



Cyberchondria: Online Health Anxiety in the General Population.

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ABSTRACT:

Health information on the internet is widely used. Quickly search Symptoms, Diseases, Medicines and Treatment Options. This may be helpful, but repeated or excessive use of searching for health information may also lead to increased worry, distress and need for reassurance and repeated searching. This sort of behaviour is often referred to as cyberchondria.

The present cross-sectional study aimed to investigate online health information seeking behaviours and experiences with cyberchondria among the adults in general population. The data were collected using Google Forms structured questionnaire from participants aged 18 years and older. In total, 201 questionnaires were completed, and out of those, 198 questionnaires were included in the study after obtaining consent from the participants. The experiences with cyberchondria were measured using 12-item Cyberchondria Severity Scale (CSS-12) comprising four domains; Excessiveness, Distress, Reassurance, and Compulsion. Descriptive statistics and Pearson's correlation analysis were performed to examine the data.

In general, the results of the study indicate that different manifestations of information seeking on the Internet are related to experiences of cyberchondria among adult residents of the general population. However, given the nature of the study's design, it is impossible to claim that the former causes the latter. Further research that includes broader populations and uses different methodologies, including longitudinal studies, would be beneficial for establishing causal relationships and better understanding the dynamics of the relationships between the variables in question.

KEYWORDS: Cyberchondria; Digital Health Anxiety; Excessive Health Searching; Reassurance-Seeking Behaviour; Compulsive Health Searching; Cyberchondria Severity Scale-12;

INTRODUCTION

The online world has changed the way people access their health information. Now you can find information about symptoms, diseases, medicines, treatment options and preventive measures without waiting for a healthcare appointment. As such health websites, search engines, social media and online discussion forums



have become convenient sources of information regarding health. Additionally, there can be benefits from accessing health information if it is accomplished appropriately and from reliable sources. It may assist people to gain knowledge about health conditions, raise awareness of preventive measures and

prepare questions for healthcare professionals. But the sheer volume of information available online can also breed uncertainty. Information from different websites can be conflicting, incomplete, or difficult to understand for someone without a medical background.

For the majority, searching for health information can become repetitive. Someone notices a symptom and looks for possible causes, and keeps looking for more explanations even when they find reassuring information. Reading up on serious or rare diseases can increase a person's anxiety and cause them to go back and check again. (1) Such repetitive searching and worrying is often associated with cyberchondria. Cyberchondria can be characterized as overbearing or continued searching on the internet for health-related information with increasing anxiety, distress or continued need for reassurance. This is contrary to typical health-information seeking where the problem is not necessarily the act of seeking, but the potential for seeking to be excessive, distressing, only temporarily reassuring or difficult to control. McMullan et al. performed a systematic review and meta-analysis and found positive associations between health anxiety, online health-information seeking and cyberchondria. Later systematic review evidence has also reported a significant association between cyberchondria and health anxiety.

A standardized instrument for assessing cyberchondria, the Cyberchondria Severity Scale (CSS), has been developed. (2,3) Later, McElroy et al. developed a shorter version of the original scale called Cyberchondria Severity Scale-12 (CSS-12). The CSS-12 has 12 items and four dimensions including Excessiveness, Distress, Reassurance, and Compulsion. The use of a short-standardized measure allows for assessing cyberchondria in different populations without the need for a long questionnaire. The CSS-12 has been validated in Indian adults also thus providing relevant psychometric evidence to use it in Indian context. However, cyberchondria might vary across populations depending on age, occupation, internet use, health-information seeking habits and past experiences with health concerns. Thus, community-based studies of the general adult population may yield useful information regarding the distribution of cyberchondria beyond narrowly defined student or clinical samples. Therefore, the present study was conducted to estimate the prevalence of cyberchondria in adults from the general population using CSS-12 and to study the distribution of cyberchondria among selected demographic characteristics.

To investigate the experiences of online health information seeking and its relationship with cyberchondria-related anxiety in adults in the general population. To assess cyberchondria related experiences in adults of the general population with the CSS-12. (9, 10) To describe the online health-information seeking patterns of the participants using questions developed by the researchers. To examine the association between increased health-related worry or anxiety following an online health information search and distress associated with searching for symptoms or perceived medical conditions online. To assess internal consistency of the CSS-12 in the present study sample.

MATERIALS AND METHODS

1. **Study Design:** To explore online search for health information experiences and cyberchondria-associated anxiety symptoms among adults in the general public, a descriptive cross-sectional observational study was performed.
2. **Study Population:** The study population was adults aged 18 years and older from the general population. The participants were reached through online networks such as friends, family members,



WhatsApp groups and other available contacts. The study was not restricted to a particular place or field of work, or a group of patients, which enabled people with a variety of different backgrounds to participate.

3. Description of the Procedure Used to Collect the Data: The data were collected in the form of a Google Forms questionnaire. The questionnaire link was shared online with my personal contacts, family, social media networks, WhatsApp groups, and other channels in order to reach a wide range of participants. The participants were able to choose whether to take part in the study or not, and they were informed about the aims and purposes of the research before filling out the questionnaire. We received 201 responses, of which 198 were consent forms allowing us to use the data, and 3 – not. Those participants who did not give consent were not included in the statistical analysis. We did not include responses from participants who did not consent in the statistical analysis. Thus, the final analytical sample included 198 participants.

4. Questionnaire Structure: - The questionnaire consisted of three broad sections:

Section A: Sociodemographic Information

Information was collected regarding: Age, Gender, Educational qualification, Occupation, Area of residence

Section B: Online Health-Information-Seeking Experiences

To characterize participants' experiences seeking health information online, ten researcher-developed questions were included. Questions about behaviours included searching for health topics, searching for symptoms, searching for diseases or medical conditions, repeated searching, searching for possible causes, searching for treatments or medicines, comparing online sources, continuing searches after finding an explanation, and searching for reassurance.

These questions were created specifically for this study to describe online health information seeking behaviour. They were not treated as a validated psychometric scale.

Section C: Cyberchondria Severity Scale–12

Cyberchondria-related experiences were assessed using the Cyberchondria Severity Scale–12 (CSS-12) developed by McElroy et al. The scale contains 12 statements rated on a five-point response scale ranging from 1 to 5.

The CSS-12 assesses four dimensions:

Excessiveness

Distress

Reassurance

Compulsion

Higher scores indicate greater endorsement of cyberchondria-related experiences. ([4](#), [5](#), [6](#))

The possible overall CSS-12 score ranges from 12 to 60. In the present study, the CSS-12 was used as a validated instrument, while the researcher-developed questions were treated separately as descriptive measures.

5. Statistical Analysis: - Data were organized and statistical calculations were done with spreadsheet-based calculations. ([7](#)) Descriptive statistics including frequency, percentage, mean, standard deviation, median, minimum and maximum values were employed to provide an overview of the data.

Pearson's correlation coefficient was used to examine the association between increased health-related worry or anxiety after searching for health information online and distress associated with researching symptoms or perceived medical conditions online.

The correlation coefficient was interpreted as to the direction and strength of the relationship. A p-value of <0.05 was used to indicate statistical significance.

In the final analysis no association testing of categories was performed.



RESULT

Participant Characteristics: - A total of 198 consenting participants was included in the final analysis.

Of the 201 responses received, 198 participants gave consent and were included in the final analysis. The largest age group was 18–30 years, comprising 99 participants (50.0%). This was followed by participants aged 41–50 years (52; 26.3%), 31–40 years (29; 14.6%), 51–60 years (16; 8.1%), and 60 years or above (2; 1.0%). Regarding gender, 99 participants (50.0%) were female, 97 (49.0%) were male, and 2 (1.0%) preferred not to disclose their gender. In terms of occupation, students and employed participants each comprised 79 participants (39.9%). Homemakers comprised 19 (9.6%), unemployed participants 14 (7.1%), and retired participants 7 (3.5%). Regarding residence, 78 participants (39.4%) reported living in urban areas, 65 (32.8%) in rural areas, and 55 (27.8%) in semi-urban areas.

Table 1. Demographic characteristics of participants (n = 198)

CHARACTERISTIC	CATEGORY	n	%
AGE	18-30 years	99	50.0
	31-40 years	29	14.6
	41-50 years	52	26.3
	51-60 years	16	8.1
	60 years and above	2	1.0
GENDER	Female	99	50.0
	Male	97	49.0
	Prefer not to say	2	1.0
OCCUPATION	Student	79	39.9
	Employed	79	39.9
	Homemaker	19	9.6
	Unemployed	14	7.1
	Retired	7	3.5
RESIDENCE	Urban	78	39.4
	Rural	65	32.8
	Semi-Urban	55	27.8

Overall CSS – 12 SCORES: -

The overall CSS-12 score among the 198 participants included in the final analysis was 28.13 ± 9.94 , with a median score of 26, an interquartile range (IQR) of 20–35, and a total score range of 12–60. The CSS-12 consists of 12 items assessing four dimensions of cyberchondria: Excessiveness, Distress, Reassurance, and Compulsion. Higher scores indicate greater endorsement of cyberchondria-related experiences.

Table 2. Descriptive Statistics of the Overall CSS-12 score and Its Four Dimensions

MEASURES	MEAN $\pm$ SD
CSS-12 Total	28.13 ± 9.94
Excessiveness	7.83 ± 3.20
Distress	6.97 ± 2.76
Reassurance	6.63 ± 2.76
Compulsion	6.69 ± 2.80

The mean scores of the four CSS-12 dimensions were examined to understand the distribution of cyberchondria-related experiences among the participants. Excessiveness had the highest mean score (7.83 ± 3.20), followed by Distress (6.97 ± 2.76), Compulsion (6.69 ± 2.80), and Reassurance (6.63 ± 2.76). These findings indicate that Excessiveness was the most prominent dimension among the four CSS-12 dimensions, whereas Reassurance had the lowest mean score.

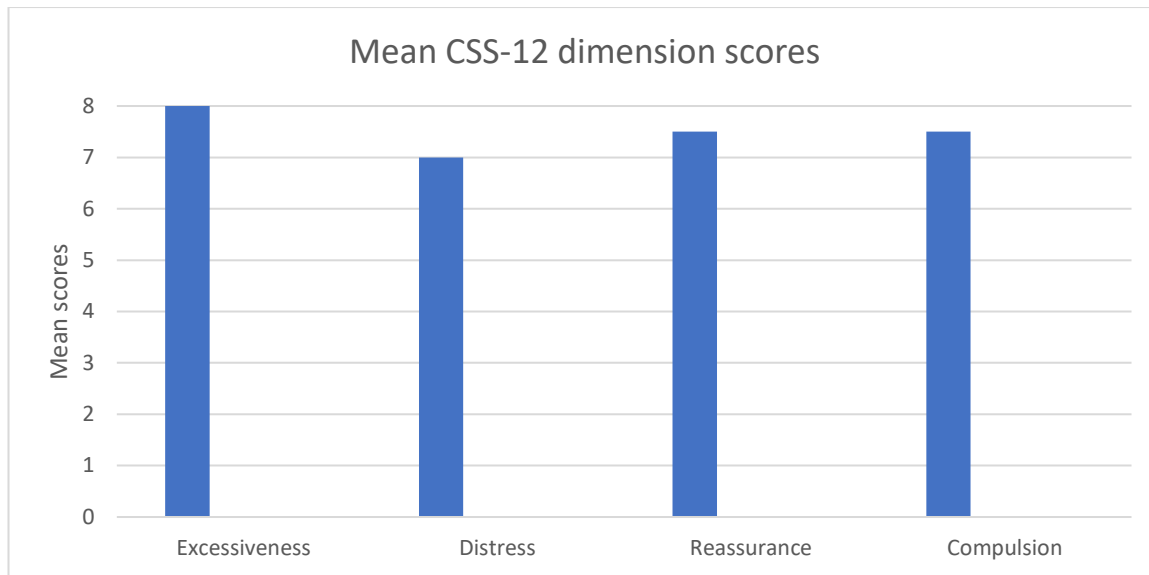


Figure 1. Mean Scores of the Four CSS-12 Dimensions

Figure 1. presents a visual comparison of the mean scores of the four CSS-12 dimensions among the 198 participants included in the final analysis.

Pearson's Correlation Analysis: -

Pearson's correlation coefficient (r) was used for this study to determine the linear relationship between selected online health-seeking behaviours and specific aspects of cyberchondria. The coefficient ranges between -1 and $+1$; thus, a positive value indicates that an increase in one variable is associated with an increase in the other variable. On the other hand, a negative value suggests that there is an inverse relationship between the two variables. Notably, the closer the value is to zero, the weaker the linear relationship. The p - value was used to determine the statistical significance of the results, with $p < 0.05$ being considered statistically significant. For this study, Pearson correlation was done using 198 participants who consented to participate in the study.

Table 3. Pearson's correlation analysis of selected online health-information-seeking behaviours and cyberchondria-related experiences

Relationship	r	r^2	p-value	Interpretation
Symptom-related searching ↔ health-related emotional distress	0.2758	0.0761	<0.001	Small positive
Repeated symptom searching ↔ compulsive online health searching	0.1635	0.0267	0.0204	Small positive
Comparing health information across websites ↔ repetitive online health searching	0.3738	0.1397	<0.001	Moderate positive



Online reassurance seeking ↔ reassurance-related behaviour	0.3054	0.0933	<0.001	Moderate positive
Increased worry after online searching ↔ health-related distress	0.3505	0.1228	<0.001	Moderate positive

1. Association Between Symptom-Related Online Searching and Health-Related Emotional Distress

Pearson's correlation coefficient was used to examine the association between symptom-related online searching and health-related emotional distress among the participants. The results showed a small positive correlation between the two variables ($r = 0.2758$), indicating that higher levels of symptom-related online searching were associated with higher levels of health-related emotional distress. The coefficient of determination ($r^2 = 0.0761$) indicates that approximately 7.61% of the variation in one variable was associated with the other variable. The correlation was statistically significant ($p < 0.001$). The analysis was conducted using data from 198 participants. Overall, the findings indicate a small positive association between symptom-related online searching and health-related emotional distress.

The r^2 value (0.0761) indicates that approximately 7.61% of the variability in one variable was associated with the other variable, while the remaining 92.39% may be explained by other factors. The p-value ($p < 0.001$) indicates that the correlation was statistically significant at the 0.05 level. Therefore, the observed positive association was statistically significant.

A total of 198 participants were included in the analysis. Overall, the findings indicate a weak positive association between symptom-related online searching and health-related emotional distress.

Table 4. Pearson Correlation Analysis of Symptom-Related Online Searching and Health-Related Emotional Distress

Parameter	Value
Pearson correlation coefficient (r)	0.2758
Correlation strength	Small
r^2	0.07606
P-value	0.0000741
Sample size (n)	198

2. Association Between Repeated Symptom Searching and Compulsive Online Health Searching

Pearson's correlation coefficient was calculated to determine the association between the two variables. The results showed a positive correlation ($r = 0.1635$), indicating that the two variables were positively related. This suggests that higher levels of repeated symptom searching were associated with higher levels of compulsive online health searching. However, the strength of the relationship was weak.

The r^2 value (0.0267) indicates that approximately 2.67% of the variability in one variable was associated with the other variable, while the remaining 97.33% may be explained by other factors. The p-value ($p = 0.0204$)



indicates that the correlation was statistically significant at the 0.05 level. Therefore, the observed positive association was statistically significant.

A total of 198 participants were included in the analysis. Overall, the findings indicate a weak positive association between repeated symptom searching and compulsive online health searching.

Table 5. Pearson Correlation Analysis of Repeated Symptom Searching and Compulsive Online Health Searching

Parameter	Value
Pearson correlation coefficient (r)	0.1635
Correlation strength	Small
r^2	0.02672
P-value	0.02042
Sample size (n)	198

3.Association Between Comparing Health Information Across Websites and Repetitive Online Health Searching

Pearson's correlation coefficient was calculated to determine the association between the two variables. The results showed a positive correlation ($r = 0.3738$), indicating that the two variables were positively related. This suggests that higher levels of comparing health information across different websites were associated with higher levels of repetitive online health searching. The strength of the relationship was moderate.

The r^2 value (0.1397) indicates that approximately 13.97% of the variability in one variable was associated with the other variable, while the remaining 86.03% may be explained by other factors. The p-value ($p < 0.001$) indicates that the correlation was statistically significant at the 0.05 level. Therefore, the observed positive association was statistically significant.

A total of 198 participants were included in the analysis. Overall, the findings indicate a moderate positive association between comparing health information across websites and repetitive online health searching.

Table 6. Pearson Correlation Analysis of Comparing Health Information Across Websites and Repetitive Online Health Searching

Parameter	Value
Pearson correlation coefficient (r)	0.3738
Correlation strength	Medium
r^2	0.1397
P-value	4.61e-8
Sample size (n)	198

4.Association Between Online Reassurance Seeking and Reassurance-Related Behaviour

Pearson's correlation coefficient (r) was calculated to determine the association between the two variables. The results showed a positive correlation ($r = 0.3054$), indicating that the two variables were positively related.



This suggests that higher levels of online reassurance seeking were associated with higher levels of reassurance-related behaviour. The strength of the relationship was moderate.

The r^2 value (0.0933) indicates that approximately 9.33% of the variability in one variable was associated with the other variable, while the remaining 90.67% may be explained by other factors. The p-value ($p < 0.001$) indicates that the correlation was statistically significant at the 0.05 level. Therefore, the observed positive association was statistically significant.

A total of 198 participants were included in the analysis. Overall, the findings indicate a moderate positive association between online reassurance seeking and reassurance-related behaviour.

Table 7. Pearson Correlation Analysis of Online Reassurance Seeking and Reassurance-Related Behaviour

Parameter	Value
Pearson correlation coefficient (r)	0.3054
Correlation strength	Medium
r^2	0.0933
P-value	0.00001037
Sample size (n)	198

5.Association Between Increased Worry After Online Searching and Health-Related Distress

Pearson's correlation coefficient was calculated to determine the association between the two variables. The results showed a positive correlation ($r = 0.3505$), indicating that the two variables were positively related. This suggests that higher levels of increased worry after online searching were associated with higher levels of health-related distress. The strength of the relationship was moderate.

The r^2 value (0.1228) indicates that approximately 12.28% of the variability in one variable was associated with the other variable, while the remaining 87.72% may be explained by other factors. The p-value ($p < 0.001$) indicates that the correlation was statistically significant at the 0.05 level. Therefore, the observed positive association was statistically significant.

A total of 198 participants were included in the analysis. Overall, the findings indicate a moderate positive association between increased worry after online searching and health-related distress.

Table 8. Pearson Correlation Analysis of Increased Worry After Online Searching and Health-Related Distress

Parameter	Value
Pearson correlation coefficient (r)	0.3505
Correlation strength	Medium
r^2	0.1228
P-value	3.38e-7
Sample size (n)	198

The strongest observed correlation was between comparing health information across different websites The weakest observed relationship was between repeated searching for the same health concern and repetitive or

compulsive searching ($r = 0.1635$, $p = 0.0204$). Although the magnitude was small, the association reached statistical significance.

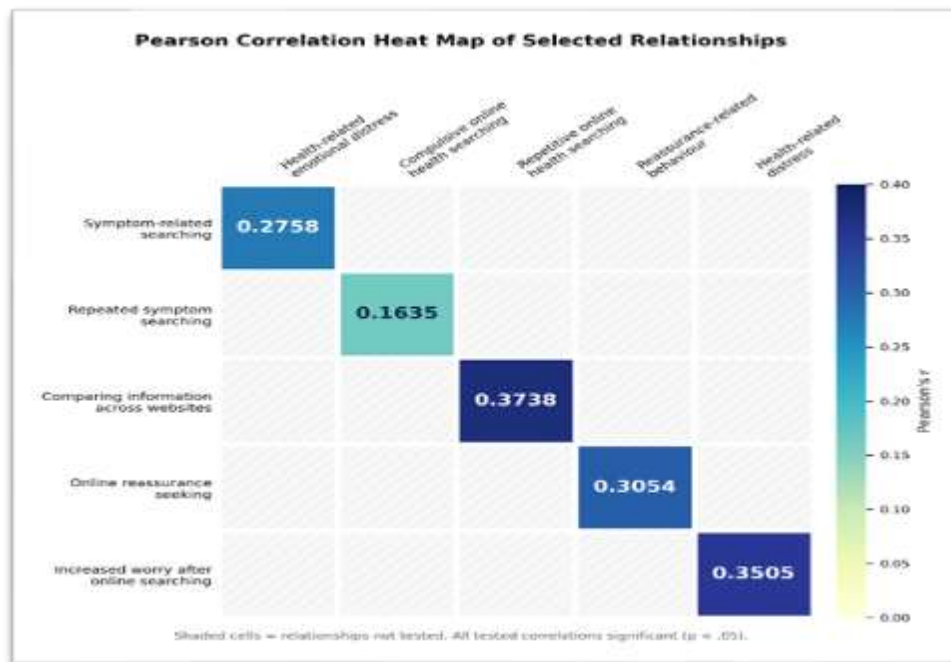


Figure 2. Pearson correlation coefficients for selected relationships

Figure 2. shows the Pearson correlation coefficients (r) between the five selected online health-information-seeking behaviours and cyberchondria-related experiences. The relationships were positive, with the strongest association observed between comparing health information across websites and repetitive online health searching ($r = 0.3738$).

DISCUSSION

The present study examined online health-information-seeking behaviours and their relationship with cyberchondria-related experiences among adults in the general population. The main finding was that all five examined relationships were positive and statistically significant, with correlation coefficients ranging from 0.1635 to 0.3738. The strongest association was observed between comparing health information across different websites and repetitive online health searching, while the weakest association was observed between repeated symptom searching and compulsive online health searching.^(8,9,10) Taken together, these findings suggest that cyberchondria-related experiences may involve a pattern of interconnected searching, checking, reassurance seeking, uncertainty and emotional responses rather than a single online behaviour.

The association between symptom-related online searching and health-related emotional distress suggests that searching for explanations of symptoms may be accompanied by greater worry or distress. One possible explanation is that online searches can present a wide range of possible conditions, including serious conditions that may share common symptoms. For individuals who are uncertain about the meaning of a symptom, this broad range of information may increase uncertainty rather than resolve it. This interpretation is consistent with previous research linking health anxiety, online health-information seeking and cyberchondria. ^(11, 12, 13) However, the present cross-sectional design does not establish whether distress leads to more searching, whether searching contributes to distress, or whether the two processes influence each other.

The positive relationship between repeated symptom searching and compulsive online health searching was statistically significant but comparatively small. This suggests that repeatedly searching for the same health



concern may be one component of compulsive online health-searching behaviour, but it does not fully account for that behaviour. Previous work has described problematic online health research as involving different processes, including repeated checking and difficulty stopping searches. (13, 14, 15) Repeated searching may also reflect a person's attempt to reduce uncertainty or obtain additional reassurance rather than necessarily indicating a clinical problem. Therefore, repeated searching should be interpreted within the wider context of the individual's online health-information behaviour.

The strongest association in the study was found between comparing health information across different websites and repetitive online health searching. A possible explanation is that people who are uncertain about a symptom may consult several sources to confirm whether the information is consistent. (17, 18) When different websites provide different explanations, however, comparison may fail to provide a clear answer and may encourage further checking. This interpretation is compatible with earlier work describing cyberchondria as involving escalation of health concerns during web searches and with research highlighting intolerance of uncertainty as a factor relevant to cyberchondria-related experiences. (15, 16) The finding therefore points to uncertainty and repeated checking as potentially important areas for further investigation.

The positive association between online reassurance seeking and reassurance-related behaviour indicates that reassurance is another relevant component of cyberchondria-related online searching. People may search with the intention of confirming that a symptom is harmless or that a feared condition is unlikely. Although obtaining reassuring information may temporarily reduce concern, repeated reassurance seeking can also lead to additional searches when uncertainty returns. Previous research has similarly discussed the role of reassurance and the relationship between health anxiety and repeated online information seeking. (17,18) The present findings support the relevance of reassurance seeking while also indicating that this relationship should be understood as an association rather than evidence that reassurance seeking causes cyberchondria.

The relationship between increased worry after online health searching and health-related distress was also positive and statistically significant. This finding is important because the emotional response to information may be as relevant as the act of searching itself. Online health information can be extensive and may include descriptions of severe or uncommon conditions. (15, 16) When information is difficult to interpret, users may focus on possibilities that appear similar to their symptoms, potentially increasing concern. Earlier research has also reported relationships between health anxiety and online health-information seeking, supporting the interpretation that searching and worry may form a reciprocal pattern. (19) Nevertheless, the present study cannot determine the direction of this relationship.

The pattern observed in this study is broadly consistent with previous literature describing relationships among health anxiety, online health-information seeking and cyberchondria. Systematic reviews and meta-analyses have reported positive relationships between these constructs, while validation studies of the Cyberchondria Severity Scale and CSS-12 have supported the use of standardized measures for assessing cyberchondria-related experiences. (5) The present study extends this perspective by examining several specific online searching behaviours in a general adult sample rather than treating online health searching as a single behaviour. The correlations in the present study were small to moderate, which is consistent with the multifactorial nature of cyberchondria described in previous literature. Differences in participant characteristics, measurement approaches and study designs may contribute to differences in the magnitude of associations across studies.

A strength of the study is the use of the CSS-12, a standardized measure designed to assess cyberchondria-related experiences, together with researcher-developed questions describing specific online health-information-seeking behaviours. This allowed the study to examine both overall cyberchondria-related experiences and selected searching patterns. (18, 19, 20) At the same time, the findings should be interpreted in light of the study limitations. The cross-sectional design prevents causal interpretation, the online



convenience sample may limit generalizability, and the researcher-developed behavioural questions were not a validated psychometric scale. Self-reported responses may also be affected by recall or response bias. These limitations mean that the observed correlations should be considered preliminary associations rather than evidence of causal pathways.

The study indicates that cyberchondria-related experiences are associated with several interconnected patterns of online health-information seeking, including symptom searching, repeated checking, comparison of information, reassurance seeking and increased worry.[\(21,22\)](#) The findings do not suggest that searching for health information online is inherently harmful; rather, they highlight the importance of how frequently information is sought, how uncertainty is managed, and how individuals respond emotionally to what they find. Further research using larger and more representative samples, validated measures of related psychological constructs and longitudinal designs would help clarify how these behaviours and emotional responses interact over time.

LIMITATIONS

The present study has some limitations that should be considered while interpreting the findings.

Since the study followed a cross-sectional design, it is not possible to establish a cause-and-effect relationship.[\(16,19, 20\)](#) The findings cannot determine whether frequent online health searching contributes to increased anxiety, whether existing anxiety encourages people to search more often, or whether both factors influence each other.

Participants were recruited through an online convenience-based approach. As a result, the study sample may not fully represent the wider adult population.

The study did not involve a separate clinical assessment of health anxiety or other psychiatric conditions. Therefore, the cyberchondria-related experiences reported by participants should not be considered clinical diagnoses.

CONCLUSION

The present study explored selected online health-information-seeking behaviours and their relationship with cyberchondria-related experiences among adults in the general population.

The findings showed positive correlations across all five relationships examined. Searching online for symptoms was associated with higher levels of anxiety or distress related to health searching. Repeated online searching was related to more repetitive or compulsive searching behaviour. Among the relationships examined, comparing health information across different websites showed the strongest association with repeated checking behaviour. [\(22\)](#) Searching for reassurance was associated with reassurance-related experiences, while increased worry following online health searches was related to anxiety-related cyberchondria experiences.

Overall, these findings suggest that cyberchondria is not limited to a single behaviour or emotional response.[\(18,19\)](#) Instead, it appears to involve several interconnected experiences, including repeated health searching, uncertainty, reassurance seeking, checking behaviour, and emotional reactions to health information found online.

However, the findings represent associations and do not establish a cause-and-effect relationship. Further studies involving larger and more representative samples, validated measures of health anxiety, and longitudinal research designs may provide a clearer understanding of how online health-information seeking and cyberchondria-related experiences influence each other over time.



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