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Cyberchondria as a Digital Predictor of Illness Anxiety Disorder among University Students in Jordan: Evidence from Structural Equation Modeling

Yahya, M. Khatatbeh[1,], Rawan Abdul Mahdi Neyef Al-Saliti[2], Bandar S. Alzahrain[1] and Mohammad A. Tashtoush[3,4]*

[1] Department of Psychology, College of Social Science, Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia
[2] Department of Psychological and Family Counseling, College of Educational Sciences, Ajloun National University, Ajloun, Jordan
[3] Department of Basic Sciences, AL-Huson University College, AL-Balqa Applied University, Salt 19117, Jordan
[4] Faculty of Education and Arts, Sohar University, Sohar 311, Oman

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Abstract: Cyberchondria has emerged as a growing digital health concern, characterized by excessive online health information seeking that may exacerbate health-related anxiety among university students. This study aimed to examine cyberchondria as a digital predictor of illness anxiety disorder among university students using a structural equation modeling approach. A quantitative cross-sectional predictive correlational design was employed. The study involved 255 university students selected through convenience sampling. The researchers used a structured questionnaire containing a 33 item Cyberchondria Scale and a 14 item Illness Anxiety Scale to collect data. Descriptive statistics, Pearson correlation analysis, and structural equation modeling (SEM) were used to assess the validity of the proposed model. The results showed a significant positive relationship between cyberchondria and illness anxiety. All components of cyberchondria were positively associated with illness anxiety, with distrust of medical advice emerging as the strongest related factor. The structural model demonstrated good fit with the data (CFI = 0.93, TLI = 0.91, RMSEA = 0.06, SRMR = 0.05), indicating that the proposed model adequately represents the data. Furthermore, cyberchondria was found to be a significant predictor of illness anxiety. In contrast, demographic variables did not show any statistically significant effects. Cyberchondria functions as a major online predictor of illness anxiety among university students. The results suggest that health-related anxiety can be reduced by addressing problematic online health information-seeking behaviors and by improving digital health literacy skills. Targeted initiatives aimed at enhancing digital health literacy among students and reducing excessive online health information seeking should be implemented.

Keywords: Cyberchondria; Illness Anxiety; University Students; Digital Health Behavior; Structural Equation Modeling; Health Anxiety.

1. Introduction

University students, who represent the most frequent users of internet services, have experienced swift changes in health information access through digital technologies, The worldwide data shows that more than 70% of young people today use the internet as their primary source for health information. This demonstrates a major shift toward online health information research that young people follow [1-2]. The academic responsibilities and personal growth needs of university students together with their internet usage patterns create special challenges for them. The meta-analysis showed that 33.6% of college students experience depression while 39.0% suffer from anxiety. The new research conducted with Saudi students discovered that their level of discomfort exceeded what earlier studies had shown, Jeddah cross-sectional research found that 81.5% of students experienced depression while 63.6% showed signs of anxiety. The research indicates that online health anxiety represents a major health threat to university students [3-4]. Also, People now have online access to medical information which has resulted in a new mental health condition called obsessive-compulsive disorder (OCD) that causes people to develop extreme anxiety when they repeatedly access health information online [5-7]. This condition results in people misinterpreting common symptoms as evidence of severe medical conditions which causes them to remain stuck in an anxiety loop that compels them to keep searching for information according to [8-9]. The term obsessive-compulsive disorder refers to the practice of individuals diagnosing and treating their own health conditions based on online information which lacks medical documentation according to [10]. The term originated in 2002 when the words "electronic" and "obsessive-compulsive" were combined to describe a form of this condition that results from internet use [11]. The concept of obsessive-compulsive disorder describes a psychological phenomenon which intensifies health anxiety through excessive online medical research according to [12].

*Corresponding author e-mail: ymkatatbh@imamu.edu.sa

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Cyberchondria occurs in student samples which results in detrimental mental health outcomes. More than one-third of 798 Saudi university students reported panic after reading online health information [13]. The dimension of excessiveness experienced the greatest impact at 63.7% while reassurance seeking followed with 46.4% of the impact. Another student study discovered that cyberchondria showed strong connections with anxiety symptoms, which resulted in its identification as a key digital mental health predictor, The research showed that cyberchondria severity in adolescent students functioned as a health anxiety predictor which accounted for 31% of the associated factors in the study, The data indicates that persistent online symptom-checking results in sustained anxiety instead of anxiety reduction [14-17]. People who access health information about diseases through the internet experience benefits because they can quickly obtain multiple resources which help them make informed choices for healthy living according to [18-19], 45% of internet users conduct online searches to find health assistance and schedule medical appointments.

The condition known as illness anxiety disorder exhibits clinically significant symptoms when patients experience ongoing fears of serious medical conditions despite having no actual physical symptoms [16]. The research shows that people who experience sickness anxiety will have higher levels of anxiety which occurs before and after they search for health information online thus establishing a two-way relationship between their online health activities and their disease-related anxiety [14]. University students need this because digital health searches can easily convert little body sensations into catastrophic interpretations which create reassurance-seeking loops that lead to functional impairment and ongoing anxiety, Students in Saudi Arabia and other regions demonstrate a widespread tendency to use online health information while their cyberchondria behavior requires educational initiatives to prevent its occurrence [20-22].

Structural equation modeling is suitable for researching these phenomena because it may examine direct and indirect paths across latent psychological factors, Cyberchondria predicts health anxiety and related outcomes, including models where it greatly affected health anxiety and other mediators, according to recent SEM investigations [23-24]. University populations benefit from this strategy because it allows researchers to examine cyberchondria as a digital predictor of illness anxiety disorder beyond bivariate associations. SEM can reveal if excessive online symptom-checking is illness anxiety or a cognitive-behavioral structural factor [17, 25].

The self-diagnosis of medical issues through these resources results in detrimental consequences for users according to [26-27]. The study by [28] discovered that 72.5% of people use the internet to search for health information or advice at different times, which shows how the internet increasingly helps people make health decisions and contact medical services. According to [29] approximately 42.8 percent of students worldwide use the internet to identify their health problems. People who excessively seek information about non-existent medical conditions demonstrate strong health anxiety symptoms because they show deep concern about developing severe health problems according to [9, 30-31]. People who exhibit this behavior show symptoms of OCD because they experience both authoritarian thinking and compulsive behavior according to [32].

The concept of emotional intelligence refers to a multidimensional construct which includes behavioral and emotional components along with cognitive components that are interrelated with each other. People who exhibit this behavior compulsively search for health information through online channels, which results in them spending excessive time and resources on this activity while neglecting their regular daily activities. People who exhibit this behavior experience distressing feelings which result in an increase of their anxiety and tension symptoms, People who experience this condition tend to interpret minor symptoms as serious medical problems because they lack trust in medical experts and doctors (who provide expertise), The frequent checking of health information leads to increased anxiety levels and drives people to continue their research activities according to [26, 33].

The results of studies that addressed this topic varied, as they conducted The study conducted by [34] found that 37.5% of university students experience symptoms of obsessive-compulsive disorder (OCD), The percentage of males who experienced this condition exceeded that of females, The study findings from The act of repeatedly searching online for medical knowledge leads to increased health-related fears which results in people believing they have a fatal health condition because they constantly think about being seriously ill [35]. The research shows that OCD exists as a multiple dimensional framework which connects strongly to health anxiety yet operates as a separate entity through its unique behavioral characteristics which involve [31]. The pathological delusion condition begins when a person develops an irrational health fear which develops into a more intense state of terror when they suspect a disease or experience common physical symptoms which they believe to be signs of a severe medical condition [36]. The anxiety disorder develops when a person becomes excessively worried about his or her health because they think he or she will become ill with a dangerous disease which doctors have not confirmed [37]. The disorder combines two main components which include psychological anxiety, plus people interpret their symptoms as dangerous, together with a biological aspect that connects to an undiagnosed medical issue which doctors have confirmed. The research showed that job performance declines [34], while personal well-being experiences decline [38]. The study by [39] found that 0.86 percent of university students experienced delusional disorder symptoms.

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Cyberchondria is associated with elevated levels of health anxiety and the exaggerated interpretation of physical symptoms. Repeated online searching for medical information leads to increased health-related doubts and reinforces catastrophic beliefs about one's health. This conceptually overlaps with illness anxiety disorder (hypochondriasis) in terms of excessive preoccupation with having a serious illness despite medical reassurance. Recent studies indicate that cyberchondria is a multidimensional construct strongly correlated with health anxiety; however, it represents a relatively distinct construct in terms of its behavioral nature characterized by compulsive online searching [31]. Furthermore, a study by [29] found that health information seeking and health anxiety are positively associated with illness anxiety disorder. Cyberchondria is not merely a symptom of illness anxiety disorder, but rather a digital driver that can precede, maintain, or worsen the disorder. Digital environments transform ordinary health concerns into clinically significant health anxiety when individuals lack digital health literacy and rely on unverified sources. Therefore, interventions targeting compulsive online searching behaviors and enhancing digital health literacy may break the cycle of anxiety and excessive searching more effectively than traditional anxiety treatments alone.

Research on cyberchondria and health-related anxiety shows increasing activity yet essential knowledge gaps remain, First, researchers who have studied this field divided most studies into two groups through bivariate correlational methods which failed to show the detailed connections between cyberchondria and sickness anxiety. Only a small number of researchers apply advanced analytical techniques such as Structural Equation Modeling (SEM) to examine interconnected theoretical frameworks, Second, existing research shows that cyberchondria links with general health anxiety yet researchers have not studied its role as a predictive digital factor driving sickness anxiety disorder among university students, The distinction matters because sickness anxiety disorder represents a more severe form of health-related anxiety.

Most previous studies on cyberchondria have primarily focused on Western populations, while research in Arab and Middle Eastern contexts remains limited [40-42], despite important cultural and digital differences that may influence online health-related behavior. In addition, previous research has not sufficiently addressed demographic variables as core components within structural models that explain the development of both cyberchondria and illness anxiety. To address these gaps, the present study employs Structural Equation Modeling (SEM) as the main analytical approach, which represents a methodological advancement over traditional techniques such as regression analysis. SEM enables the simultaneous testing of complex relationships among latent variables, the examination of direct and indirect effects, and the control of measurement error within a single integrated framework. Specifically, this approach allows for the examination of cyberchondria as a digital predictor of illness anxiety disorder among university students, while incorporating demographic variables into a comprehensive structural model that captures their direct and structural effects on both constructs. This is achieved through:

- Cyberchondria has a significant positive effect on illness anxiety among university students.
- Cyberchondria significantly predicts illness anxiety disorder among university students.
- The levels of cyberchondria and illness anxiety disorder among university students differ significantly from the theoretical mean.
- There are statistically significant differences in cyberchondria and illness anxiety disorder among university students based on gender, faculty, and the presence of chronic illness.
- Demographic variables (gender, faculty, and chronic illness status) significantly predict cyberchondria and illness anxiety disorder in the structural equation model.
- Demographic variables (gender, faculty, and chronic illness status) have significant structural effects on cyberchondria and illness anxiety among university students.

2. Methods

2.1 Study Design

The current research used a quantitative cross-sectional predictive correlational design to investigate how cyberchondria functions as a digital predictor of illness anxiety among university students. The design enabled researchers to test the proposed structural model while assessing how variables interacted with each other at a single moment in time .The study design allowed researchers to use Structural Equation Modeling (SEM) through AMOS software to examine how cyberchondria (independent variable) affected illness anxiety (dependent variable) through direct predictive relationships.

2.2 Sampling and Analysis

The research team gathered study subjects through an online survey distributed through digital networks, which included

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university groups and social media channels while using a convenience sampling approach, The approach allowed researchers to study a broad spectrum of university students who came from various academic disciplines, The research team followed all required procedures which met the established ethical standards before starting the research study. The research team obtained informed consent from participants through a mandatory consent item presented at the beginning of the survey, which required participants to agree before they could take part in the study, The research team assured participants that their identities would remain hidden and their personal information would stay protected and that they could leave the study whenever they chose to do so.

The final sample included 255 university students. The sample included 165 females (65.1%) and 89 males (34.9%). The academic program distribution shows that 134 students (52.5%) studied scientific fields while 121 students (47.5%) studied humanities; The study revealed that 49 participants (19.2%) had chronic health conditions while the majority 206 participants (80.8%) reported no health issues. Researchers focused on studying participants who showed digital health information-seeking behaviors because this behavior pattern represents the central features of cyberchondria which researchers wanted to investigate. The research study maintained an appropriate sample size which satisfied the Structural Equation Modeling (SEM) requirements because the sample size fulfilled the established standards for multivariate research and it enabled accurate measurement of model parameters; the sample demonstrates sufficient size because it shows equal representation of essential demographic characteristics described in Table 1.

Table 1: Demographic Characteristics of the Study Participants

Variable	Category	Frequency (N)	Percentage (%)
Gender	Male	89	34.9
	Female	166	65.1
Faculty	Humanities	121	47.5
	Scientific	134	52.5
Chronic Illness	Yes	49	19.2
	No	206	80.8
Total		255	100.0

2.3 Ethical Considerations

Researchers provided complete study information to all voluntary participants so they could choose their study involvement. Participants have to read a electronic informed consent form before doing the online survey. Only those who received explicit permission could continue. The research team explained to participants the study purpose and its operational details along with the potential risks, which they could choose to participate in or not. They were also told that they could exit the research at any point in time without facing any consequences. The project enforced strict data protection needs, which included using confidential protection methods. The answers did not include any personally identifiable information. The researchers used aggregated data for their study purposes to protect participant identities. The study researchers provided information about minor risks, which included psychological discomfort, and they confirmed to participants that they could leave the study whenever they wanted without providing a reason. The research study obtained approval from the research ethics council according to established ethical principles for human participant research, which ensured that the study maintained both scientific and ethical standards.

2.4 Measurement

The researchers of the current study employed a structured questionnaire as their primary instrument to collect research data. The questionnaire consisted of two main sections .The first section included items related to the demographic characteristics of the participants which consisted of gender and age and additional background information that could affect the study variables .The second section comprised the main study instruments. The researchers used a Cyberchondria Scale which included 33 items divided into five dimensions to assess cyberchondria. The researchers used a 14 item Illness Anxiety Scale to assess illness anxiety through its evaluation of cognitive and emotional health-related concerns, The researchers translated and adapted both instruments to the study context following established psychometric standards. The questionnaire structure was developed to maintain clear measurement of study variables while achieving research validity and reliability, The instruments are presented in detail as follows:

2.4.1. Cyberchondria Scale

The present study employed a Cyberchondria Scale that researchers developed by modifying the widely used Cyberchondria Severity Scale (CSS) to measure health-related anxiety caused by excessive online medical information searching .The instrument consisted of 33 items distributed across five dimensions which included Compulsion and Distress and Excessiveness and Reassurance and Mistrust of Medical Professionals. The dimensions reflect the multidimensional structure of cyberchondria that prior psychometric research has validated through its multidimensional structural framework.

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Translated the scale into the target language and adapted it to the local culture using standard psychometric procedures which included linguistic validation and content equivalence testing to confirm its suitability for the target population. The adapted version underwent a review process which evaluated its clarity and semantic accuracy and contextual relevance .The study employed a five-point Likert scale which ranged from (1 = strongly disagree) to (5 = strongly agree) to assess participant responses. The mean scores achieved three levels of classification which included low (1.00–2.33) and moderate (2.34–3.67) and high (3.68–5.00) scores .The scale was calculated using the following formula: (Maximum scale value (5) − Minimum scale value (1)) ÷ Number of required categories (3). Therefore, 1.33 =/3(1 − 5). Then, a value of (1.33) was progressively added to determine the boundaries of each of the three rating categories.

The researchers evaluated construct validity through item-total and item-dimension correlation analysis which they conducted with a pilot sample (n = 30). The correlation coefficients ranged between :0.37 0.83 – (item-total correlations) 0.37 – 0.75 (item-dimension correlations)

All coefficients achieved statistical significance at ($p < .05$, $p < .01$) which provided evidence for both adequate internal consistency and strong construct validity. The study found positive inter-correlations among dimensions and total score which exceeded the acceptable threshold ($r > 0.30$) to confirm a coherent factor structure of the study .The researchers used two complementary methods to assess reliability :Test–retest reliability (two-week interval) coefficients ranged from 0.81 to 0.90 Internal consistency (Cronbach's alpha) values ranged from 0.71 to 0.86 The scale demonstrates high stability over time while maintaining satisfactory internal consistency according to established psychometric standards used in behavioral research.

2.4.2. Illness Anxiety Scale

The research team used the Whiteley Index as their primary tool to measure illness anxiety among their study participants through established research instruments .The research tool included 14 assessment items which evaluated three different aspects of illness anxiety through the measurement of unnecessary health concerns and the incorrect interpretation of physical symptoms and the constant anxiety about developing severe medical conditions .team used standard psychometric testing methods to translate and modify the scale from the previous research instrument into their current study requirements, The total score was calculated by summing all items, where higher scores indicated higher levels of illness anxiety. A cut-off score of seven or above (≥7) provides a threshold for identifying medically significant hypochondriasis according to the findings of earlier studies .

The researchers evaluated construct validity by analyzing item-total correlations which showed values that ranged between0.40 to 0.80. The scale demonstrated strong internal coherence because all values reached statistical significance and the scale achieved sufficient construct validity . The reliability analysis produced the following results :Test–retest reliability: 0.90, Cronbach's alpha: 0.86, The instrument demonstrates high reliability according to these coefficients, which show both operational stability and internal consistency for illness anxiety measurement.

Overall, the instruments used in this study demonstrated robust psychometric properties, including satisfactory levels of construct validity and reliability. The rigorous adaptation process and empirical validation support their suitability for investigating cyberchondria and illness anxiety within the current research context.

2.5 Translation of Study Measures

The researchers developed study instruments which underwent translation and adaptation processes to create instruments which met the needs of the target population while maintaining their original psychometric characteristics. The translation process followed internationally recognized guidelines for cross-cultural adaptation of psychological measures .The two independent bilingual translators who specialized in psychology translated the original English instruments into Arabic. The two translated versions were then compared, and a preliminary reconciled version was developed based on linguistic accuracy and conceptual equivalence, The third independent translator who worked on the reconciliation process back-translated the Arabic version into English without knowing the original instruments. The back-translated version was compared with the original scales to identify any discrepancies, ambiguities, or inconsistencies in meaning, The content validity of the translated instruments required testing through expert reviews by psychologists and behavioral science specialists. The researchers made minor changes to the document which improved clarity and cultural appropriateness and document comprehension, The researchers conducted a pilot study with 30 participants who were not included in the main study sample to evaluate the translation measures for clarity and reliability. The results indicated that the instruments were clear, culturally appropriate, and suitable for use in the current study.

2.6 Statistical Analysis

The researchers performed data analysis through the use of SPSS and Structural Equation Modeling (SEM), software. The researchers used descriptive statistics which included means standard deviations frequencies and percentages to present the

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characteristics of the sample and the study variables .The researchers used Pearson correlation analysis to study the relationship between cyberchondria and illness anxiety. The proposed model testing which used SEM allowed researchers to determine how the different variables affected each other through direct connections .The researchers used standard indices which included **χ^2/df CFI TLI RMSEA SRMR, to evaluate model fit according to the established threshold values. The researchers established statistical significance at **$p < 0.05$** level.

3. Results

3.1 Cyberchondria has a Significant Positive Effect on Illness Anxiety Among University Students

Table 2: Pearson Correlations Between Cyberchondria and Illness Anxiety Disorder Dimensions

Dimension of Cyberchondria	r	p-value
Compulsive Behavior	0.253**	< .001
Psychological Distress	0.359**	< .001
Excessiveness	0.345**	< .001
Reassurance Seeking	0.295**	< .001
Distrust of Medical Advice	0.402**	< .001
Total Cyberchondria Score	0.385	< .001

Table 2. The study found that university students who showed cyberchondria exhibited a statistically valid positive link to illness anxiety disorder with a correlation of r equal to 0.385 and a p value below 0.001.At the dimensional level, the subcomponents of cyberchondria showed positive relationships with illness anxiety which reached statistical significance at p level below .001 across all behavioral cognitive and emotional dimensions.The strongest correlation was observed for distrust of medical advice (r = 0.402) which indicates that people who trust medical professionals less start to develop higher levels of illness anxiety.The psychological distress (r = 0.359) which followed through to excessive behavior (r = 0.345) demonstrated how emotional stress together with online health searching activities leads to increased health anxiety.The two factors showed weaker relationships which still reached statistical significance with compulsive behavior showing a correlation of r equal to 0.253 and reassurance seeking showing a correlation of r equal to 0.295 .The research results demonstrate that people who experience higher cyberchondria levels tend to develop higher illness anxiety levels which shows how online health information seeking behavior brings about health-related fear development. These results support the hypothesis that cyberchondria is positively associated with illness anxiety disorder.

3.2 Cyberchondria Significantly Predicts Illness Anxiety Disorder Aamong University Students

Table 3: Goodness-of-Fit Indices for the Structural Model

Fit Index	Value	Recommended Threshold
CFI	0.93	> 0.90
TLI	0.91	> 0.90
RMSEA	0.06	< 0.08
SRMR	0.05	< 0.08

In Table 3, the goodness-of-fit indices demonstrated that the proposed structural model achieved an acceptable to good match with the observed data. The model demonstrated adequate fit to the data because the Comparative Fit Index (CFI = 0.93) and Tucker–Lewis Index (TLI = 0.91) values exceeded the minimum threshold of 0.90. The model proved to be sufficient because the Root Mean Square Error of Approximation (RMSEA = 0.06) and Standardized Root Mean Square Residual (SRMR = 0.05) values stayed within the recognized boundaries.

Table 4: Confirmatory Factor Analysis (CFA)

Variable	Indicator	Loading (λ)
Cyberchondria	Compulsive Behavior	0.68
	Psychological Distress	0.75
	Excessiveness	0.73
	Reassurance Seeking	0.69
	Distrust	0.78

The CFA results which Table 4displays show that all observed indicators from the study resulted in significant loadings toward their cyberchondria latent construct because their standardized factor loadings reached the minimum requirement of ($\lambda > 0.50$). The finding establishes strong proof for the measurement model's convergent validity while showing that the construct representation meets its necessary requirements .The measurement model requires validity before researchers can investigate how latent variables connect through their structural relationships. The Table 4 validated factor structure

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establishes the foundation to continue with structural model investigations .Table 5demonstrates that cyberchondria leads to a significant positive relationship with illness anxiety disorder which has a statistical value of $\beta = 0.39$ and a p-value below 0.001. The research shows that university students who engage in maladaptive online health information-seeking behaviors tend to develop higher levels of illness-related anxiety .The results from Tables 3 and 4 show that the measurement model possesses psychometric validity while the proposed structural relationship receives empirical validation. The research results demonstrate that cyberchondria serves as an essential factor which predicts illness anxiety disorder when evaluated with structural equation modeling methods.

Table 5: Structural Path Estimates

Path	β	SE	CR	p
Cyberchondria → Illness Anxiety	0.39	0.05	7.80	< 0.001

3.3 The Levels of Cyberchondria and Illness Anxiety Disorder Among University Students Differ Significantly from the Theoretical Mean

The results shown in Table 6 demonstrate that university students exhibit different levels of cyberchondria dimensions when researchers compared their results to the established theoretical mean ($\mu = 3$). The study found no statistically significant differences for compulsive behavior (M=2.93, p=0.158), psychological distress (M=3.05, p=0.335), and excessiveness (M=3.01, p=0.835) which indicates that participants showed average levels of these dimensions.Students displayed higher levels of reassurance seeking (M=3.18, p=0.002) and distrust (M=3.25, p<0.001) because both components exceeded their theoretical mean values.The study found no statistically significant difference in overall cyberchondria scores (M=3.05, p=0.243) which indicates that participants showed moderate levels of cyberchondria symptoms.The study found that university students experienced illness anxiety disorder at a higher rate shown by their average score of (M=3.52, p<0.001) which indicates high levels of illness-related anxiety .The study results show that cyberchondria exists at moderate levels in the population but specific components, especially reassurance seeking and distrust, exist at higher levels while illness anxiety disorder shows significant prevalence.

Table 6: Means, Standard Deviations, and One-Sample t-Test Results for Cyberchondria and Illness Anxiety Compared to the Theoretical Mean.

Variable	N	Mean	SD	t	df	p-value
Compulsive Behavior	255	2.93	0.829	-1.416	254	.158
Psychological Distress	255	3.05	0.859	0.965	254	.335
Excessiveness	255	3.01	0.898	0.209	254	.835
Reassurance Seeking	255	3.18	0.900	3.158	254	.002*
Distrust	255	3.25	0.952	4.159	254	< .001**
Cyberchondria (Total)	255	3.05	0.746	1.170	254	.243
Illness Anxiety Disorder	255	3.52	0.685	12.056	254	< .001**

3.4 There are Statistically Significant Differences in Cyberchondria and Illness Anxiety Disorder Among University Students Based on Gender, Faculty, and the Presence of Chronic Illness

The data from Table 7 shows that descriptive statistics demonstrate small differences in cyberchondria and illness anxiety between male and female students from different academic departments who have various chronic medical conditions.

Table 7: Means, Standard Deviations, and Three-Way ANOVA Results for Cyberchondria and Illness Anxiety by Demographic Variables

Variable	Category	Cyberchondria (M ± SD)	Illness Anxiety (M ± SD)	N
Gender	Male	3.14 ± 0.83	3.62 ± 0.70	89
	Female	3.01 ± 0.69	3.46 ± 0.67	166
Faculty	Humanities	3.10 ± 0.66	3.44 ± 0.72	121
	Scientific	3.01 ± 0.81	3.59 ± 0.65	134
Chronic Illness	Yes	2.88 ± 0.71	3.60 ± 0.60	49
	No	3.10 ± 0.75	3.50 ± 0.70	206

The data from Table 8 shows the three-way ANOVA results showed that all observed differences failed to achieve statistical significance .The study found no significant differences in cyberchondria scores based on gender (F = 2.072, p = 0.151) or faculty (F = 1.379, p = 0.241) or chronic illness status (F = 3.058, p = .082). The study found no significant differences in illness anxiety disorder across gender (F = 2.490, p = 0.116) or faculty (F = 1.805, p = 0.180) or chronic illness status (F = 1.062, p = 0.304) .The study used effect size estimates(η^2) to show that all variables produced small effect sizes which

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demonstrated that demographic factors caused minimal changes in both cyberchondria and illness anxiety symptoms .The study results demonstrate that the studied population displays consistent patterns of cyberchondria and illness anxiety disorder across different demographic subgroups.

Table 8: Differences in Cyberchondria and Illness Anxiety by Gender, Faculty, and Health Status

Variable	Outcome	F	p-value	Effect Size (η^2)
Gender	Cyberchondria	2.072	0.151	0.008
	Illness Anxiety	2.490	0.116	0.010
Faculty	Cyberchondria	1.379	0.241	0.005
	Illness Anxiety	1.805	0.180	0.007
Chronic Illness	Cyberchondria	3.058	0.082	0.012
	Illness Anxiety	1.062	0.304	0.004

3.5 Demographic Variables (Gender, Faculty, and Chronic Illness Status) Significantly Predict Cyberchondria and Illness Anxiety Disorder in the Structural Equation Model

Table 9: Structural Path Estimates of Demographic Variables Predicting Cyberchondria and Illness Anxiety Disorder

Outcome Variable	Predictor	Estimate (β)	S.E.	C.R.	p-value
Cyberchondria	Gender	-0.143	0.097	-1.482	.138
	Faculty	-0.111	0.092	-1.206	.228
	Chronic Illness	0.207	0.117	1.763	.078
Illness Anxiety	Gender	-0.144	0.089	-1.624	.104
	Faculty	0.117	0.085	1.380	.168
	Chronic Illness	-0.112	0.108	-1.039	.299

The structural equation modeling (SEM) results presented in Table 4 demonstrate that university students' cyberchondria and illness anxiety disorder conditions both show no relationship with their demographic information which includes gender and faculty membership and their chronic illness status.The studied predictors did not produce any significant effects on cyberchondria because all examined factors which included gender (β = -0.143, p = .138) and faculty (β = -0.111, p = .228) and chronic illness status (β = 0.207, p = .078) did not reach statistical significance except for chronic illness status which approached marginal significance.The study found no significant effects for illness anxiety disorder as both gender (β = -0.144, p = .104) and faculty (β = 0.117, p = .168) and chronic illness status (β = -0.112, p = .299) failed to produce any statistically significant results.The research results demonstrate that demographic factors can only explain a small portion of cyberchondria and illness anxiety disorder because these psychological conditions tend to be more affected by psychological and behavioral factors than by basic demographic characteristics.

Notably, the effect of chronic illness on cyberchondria approached statistical significance (p = .078), suggesting a potential trend that warrants further investigation in future research.

3.6 Demographic Variables (Gender, Faculty, and Chronic Illness Status) have significant structural effects on cyberchondria and illness anxiety among university students.

Table 10: Effects of Demographic Variables on Cyberchondria and Illness Anxiety: Structural Model Estimates

Outcome	Predictor	β	SE	Z	p
Compulsive	Gender	-0.089	0.110	-0.814	0.416
	Faculty	-0.150	0.105	-1.436	0.151
	Chronic illness	0.267	0.130	2.056	0.040*
Psychological	Gender	-0.197	0.114	-1.725	0.084
	Faculty	-0.114	0.109	-1.043	0.297
	Chronic illness	0.108	0.136	0.798	0.425
Cyberchondria	Compulsive	0.432	0.017	25.645	<.001***
	Psychological	0.489	0.016	30.130	<.001***
Illness Anxiety	Cyberchondria	0.640	0.175	3.649	<.001***
	Compulsive	-0.259	0.099	-2.621	0.009**
	Psychological	-0.038	0.106	-0.358	0.720

Demographic variables exhibit limited capacity to explain the observed results. The research found that chronic illness had a minor yet statistically significant impact on compulsive behavior (β = 0.267, p = .040) but gender and faculty failed to serve as reliable predictors, Psychological and compulsive dimensions operated as strong predictors of cyberchondria (β = 0.489 and 0.432, respectively; p < .001). Cyberchondria created a significant positive relationship with illness anxiety (β = 0.640,

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$p < .001$) .The research results demonstrate that psychological mechanisms serve as the primary factor explaining variability in illness anxiety while demographic factors have no significant impact.

Table 11: Explained Variance (R^2) of Endogenous Variables

Variable	R^2
Compulsive	0.026
Psychological	0.017
Cyberchondria	0.862
Illness Anxiety	0.164

Table 11 The model explains a high proportion of variance in cyberchondria ($R^2 = 0.862$) and a moderate proportion in illness anxiety ($R^2 = 0.164$), while demographic variables account for minimal variance in the psychological dimensions. Demographic variables contribute minimally to explaining variance, whereas psychological dimensions and cyberchondria play a central predictive role in illness anxiety.

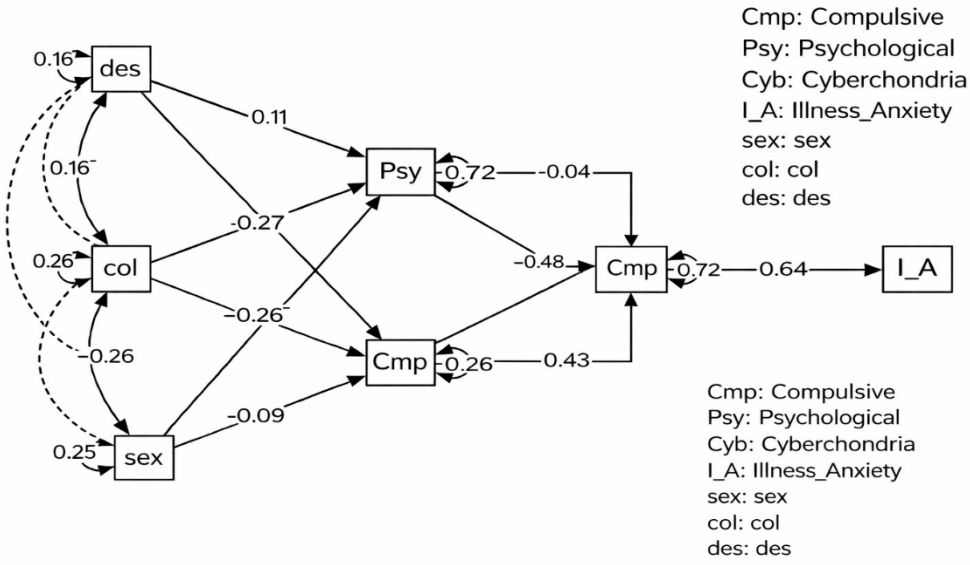

Fig. 1: Structural Model of the Effects of Demographic Variables on Cyberchondria and Illness Anxiety

4. Discussion

The researchers used structural equation modeling to study how university students' cyberchondria predicts their development of illness anxiety disorder. The research findings offer strong evidence for the proposed model while they establish new findings about people's digital health behavior patterns.

The study results demonstrated that cyberchondria leads to increased illness anxiety because of their positive correlation ($r = 0.385$, $p < 0.001$). The finding matches earlier research which showed that people who search for health information online too much experience increased health anxiety [17, 36]. The meta-analysis shows that health anxiety and cyberchondria have a moderate to strong association, which demonstrates that repeated online exposure to medical content increases fearful thoughts about health, The relationship exists because patients develop harmful health beliefs when they misinterpret their body symptoms after seeing unclear or frightening health-related online content [2, 15, 44]. Medical advice distrust presented the strongest correlation with illness anxiety at the dimension level according to the research results which showed ($r = 0.402$) as the second strongest correlation with psychological distress and social functioning. The finding supports earlier research which showed that people who distrust medical professionals and who hold metacognitive beliefs about their health problems defend their cyberchondria condition [31-32]. People who trust online content more than medical professionals probably will repeat their online search activities which causes more anxiety instead of decreasing it. Research by Jungmann and Dessauer (2025) discovered that people who need reassurance about their health and people who distrust their health assessment results will keep experiencing health anxiety because those needs will create a harmful cycle of anxiety symptoms.

The study found that cyberchondria acts as an accurate predictor of illness anxiety according to structural model findings ($\beta = 0.39$, $p < 0.001$). The evidence shows a directional relationship between cyberchondria and health anxiety, which matches SEM-based findings from recent studies that tracked psychological outcomes [14, 23 ,27]. The structural relationship validity

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receives support from the good model fit indices which show (CFI = 0.93; RMSEA = 0.06). The findings show that cyberchondria operates as a primary online mechanism which affects psychological health among users who engage with the Internet at high rates.

The study found that students showed moderate cyberchondria levels while experiencing extreme illness anxiety with an average of ($M = 3.52$, $p < .001$). The pattern appears similar to previous research which identified high levels of health anxiety among university students [3-4]. The results demonstrated that students showed higher levels of reassurance seeking behavior and distrust levels, which exceeded the theoretical average level according to the study results. [2] discovered that people use reassurance-seeking behavior to handle their health doubts, but that behavior actually increases their health anxiety .The study results showed equal outcomes for all demographic variables which included gender, faculty, and chronic illness status. The research findings show that demographic factors do not affect either cyberchondria or health anxiety, which exist because people have psychological and cognitive conditions [17, 32]. The model shows that chronic illness has a minor effect, which suggests that people with existing health conditions will develop more regular health-related searching behavior according to research findings which show partial support for this statement [14].

The model generates a high level of explanation for cyberchondria ($R^2 = 0.862$) and it provides a moderate explanation for illness anxiety ($R^2 = 0.164$). Cyberchondria functions as a complete and effective construct that explains most of its results, while illness anxiety requires extra elements which people experience beyond their online activities. Previous research shows that people use their emotional regulation and their metacognitive beliefs about health anxiety to develop characteristics that lead to health anxiety [31, 34], so cyberchondria represents one item in a complete psychological system .The research results demonstrate that cyberchondria functions as a major digital risk factor which leads to the development of illness anxiety disorder. The study combines empirical results with existing theoretical and empirical literature to establish a complete framework which explains how digital environments affect health-related anxiety in university students.

The researchers discovered an intricate cognitive-behavioral system which operates as a self-reinforcing mechanism that connects cyberchondria with disease anxiety, The first stage of body perception doubt leads to online health information search, which results in users encountering medical material that either confuses them or poses risks, thus causing anxiety and driving them to seek more information, The present-day health anxiety frameworks demonstrate the way cognitive biases (colossal misinterpretation), emotional reactions (dread and discomfort), and behavioral patterns (reassurance seeking and obsessive monitoring) interact with one another, The study's cyberchondria characteristics work together: skepticism in medical advice reduces external reassurance, psychological discomfort increases perceived threat, and excessive searching maintains health-related cue bias, The physical world creates psychiatric disorders through its multiple pathways which connect the digital realm to psychiatric disorders, University students who experience cyberchondria display sickness anxiety, which suggests that cyberchondria functions as a central element in psychological mechanisms that establish and sustain this condition.

5. Conclusion

The research results demonstrate that university students experience digital illness anxiety through their cyberchondria behavior. The research shows that people who search for health information online too much will develop more health anxiety because their cognitive and behavioral processes become affected .The demographic variables did not produce any important results which demonstrated that psychological factors were the main reason for driving illness anxiety instead of background characteristics. The study results demonstrate that digital health literacy needs improvement because health information online is being misused by users .The research study establishes a direct connection between cyberchondria and illness anxiety which supports existing research on digital health behavior. The research should use longitudinal studies to investigate the relationships between variables and the psychological mechanisms that link them to each other.

6. Limitations

The study possesses multiple strengths which enhance its scientific value. The research uses Structural Equation Modeling (SEM) to study how cyberchondria and illness anxiety problems connect with each other. The study created its findings through validated and psychometrically sound instruments which established the research outcomes through reliable testing methods. The study results obtained from SEM analysis demonstrate strong research capacity because the sample size met minimum requirements, The research contains significant advantages but it also includes specific restrictions that researchers must recognize, design restricts researchers from establishing causal relationships between the studied variables. The researchers collected data through self-report measures which researchers believe might lead to biased response results. The research team used a convenience sample which restricts their ability to apply study results to different population groups, adopt longitudinal research designs while using diverse participant groups to increase research findings which can be applied to different groups and establish causal relationships between variables.

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7. Recommendations

The current research findings lead to the development of these proposed recommendations. First, it is necessary to create intervention programs which will help university students stop their harmful online health information-seeking practices. The programs need to improve digital health literacy by teaching students how to analyze online medical content .The universities need to offer students psychological support services together with awareness campaigns which will assist students in handling health-related anxiety while decreasing their dependence on online self-diagnosis .Healthcare professionals need to increase their effort in helping people find reliable health information sources which will decrease the harmful effects of medical misinformation and public distrust in health guidance .The upcoming research needs to study additional psychological and contextual factors which affect the connection between cyberchondria and illness anxiety. The researchers should use longitudinal and experimental designs to achieve this research goal.

Data availability

All data supporting the findings of this study are available from the corresponding author upon reasonable request. Due to ethical restrictions involving human participants' privacy, data cannot be made publicly available but can be shared with qualified researchers upon request.

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Conflict Interest

The authors declare no competing interests.

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Contributions

Y.M.K. conceptualized and designed the study, secured the funding, supervised the overall research process, and contributed to data interpretation and manuscript revision .R.A.A. collected the data, coordinated with participants, conducted the literature review, and prepared the initial draft of the manuscript .All authors have read and approved the final version of the manuscript.

Ethical Approval

This study followed human participant research ethics. Participants gave informed permission before data collection as participation was voluntary. Participants were assured of anonymity and confidentiality, and no personally identifiable information was collected.

Competing interests

The authors declare no competing interests.

Clinical trial number

Not applicable

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