address health concerns than a face-to-face appointment with a doctor. A visit to the doctor often involves a critical evaluation of the diagnosis of health and allows the patient to ask questions, which is a rather challenging task for people with low self-esteem. Therefore, it is possible that individuals with low self-esteem choose the Internet for various purposes, including excessive browsing of health-related content.

Individuals with dysfunctional self-belief may be more prone to activate false cognitions about illness and health and even interpret neutral stimuli related to health. For example, physical symptoms of a cold can lead to seeking reassurance through excessive and frequent health-related searches on the Internet (cyberchondria)(Fergus, 2014; Fergus & Russell, 2016).

The results showed that self-esteem is related to Illness anxiety. This result is in agreement with Bajcar and Babiak (2021); Rizwan and Ahmad (2015); Salkovskis (1999) is consistent. Probably, people with low self-esteem who may suffer from disease anxiety, as a result, may be vulnerable to experiencing the cognitive-emotional domains of cybercrime (such as distress) (Bajcar & Babiak, 2021).

The research results showed that there is a positive relationship between Illness anxiety and cyberchondria. This result is in agreement with Arsenakis et al. (2021); Bajcar and Babiak (2021); Marino et al. (2020); Schenkel et al. (2021); Sabouri and Nikuzadeh (2021) is consistent.

Te Poel et al. (2016) stated that illness anxiety related to cyberchondria is consistent. Relatively high prevalence rates, reluctance to accept referrals to psychiatric clinics, overutilization of health care, and affordability have made illness anxiety a social public health concern (Vismara et al., 2020). Sabaghinejad et al. (2021) state that uncertainty and doubt regarding health-related conditions, as well as anxiety caused by exposure to health-related information, increase the online search for health information and cyberchondria among students. The findings of Karimi et al. (2019) confirm that experimental avoidance and sensitivity to anxiety symptoms will increase the anxiety of the Illness.

That is, a person with illness anxiety experiences anxiety at the thought of facing health information along with uncertainty in his health. Arsenakis et al. (2021) state that illness anxiety, obsessive-compulsive symptoms, and depression, followed by somatic symptoms and intolerance of uncertainty, have the strongest ability to predict the severity of cyberchondria. Among these, illness anxiety has the largest contribution.

Nicolai et al. (2022) state that people prone to cyberchondria are biased in their reasoning (base rate error). This type of bias can be considered a general (non-specific) defect in the integrity of information, which can also be involved in increasing anxiety. They state that special training on how to avoid reasoning errors can be the target of behavioral interventions to reduce these cases. Treatments have been able to improve cyberchondria and anxiety disorders. One study showed that cognitive behavioral therapy delivered via the Internet to patients with severe illness anxiety improved patients in all subscales of cyberchondria severity except the mistrust subscale (Newby & McElroy, 2020). Also, the results of the research Bati et al. (2018) study show that cyberchondria scores are higher in students with health problems on the entire scale and the subscales of "anxiety and distrust of medical professionals."

We stated that various factors can increase disease anxiety and cyberchondria. In a study by Liu et al. (2022), they state that dysfunction in the family, as well as disease anxiety, can increase cyberchondria. These results show that it is necessary to simultaneously consider individual and family factors to understand cyberchondria in adolescents in cyberchondria intervention programs.

Among the limitations of the research is that the present study was conducted on Azarbaijan Shahid Madani University students. Therefore, caution should be observed when generalizing its results. Also, this research is of the structural equation-correlation type, so caution should be observed when generalizing its results compared to experimental methods.

Conclusion

The research results showed that Illness anxiety can mediate the relationship between self-esteem and cyberchondria.

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No potential conflict of interest was reported by the authors.

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