



Cyberchondria, Anxiety Sensitivity, Hypochondria, and Internet Addiction: Implications for Mental Health Professionals

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Abstract

Repetitive online searches for health information increase anxieties and result in Internet addiction. Internet addiction, cyberchondria, anxiety sensitivity, and hypochondria have been studied separately, but how these concepts are reciprocally linked has not been investigated. This study aimed to determine the levels, correlations, and predictors of Internet addiction, cyberchondria, anxiety sensitivity, and hypochondria among students based on the sample's characteristics. A sample of 143 university students participated in this cross-sectional online survey. A self-reported questionnaire was employed to collect data from students. The studied concepts had moderate to high correlations with each other and with the students' characteristics. Not getting infected with the coronavirus was among the demographic factors inserted into the regression model that only predicted cyberchondria. The model of cyberchondria was significant and explained 11.5% of the variance in the score of concepts. The results of the standard regression analysis indicated that the model predicting Internet addiction accounted for 41.2% of the variability. Our unique findings indicate that cyberchondria can contribute to developing Internet addiction compared to earlier studies. The findings suggest the importance of empowering students to overcome their anxieties by managing cyberchondria and Internet addiction. Mental health professionals, namely psychiatric nurses, are at the forefront of taking preventive mental health measures on campus, such as screening and referring students who exhibit these problems to psychological support and counseling to cope with their anxieties.

Keywords Internet addiction · cyberchondria · Anxiety sensitivity · Hypochondria

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Introduction

Many students are increasingly looking for all forms of online information, especially after the rapid improvement of Internet connectivity. Research has shown that at least 50% of Internet users searched for online health-related information, with 56% having self-medical diagnoses using information available online (Deetjen, 2017; Jhanwar et al., 2021). Searching for online medical-related information may be accompanied by distress with profound consequences for users, such as Internet addiction, hypochondria, and anxiety sensitivity (Guo et al., 2020). Internet addiction is one's inability to control preoccupations with the Internet and compulsive urges to spend significant time on the Internet, causing distress and impairment in daily functioning (Boysan et al., 2017). Hypochondria (also known as health anxiety) refers to an extreme focus on physical symptoms based on incorrect interpretations of physical sensations (Salkovskis et al., 2002). Anxiety sensitivity is the over-estimation of anxiety and bodily sensations (Taylor et al.,

2007), which leads to misinterpreting such sensations as distressing and dangerous and perceiving them to have detrimental physical, psychological, and social consequences (Hashemi et al., 2020). These individuals may experience physical sensations such as nausea and palpitation, which manifest as a sign of losing control and becoming mentally ill (Hashemi et al., 2020; Starcevic, 2017). In terms of social consequences, these afflicted individuals become embarrassed because others notice the anxious triggering, resulting in critique, jeer, and social withdrawal (Hashemi et al., 2020). The unwarranted exaggeration of individuals' health-related anxiety resulting from online-based searches is dubbed "cyberchondria" (Starcevic, 2017).

Internet Addiction and Cyberchondria

Online medical information may cause repetitive use of Internet resources to search for information on a person's health (Selvi et al., 2018). Internet users' panic could escalate because of the inaccurate information they obtain while surfing the Internet. A large amount of online medical information causes people to spend a lot of time searching for possible symptoms for self-diagnosis (Starcevic, 2017). Online self-diagnosis can exacerbate people's anxiety who don't have much medical knowledge (Guo et al., 2020). Although cyberchondria is a phenomenon that has only recently emerged, the wide availability of the Internet and extensive smartphone use make it a public health problem (Selvi et al., 2018). In particular, university students repetitively use the Internet to address their academic and personal requirements, which may contribute to developing cyberchondria and Internet addiction (Bati et al., 2018; Guo et al., 2020; Rohilla et al., 2020; Selvi et al., 2018). Some students may lose control over Internet use, resulting in excessive use to the detriment of other life activities (Boysan et al., 2017; Fawaz & Samaha, 2021; Guo et al., 2020). Cyberchondria is a common symptom of Internet addiction in some students (Fergus & Dolan, 2014; Fergus & Spada, 2017; Fergus & Russell, 2016; Rohilla et al., 2020). Specific individual personality attributes and the availability of information influence vulnerability to cyberchondria (Selvi et al., 2018; Tyrer et al., 2019). Empirical evidence indicates that students with endogenous vulnerability characteristics such as intolerance to uncertainty, perfectionism, and high anxiety sensitivity are prone to experiencing cyberchondria (Starcevic et al., 2020; Starcevic, 2017; Starcevic & Aboujaoude, 2015).

Psychological Changes in Emerging Adulthood

Arnett (2000) indicated that the age between 18 and 25 is when the emerging adulthood stage occurs, where one is no longer an adolescent or a fully adult. Arnett's (2000) social and demographic theory emphasized the life areas (e.g., getting married, leaving home, and shaping potential career paths) where change and exploration increase, and the psychological changes are most prominent in this period. This distinct stage is characterized by demographic variability and exploring possible life directions. It also sets the stage for their future endeavors. Emerging adulthood is not a universal developmental stage but exists in most societies.

Psychosocial developmental approaches have found a significant relationship between compulsive Internet use and failure to resolve intimate crises (Guo et al., 2020). According to Erikson's theory (2004), emerging adults (i.e., university students) live a new life stage (stage 6; intimacy versus isolation) that arises between adolescence and young adulthood. They seek meaningful connections through social media and the Internet to build close romantic relationships. At this stage, emerging adults attempt to develop intimate relationships (Musetti et al., 2020). However, this stage comes with some unique stressors and psychological challenges for university students.

During the transition from adolescence to young adulthood, mental health issues often appear or reveal themselves (Arnett, 2000; Erikson, 2004). Struggling at this stage may yield feelings of loneliness and isolation. Emerging adults may become lonely, negatively impact their ability to regulate their emotions, and engage in maladaptive behaviors related to pathological use of the Internet and cyberchondria (Alzayyat et al., 2015). Previous literature has shown that loneliness predicts problematic Internet use in emerging adults (Musetti et al., 2020). As university students become more exposed to the realities and stressors of life, they may engage in various maladaptive behaviors to cope during stressful times and engage in maladaptive behaviors related to unhealthy internet use (Al-Gamal et al., 2015).

Theoretical Foundation

Internet addiction theories may help explain why students may be vulnerable to developing Internet addiction and cyberchondria. An individual may be more prone to becoming addicted to the Internet if they have both proximal (e.g., pre-existing psychopathology) and distal (e.g., negative thoughts that increase the urge to use the Internet) risk factors (Davis, 2001). Another theoretical model adopted from this study is the metacognitive model of cyberchondria

(Fergus & Spada, 2017). People with cyberchondria are at greater risk of experiencing profound anxiety and distress due to metacognitive beliefs. A positive metacognitive view of the Internet's ability to alleviate health-related stress exemplifies this belief. In contrast, negative metacognitive beliefs focus on the Internet's loss of control and the idea that searching for health information online is harmful.

Statement of the Problem

This study targets Jordanian university students. The overwhelming majority of Internet users in Jordan are university students (Al-Gamal et al., 2015). They utilize the Internet as an integral part of their academic and personal lives. This marked Internet usage in Jordan has resulted in substantial societal shifts, such as a turn to home-based activities and social isolation, primarily through the COVID-19 pandemic (Al-Rawashdeh et al., 2022). Previous studies have examined cultural and environmental factors in Jordan that could make people more likely to become addicted to the Internet or have cyberchondria (Al-Gamal et al., 2015; Al-Rawashdeh et al., 2022; Alzayyat et al., 2015). Social withdrawal, poor parental supervision, and a lack of family and social support were among these factors. In particular, students become fearful of their health, especially considering the high number of mortalities in the country and worldwide (Al-Rawashdeh et al., 2022). Many Jordanian students have become more dependent on the Internet with nowhere to go. In Jordan, the Internet serves as a means of communication, information exchange, shopping, personal enjoyment, and social interaction among the population. These uses increased following online education, especially during the COVID-19 pandemic. Hence, questions regarding the effects of too much Internet use and cyberchondria have started to be raised (Al-Rawashdeh et al., 2022). Cyberchondria may have resulted from students' spending too much time on the Internet, especially those addicted to it. Some students may have had changes in their health because of the coronavirus (Hashemi et al., 2020). Others may have been concerned about their health. This compulsive use of the Internet was linked to students' poor mental health and maladaptive behaviors (Jungmann & Witthöft, 2020).

A recent meta-analysis study showed that people who experience compulsive use of the Internet exhibit cyberchondria behaviors and increased health-related anxiety levels (McMullan, Berle, Arnaez, & Starcevic, 2019). A better understanding of the magnitude and direction of the correlations between students' characteristics and growing hypochondria enables them to manage their anxieties (Jhanwar et al., 2021). Previous literature has studied each concept apart (Jokic-Begic et al., 2020; Hashemi et al., 2020; Selvi

et al., 2018; Siste et al., 2021; Starcevic & Berle, 2013). Yet, little is known about the reciprocal relationship between these concepts, on the one hand, and students' academic and demographic characteristics, on the other (Gerolimatos & Edelstein, 2012; Gioia & Boursier, 2020; Khazaal et al., 2021). To date, there have been no studies done outside of Western culture, particularly among a unique population of university students. However, most Jordanians use the Internet, making them vulnerable to Internet addiction and its associated consequences (Global Digital Insights, 2021). Even though the direct effects of the condition were comparable across different global populations like Jordan, the indirect effects could be different, warranting specific empirical investigation. The current study aims to study levels, correlations, and predictors of Internet addiction, cyberchondria, anxiety sensitivity, and hypochondria among students based on their personal and academic characteristics.

Selection of the Study's Variables and Research Hypotheses

The Internet has become a significant source of information among students experiencing cyberchondria (Bati et al., 2018), allowing them to do continuous research on their perceived health conditions. Ongoing and exaggerated Internet use can be detrimental to the psychological health of the Internet user (Hashemi et al., 2020; Guo et al., 2020; Jhanwar et al., 2021; Selvi et al., 2018). Adverse health conditions associated with excessive Internet use may include physical or emotional distress, anxiety, depression, and eventual addiction to the Internet (Zeng et al., 2019).

Internet addiction was considered a dependent variable in this study because students used the Internet more during the COVID-19 pandemic than at other times. In contrast, cyberchondria, hypochondria, and health sensitivity were selected as independent variables because the pandemic forced students to live in isolation, and some students' mental health deteriorated during the pandemic. Students' health anxiety might worsen cyberchondria and internet addiction, especially during this pandemic. These circumstances give students the impetus to compulsively search for online health information and have contributed to the development of Internet addiction among students. Internet addiction was found as a potential risk factor for cyberchondria, and, in turn, cyberchondria has a bidirectional relationship with Internet addiction. Compulsive online health information searches contribute to both cyberchondria and the Internet. Although prior literature has mainly focused on Internet addiction as a risk factor for cyberchondria, little is known about the opposite direction of this relationship among university students. Thus, we focused on examining the

predictors of Internet addiction in light of the bidirectional relationship between cyberchondria and Internet addiction and the sample's personal and educational factors. The following four hypotheses are tested in the current study:

1. The levels of cyberchondria, Internet addiction, anxiety sensitivity, and hypochondria are mild to moderate among university students in Jordan.
2. The relationships between cyberchondria, Internet addiction, anxiety sensitivity, and hypochondria are positive and moderate among university students in Jordan.
3. The sample characteristics are significant predictors of cyberchondria, internet addiction, anxiety sensitivity, and hypochondria in a sample of university students in Jordan.
4. Cyberchondria, anxiety sensitivity, hypochondria, and sample characteristics are significant predictors of Internet addiction in a sample of university students in Jordan.

Significance of the study

Much information about health issues is now available online, making it easier for students with hypochondria or anxiety sensitivity to look up information about their condition. The escalating use of the Internet and cyberchondria behavior creates more stress and confusion than the knowledge established in an Internet user (Guo et al., 2020; Hashemi et al., 2020). Cyberchondria is mainly common in students with a heightened level of hypochondria (Bati et al., 2018; Selvi et al., 2018). Addiction has been a common phenomenon on the Internet (Selvi et al., 2018). Research has shown a profound acceleration in cases of cyberchondria during the COVID-19 pandemic (Fawaz & Samaha, 2021; Hashemi et al., 2020; Jokic-Begic, 2020; Li et al., 2020). Recent research has demonstrated that high levels of COVID-19 anxiety among students with knowledge about the disease's symptoms and mortality rates and fear of coronaviruses were significantly linked to Internet addiction and hypochondria in university students (Abas et al., 2021; Fawaz & Samaha, 2021; Li et al., 2020; Manning et al., 2021; Mertens et al., 2020; Wang & Zhao, 2020).

Gaining certainty of the specific indirect effects of the pandemic by analyzing the concepts mentioned above would provide important insights and implications for practice and future research. The study's findings would help Jordanian university students manage and cope with their anxieties and would guide psychosocial interventions to reduce Internet addiction and its consequences on mental health. Mental health professionals, namely psychiatric

nurses, in Jordan may use the results of this study to develop appropriate educational protective plans for students based on their knowledge and understanding of the purposes of Internet use and to avoid compulsive Internet behavior based on their personal and academic characteristics. Thus, in-depth recognition of this phenomenon would add to the problem's understanding from the Jordanian perspective, as most Jordanian universities lack support group services for students on campus to overcome pathological Internet use and its associated risk factors. A better understanding of internet addiction and cyberchondria and how they are linked to hypochondria and anxiety sensitivity in students in Jordan would make it easier to diagnose and treat them.

Methods

Design

This study is a predictive, cross-sectional, correlational study conducted online to answer the previous research questions. The University's institutional review board granted ethical approval for the research before the recruitment process. We maintained the highest level of confidentiality and anonymity for all collected data.

Sample

The sample for this study comes from a large-scale survey of university students in Jordan. Convenience and snowball sampling strategies were adopted in this study to recruit participants. This survey was open to all students who could access the study link through platforms without imposing inclusion or exclusion criteria. G-Power (Cohen et al., 2003) was used to calculate the sample size needed ($N = 89$) to achieve 95% statistical power, a medium effect size (f^2) of 0.15, and an alpha level of 0.05 for up to six predictors.

The mean age of the sample is 21.23 ± 0.66 (see Table 1). Of the 143 students, most were females (70.6%). Most participants acknowledged studying nursing for a bachelor's degree (84.6%). The vast majority of students are from low-income households. An overwhelming majority of students did not get infected with the coronavirus (70.0%; (43 missing data)).

Data Collection Procedure

Facebook and WhatsApp were used to invite students to participate in this study online. We used Google Forms to design an online survey to be sent to eligible participants.

Table 1 Subjects' Characteristics (N = 143)

Characteristics	N (%) or mean \pm SD
Age, Years	21.23 \pm 0.66
Monthly Income, JD.	816.00 \pm 0.48 (\$1150.93)
Gender	42 (29.4%)
Male	101 (70.6%)
Female	
Field of Study	112(78.3%)
Nursing	10(33.3%)
Health Sciences	11(36.7%)
Science and Engineering	6(20.0%)
Art and Educational Sciences	3(10.0%)
Sport and Tourism	
Level of Education	19(13.3%)
Diploma	121(84.6%)
Bachelor's Degree	3(2.1%)
Master and Doctorate	
Got Infected with Coronavirus	27(18.87.)
Yes	76(53.30%)
No	

The anonymous link to the study was created and sent to eligible students. They were asked to share the study link with eligible colleagues and friends on their Facebook and WhatsApp accounts. The survey link provided all potential participants with online details through an information sheet about the study's purpose to make informed decisions on whether or not to participate. The survey was set up to allow participants to submit only one response. We sent two follow-up reminders to the potential participants in 4-day intervals to maximize the response rate, which involved instructions that students who had already responded to our request should ignore this reminder. Participation was voluntary; students could refuse to participate or withdraw from the survey study without penalty. Students' responses could not be linked to their identities. We stored students' responses in a password-protected electronic format.

Measures

Demographic Data

The study researchers developed a set of demographic questions about the students' age, gender, income, the field of study, education level, and whether they were infected with the coronavirus.

Cyberchondria Severity Scale-Short Form (SCSS)

The SCSS is an assessment instrument to measure hypochondria results from exaggerated online health searches (McElroy & Shevlin, 2014). The questionnaire contains eight items for evaluating cyberchondria. Items of the SCSS were scored on a 5-point Likert scale, ranging from 1 = Never

to 5 = Always. The items of the SCSS are rated on a 5-point Likert scale, ranging from 1 = Never to 5 = Always. The scale comprises four subscale scores: "compulsion" (e.g., "researching symptoms or perceived medical conditions online interrupts my online leisure activities"), "distress" (e.g., "I have trouble relaxing after researching symptoms or perceived medical conditions online"), "excessiveness" (e.g., "I read different web pages about the same perceived condition"), and "reassurance" (e.g., "I discuss my online medical findings with my GP/health professional") (McElroy & Shevlin, 2014; Jokić-Begić et al., 2020). Lower scores signify lower levels of cyberchondria. The mean score of the SCSS in the current sample is 21.8 \pm 4.08 (median = 21), indicating a moderate level of cyberchondria. The reliability of the SCSS was 0.59 in the Jordanian sample.

Internet Addiction Test (IAT)

The IAT is a self-reported questionnaire that assesses pathological Internet use symptoms (Young, 1998). For each item (e.g., "How often do you neglect household chores to spend more time online" and "How often do you find yourself anticipating when you will go online again?"), participants rate their response by assigning numerical values as follows: 0 = not applicable, 1 = rarely, 2 = occasionally, 3 = frequently, 4 = often, 5 = always). IAT's Cronbach alpha is 0.93 (Boysan et al., 2017). The total score range is between 0 and 100 points, with a higher score meaning more dependence upon the Internet. In contrast, a range between 0 and 30 means a normal level of Internet usage (Young, 1998). Scores ranging from 31 to 49 reflect a mild level of Internet addiction; 50 to 79 indicate a moderate level; and scores of 80 to 100 suggest severe Internet addiction. The mean score of the IAT in our sample is 43.42 \pm 13.00 (median = 42), suggesting a mild level of Internet addiction. The internal consistency of IAT for the research sample is good ($\alpha = 0.85$).

Anxiety Sensitivity Inventory-3 (ASI-3)

The ASI-3 comprises 18 self-reported items (e.g., "When I am nervous, I worry that I might be mentally ill" and "It scares me when I feel faint") about an inclination to exhibit health-related anxiety sensitivity (Taylor et al., 2007). Items of the ASI-3 were scored on a 5-point Likert scale, ranging from "0 = very little" to "4 = very much." Scores can be calculated on three subscales (physical, cognitive, and social) (Mantar et al., 2010; Selvi et al., 2018). The total subscale score is either high (54–72), moderate (53–36), low (35–18), or almost no anxiety sensitivity (17–0). The mean score of the ASI-3 in the current sample is 32.7 \pm 8.94 (median = 32), indicating low anxiety sensitivity. The internal consistency of ASI-3 for the current research sample was 0.84.

Health Anxiety Inventory (HAI)

The HAI is an 18-item scale to evaluate individuals' levels of hypochondria independently of their physical health status (Salkovskis et al., 2002). Participants respond to the scale's items (e.g., "I spend much of my time worrying about my health" and "If I had a serious illness, I would be completely unable to enjoy life at all") on a group of four statements using a 4-point Likert scale ranging from 0 to 3, with a total score ranging from 0 to 54 (Salkovskis et al., 2002). These items evaluate health concerns over the previous six months. The first 14 items constitute the main section of this scale about fearing becoming ill. The remaining four questions are related to the negative consequences of health anxiety due to incurring a disease, starting with item 15. A lower score signifies a lower health anxiety level. The means and standard deviations of health anxiety and anxiety sufferers were 37.9 (6.8) and 18.5 (7.3), respectively. The means and standard deviations of the negative consequences items of health anxiety were 7.8 (2.8) and 3.6 (2.2) for anxiety sufferers (Salkovskis et al., 2002). The mean score of the HAI in the Jordanian sample is 37.8 ± 7.88 (median = 37), indicating low health anxiety. Cronbach's alpha on this scale for the research sample was 0.86.

Data Analysis Plan

Both descriptive and inferential statistics were generated using SPSS version 25 (IBM, 2017). For categorical data, frequencies and percentages were used to calculate descriptive statistics, whereas, for continuous variables, means and standard deviations were calculated. The Pearson correlation coefficient was used to compute all correlations between study variables and students' characteristics. In the first regression model, the sample characteristics (independent variables) were examined in standard multiple linear regressions to check whether they could predict cyberchondria, internet addiction, anxiety sensitivity, and hypochondria. In the second model, standard multiple linear regressions were used to look at cyberchondria, health sensitivity, hypochondria, and sample characteristics (all of which were independent variables) to see if they could predict Internet addiction (the dependent variable). The categorical variables were dummy coded for this purpose. We checked all the regression analysis assumptions prior to data analysis, including outliers, the assumptions of normality, multicollinearity, linearity, homoscedasticity, and the value of the variance inflation factor (VIF). The significance level was set below 0.05.

Table 2 Significant Correlations of Total Scores of Cyberchondria, Internet Addiction, Anxiety Sensitivity, Hypochondria, and Samples' Characteristics (N=143)

Factor	1	2	3	4
1 Cyberchondria (n = 143)	1.00			
2 Internet Addiction (n = 143)	0.587**	1.00		
3 Anxiety Sensitivity (n = 143)	0.230**	0.390**	1.00	
4 Hypochondria (n = 143)	0.161	0.325**	0.874**	1.00
5 Got Infected with Corona-virus (n = 100)	-0.356**	0.258**		

** At significance level 0.01

Missing Data

All returned questionnaires were checked for missing data online. In our case, we faced one problem in the item about getting infected with COVID-19 (missing data = 43). First, we conducted frequency analyses to identify missing data and outliers. Then, we followed Ender's (2010) recommendations, using multiple imputations to impute values for missing data.

Results

Concepts' Scores

The mean score and standard deviation for items of CSS, IAT, ASI-3, and HAI were 2.55 (SD = 0.60; moderate levels), 2.17 (SD = 0.65; mild levels), 1.78 (SD = 0.49; low levels), and 2.06 (SD = 0.43; low levels), respectively. The means and standard deviations of the negative consequences of items for hypochondria and anxiety sufferers (items 15–18) were 3.6 (2.2) and 2.10 (SD = 0.65), respectively.

Correlations among the Studied Concepts

We found significant positive moderate to high associations between cyberchondria and Internet addiction ($r = .587$) (Effect Size (ES) = 0.345; medium ES), anxiety sensitivity ($r = .230$) (ES = 0.056; small ES), and whether you got infected with coronavirus ($r = .356$) (ES = 0.13; small ES) (see Table 2). The Pearson correlation analysis showed significant positive moderate associations between Internet addiction and anxiety sensitivity ($r = .390$) (ES = 0.15; small ES) and hypochondria ($r = .325$) (ES = 0.11; small ES), and whether they got infected with coronavirus ($r = .258$) (ES = 0.067; small ES). Finally, we found significant positive moderate associations were found between anxiety sensitivity and hypochondria ($r = .874$) (ES = 0.76; large ES).

Table 3 Significant Predictors (Sample Characteristics) of Cyberchondria, Internet Addiction, Anxiety Sensitivity, and Hypochondria (N = 143)

Dependents* and Predictors (Sample Characteristics)	B**	β **	T-test	<i>p</i>	R ²	Adj R ²	***F-test (P-value)
Cyberchondria					0.243	0.115	1.902(P=0.043)
Got Infected with Coronavirus-No	3.168	0.301	2.638	0.010			
Internet Addiction					0.213	0.080	1.605(P=0.102)
Anxiety Sensitivity					0.169	0.029	1.208(P= .290)
Age-25-34 years	9.431	0.238	2.042	0.045			
Hypochondria					0.109	-0.041	0.727(.732)

* At each step, the cyberchondria, internet addiction, anxiety sensitivity, hypochondria was entered into the model as a dependent variable.

B and β =Unstandardized and Standardized coefficients, respectively; * $p < .001$ (2-tailed); $df = 13$.

Table 4 Significant Predictors of Internet Addiction (N=143)

Dependent and Significant Predictors	B**	β **	T-test	<i>p</i>	R ²	Adjusted R ²	**F-test (P-value)
Internet Addiction					0.523	0.412	4.712(<0.001)
Cyberchondria	1.374	0.506	5.266	<0.001			
Anxiety Sensitivity	0.290	0.270	1.073	0.287			
Hypochondria	0.119	0.073	0.400	0.691			

* Internet addiction is only considered a dependent variable in this regression model, while other total scores and sample characteristics were entered as independent variables

**B and β =Unstandardized and Standardized coefficients, respectively; ** $p < .001$ (2-tailed); $df = 17$

Predictors of Internet Addiction, Cyberchondria, Anxiety Sensitivity, and Hypochondria

The results of the standard regression analyses indicated that not getting infected with coronavirus predicted cyberchondria ($\beta = 0.301$) (see Table 3). The model was significant ($F(13) = 1.902$, $p = .043$; $ES = 0.32$), and it explained 11.5% of the variability of cyberchondria. Although the standard regression analysis results revealed that the model for Internet addiction was not significant ($F(13) = 1.605$, $p = .102$; $ES = 0.27$), it explained 8.0% of the variance in Internet addiction scores. Similarly, the anxiety sensitivity model was not significant ($F(13) = 1.208$, $p = .290$; $ES = 0.20$). This model explained only 2.9% of the variance in the score of anxiety sensitivity. However, age 25–34 years was a significant predictor of anxiety sensitivity. The model for hypochondria was also not significant ($F(13) = 0.707$, $p = .732$; $ES = 0.12$), which explained 4.1% of the variance in the score for hypochondria. None of the other sample's characteristics were significant predictors of Internet addiction or hypochondria.

Predictors of Internet Addiction (Dependent Variables) with Cyberchondria, Anxiety Sensitivity, Hypochondria, and Sample's Characteristics (Independent Variables)

The results of the standard regression analysis revealed that cyberchondria predicted Internet addiction ($\beta = 0.506$) (see Table 4). The model was significant ($F(13) = 4.172$,

$p = .001$; $ES = 1.09$) and accounted for 41.2% of the variance in the Internet addiction score.

Discussion

The study's primary aim was to measure the levels, correlations, and predictors of Internet addiction, cyberchondria, anxiety sensitivity, and hypochondria among university students in Jordan based on their academic and demographic characteristics. Students in this study sample had moderate cyberchondria, which supports the first hypothesis and agrees with previous studies (Jungmann & Witthöft, 2020; McElroy & Shevlin, 2014). Based on internet health information, a speculative escalation of anxiety about specific health issues causes cyberchondria (Bati et al., 2018; Bajcar et al., 2019; McMullan et al., 2019; Selvi et al., 2018), which is common among the student community (Bati et al., 2018). According to the metacognitive model of cyberchondria (Fergus & Spada, 2017), students with cyberchondria are at a high risk of anxiety and distress due to their negative metacognitive beliefs. These beliefs include the Internet's loss of control and the threats of searching for health information online. Online health searches are unpleasant, compulsive, and out of control in this case, because there is a real threat from the search itself, which makes it difficult to stop (Fergus & Russell, 2016).

In contrast to earlier findings (Guo et al., 2020), Jordanian students reported a minor level of Internet addiction compared to those who reported higher levels, which supports the first hypothesis. The possible explanation for this

result is that not all students have continued access to the Internet and, thus, are not entirely dependent on the Internet as their primary source of information. One unanticipated finding was that the current sample reported low levels of anxiety sensitivity, which does not concur with previous literature (Hashemi et al., 2020). The current sample's hypochondria and anxiety sensation levels are relatively low compared to those with hypochondriasis (Alberts et al., 2013). People with low anxiety sensitivity may believe that certain things are harmless and don't take them seriously (Selvi et al., 2018).

In contrast to earlier findings (Starcevic et al., 2020a, b), students reported a typical hypochondria level compared with other samples who reported higher scores. The results are expected in the non-clinical sample, and this difference in results might be attributed to cultural differences. These results call for more attention to providing extra psychological and emotional support to risky students (Guo et al., 2020). Maximized awareness of the risk factors of cyberchondria can engender promising results through health education and recommended behaviors by focusing on safe and reliable search of sound sources and following clinical practice guidelines of reputable institutions. Experimental studies may examine the impact of these strategies on psychological well-being in upcoming studies on different groups of people who face these anxieties and are prone to Internet addiction.

Our results concur with previous studies (Jungmann & Witthöft, 2020; Selvi et al., 2018) regarding the significance of the positive relationship between cyberchondria, Internet addiction, anxiety sensitivity, and getting infected with COVID-19, which supports the second hypothesis. As expected, cyberchondria moderately correlates with Internet addiction; cyberchondria is strongly associated with compulsive Internet use. Cyberchondria is also associated with anxiety sensitivity. People are exposed to the risk of Internet addiction and the doctor-shopping phenomenon when they conduct unreasonable searches for online health-related information (Bajcar et al., 2019; McMullan et al., 2019; Selvi et al., 2018). These results confirm the previous findings in the literature that hypochondria may be the antecedent of cyberchondria (Starcevic & Berle, 2013; Te Poel et al., 2016). Cyberchondria could perpetuate hypochondria (Bati et al., 2018), indicating a reciprocal relationship between these concepts.

Internet addiction was correlated positively, significantly, and moderately with hypochondria, which supports the second hypothesis. Individuals with Internet addiction have an overwhelming preoccupation with somatic symptoms due to incorrect interpretations of physical sensations. Previous Jordanian literature (Al-Gamal et al., 2015; Al-Rawashdeh et al., 2022; Alzayyat et al., 2015) has shown that some

cultural values affect university students' Internet addiction and cyberchondria. For example, gender differences play a significant role in developing Internet addiction and cyberchondria, which is in contrast to our sample (Al-Rawashdeh et al., 2022). Due to some socio-cultural parameters, female students are at risk for maladaptive behaviors related to Internet use and going online as long as they stay at home. The high amounts of inaccurate information on the Internet and the unlimited openness of sharing information among Jordanians have contributed to addiction's growth and the proliferation of maladaptive behaviors among individuals during home quarantine (Al-Gamal et al., 2015; Al-Rawashdeh et al., 2022; Alzayyat et al., 2015). In Jordan, curiosity, competition in education, marketing, and communication via the Internet facilitated online health information flow from one to another during the crisis. Jordanians' health fears increased during COVID-19 because they were more open and willing to share their own stories about health (Al-Rawashdeh et al., 2022).

Although we found a weak relationship between internet addiction and whether people got infected with the coronavirus, people with internet addiction may exaggerate their visits to healthcare providers and the pressure on health services, namely in developing countries like Jordan. Moreover, Internet users may have begun hoping for support and relevant information but are surprised by the incomplete information, which arouses their anxiety and increases their unhealthy use of the Internet (Boysan et al., 2017; Fawaz & Samaha, 2021; Guo et al., 2020).

Consistent with previous findings, anxiety sensitivity was positively, significantly, and highly associated with hypochondria (Boysan et al., 2017; Fawaz & Samaha, 2021; Guo et al., 2020; Jhanwar et al., 2021; Starcevic et al., 2020a, b). This finding suggests that being preoccupied with the irrational belief of over-focusing on somatic functions may be a risk factor for developing hypochondria and misinterpreting symptoms as a critical disease. Additional studies may investigate whether the relationship between anxiety sensitivity and hypochondria is individual or refers to a negative connotation.

In the current sample, age between 25 and 34 years was a significant predictor of anxiety sensitivity, which supports the third hypothesis. Older students are more sensitive to anxiety experiences because they are more aware of the severity of the disease and the consequences of anxiety-related symptoms (McMullan et al., 2019). They also have thoughts about uncertain feelings when encountering health problems. The previous literature has indicated that social distancing, lockdown, and absence of interpersonal communication due to the COVID-19 crisis may exacerbate the anxiety sensitivity of university students, and the student community is likely to be a highly vulnerable population

(Abas et al., 2021; Ahorsu et al., 2020; Li et al., 2020; Manning et al., 2021; Mertens et al., 2020; Wang & Zhao, 2020; Zeng et al., 2019). Universities need to develop wellness programs that focus on social and personal support to keep up with the ramifications of these anxieties by offering avenues to a healthy lifestyle through accessible mental health services. These universities may also offer elective courses that enable students to assess anxiety and Internet addiction problems and design effective interventions to deal with these problems through these course chapters.

In the current study, cyberchondria is a risk factor for Internet addiction, which supports the fourth hypothesis. Contrary to earlier research, Internet addiction, anxiety sensitivity, and hypochondria are risk factors for cyberchondria (Fergus & Spada, 2017; Norr et al., 2015). Finally, the present study's findings suggest that students' specific demographic and academic characteristics can predict a higher cyberchondria level, which supports the third hypothesis. For example, we found that not getting infected with COVID-19 significantly predicts cyberchondria. As students need to repeatedly search for online medical information to protect themselves from this contagious disease, cyberchondria tends to increase. Repetitive and unreasonable searches for online medical information can also develop Internet addiction (Guo et al., 2020; Rohilla et al., 2020; Selvi et al., 2018). When previous studies examined the relationships between Internet addiction, building intimate relationships, and identity development among university students, weak symptoms of identity realization and strong signs of identity spreading for Internet-addicted individuals emerged (Musetti et al., 2020). University students go through research and experimentation regarding their ability to build close relationships. This forms the basis for many studies of the Internet's role in developing identity, building relationships, or failing to regulate emotions (Guo et al., 2020). Understanding Internet addiction and cyberchondria may be improved by interpreting current research findings via a psychosocial developmental lens. According to stage 6 of Erikson's theory (2004), emerging adults involve themselves more intimately with others. However, avoiding closeness might contribute to feelings of loneliness that could harm one's personal development in the future. University students who are more likely to be lonely and stressed out are more likely to use the Internet in unhealthy ways and have cyberchondria behaviors to deal with their failures (Musetti et al., 2020).

Limitations, Recommendations, and Directions for Future Studies

A set of limitations should be acknowledged in this study. The study participants are non-clinical samples. Future work may replicate this study using clinical samples of individuals with anxiety disorders to enhance the possibility of its findings' generalizability. Given that this study used convenience and snowball sampling methods, it is difficult to conclude the sample's representativeness for populations outside Jordan. Although the study results are confined to Jordanian students, these results may be helpful for future studies in other Arab countries. They may help compare results on an international scale and serve as a starting point for experimental and psychosocial studies that target students.

Despite the small sample size, the cyberchondria model was significant and explained 11.5% of the variance in concept score; thus, future studies should investigate a vast scale with more items and other variables. A preponderance of nursing students in the current study might impact the mean levels of the study concepts. Students from medical schools frequently employ the Internet as their major source for addressing health-related concerns. For example, Khasawneh et al. (2020) found that more than 80% of medical students employ the Internet as their primary source of coronavirus information. Participants' self-reports might not be accurate or reliable because they may underestimate or overestimate their responses. Low internal reliability values in the SCSS may suggest a strong motivation for changes in scale items to be suitable for the study sample.

The nature of cross-sectional research precludes establishing causality and does not allow exploring students' trends over time (Sedgwick, 2014). Future research into the causal pathways between these anxieties, inner resources, and mental health is recommended. Future studies may also investigate the predictors of some nonsignificant concepts, especially Internet addiction, anxiety sensitivity, and hypochondria. Using a web-based survey renders it challenging to create random samples as the participants should have Internet access to participate in the study, resulting in potential self-selection biases. Replicating this research on a vast national scale is recommended, and using qualitative methodologies can uncover cultural nuances to the study concepts that quantitative approaches cannot.

Implications for Practice

Through health promotion and disease prevention programs in Jordan, mental health professionals, namely psychiatric nurses, may focus on the student population during online

education to promote their emotional and psychological growth. Caregiver providers in campus environments can deliver support services for mental health, through which students receive safe and quality care (Wang & Zhao, 2020). They should not only focus on biological aspects but also on psychological ones, including activating hotlines for students to promote their resilience and coping skills. Using non-pharmacological techniques such as yoga and mindfulness can help students cope with such anxieties (Zahrat & Riaz, 2017). The study results also provide a starting point for interventions to address and cope with Internet addiction and anxiety relief and enhance adaptive emotion regulation techniques (Malak, 2018). The results suggest the necessity of enhanced students' and stakeholders' awareness of mental illnesses and the importance of early diagnosis and treatment (Guo et al., 2020), which increases successful interventions by focusing on the problem, saving time, and reducing burdens.

Conclusion

This research was the first to find a mutual relationship between Internet addiction, cyberchondria, anxiety sensitivity, and hypochondria among university students. The findings showed that those not infected with the coronavirus were at risk of developing cyberchondria. In the current sample, cyberchondria predicted Internet addiction; thus, it serves as a risk factor. These findings could benefit clinical settings by delineating individuals at risk of anxiety and intervening effectively. The development of mental health care plans for screening, managing, and treating afflicted students will be important in the future to maintain their mental health during possible pandemics.

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Authors' contributions Abu Khait and Mrayyan conceptualized the study. Abu Khait and Mrayyan contributed to the study design, concepts, ethics, data collection, study proposal, and manuscript preparation. Abu Khait, Mrayyan, Al-Rawashdeh, and Rababa facilitated the data collection. Mrayyan and Abu Khait performed the primary statistical analysis. Abu Khait performed the secondary statistical analysis based on the reviewers' comments. Abu Khait drafted the manuscript. Abu Khait and Mrayyan interpreted the findings and reviewed the manuscript. Dr. Abu Khait and Al-Rjoub wrote the introduction. Abu Khait, Mrayyan, and Al-Rawashdeh discussed the study results. Abu Khait, Mrayyan, Al-Rjoub, Al-Rawashdeh, and Rababa contributed to ongoing peer discussions on the study results and their interpretations. The manuscript was critically revised by Abu Khait, Al-Rjoub, and Mrayyan, who commented on it. Abu Khait did the final critical revisions and the final proofreading and editing. Abu Khait supervised the entire work and addressed the reviewers' comments. All authors have approved the final version and agreed to both be personally accountable for the author's contributions and ensure that questions related to the accuracy or integrity of any part of the work are cleared.

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Declarations

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Informed consent Consent was obtained from all students who participated in the study.

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