RESEARCH ARTICLE

Prevalence of cyberchondria among university students: an emerging challenge of the 21st century

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Abstract

Objective: To investigate the prevalence of cyberchondria among university students, and to explore their self-diagnosis behaviour.

Method: The cross-sectional study was conducted in different cities of Pakistan from September 2021 to July 2022. Participants were approached through purposive sampling at different institutions of higher education and were asked about access to internet. Data was collected using a demographic proforma and through the self-reporting Cyberchondria Severity Scale-Short Version. Data was analysed using SPSS 26.

Results: Of the 500 subjects, 248(49.6%) were male and 252(50.4%) were female. The overall mean age of the sample was 24.14±3.68 years (range: 18-45 years). Of the total, 286(57.2%) subjects were diagnosed with some medical condition, 214(42.8%) self-diagnosed themselves, 302(60.4%) rated their health status as fair, 123(24.6%) rated their health status as good, and 320(64%) said they did not check the accuracy of health-related information. The prevalence of cyberchondria was moderate 252(50.4%) to high 119(23.80%) which indicates the severe severity level of cyberchondria among students. The prevalence of cyberchondria was moderate in women 151(60%) compared to men 101(40.7%). Mean scores of women on cyberchondria severity scale were higher than men ($p<0.01$). Cyberchondria was more prevalent among individuals with diagnosed medical condition ($p<0.01$) and those who self-diagnose their symptoms via the internet ($p<0.001$).

Conclusions: Cyberchondria must be seen as a serious public health concern in Pakistan. Since it is associated with distress and worry, measures need to be adopted to evaluate, prevent, and treat it at the population level.

Key Words: Cyberchondria, Health anxiety, Online health information searches, Self-diagnosis, Diagnosed medical condition. (JPMA 1634: 37; 2023) **DOI: 10.47391/JPMA.7771**

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Introduction

Digital advancement has made it more common for people to seek health-related information via the internet. Regularly looking for medical information online is a typical behaviour in daily life, but some dispositional attributes may encourage the development of numerous dysfunctional and disrupted online information-seeking behaviours. Cyberchondria is also considered one of the unusual behaviour patterns.[1] Cyberchondria is placing a heavy load on the healthcare system, and it is especially dangerous for those in the underdeveloped world. In countries like Pakistan, where the population lacks access to basic healthcare due to poor socioeconomic situations, mental health is already a neglected area of healthcare. Since mental health problems are frequently stigmatised, they are seldom diagnosed. The advent of technology, such as the internet and the availability of it 24/7 are, on the other hand, leading to a wide range of problems in Pakistani culture, such as internet addiction, mental health problems, gaming addictions and internet obsessions among adults. One of the main reasons for these problematic actions is a lack of understanding about how to properly utilise the internet. Similarly, cyberchondria is considered an emerging challenge associated with an excessive use of internet for health-related information.[2]

Cyberchondria is defined as a multi-faceted concept that involves an escalation in worry about one's own general health, as a consequence of the extreme evaluation of information on the worldwide web, and contains mainly two cognitive-emotional aspects: excessiveness and elevated anxiety.[2]

In Pakistan, there has been a significant rise in the practice of online research before and after medical consultation.[3] In the age of technology, mainstream media initially coined the term to highlight the negative effects of technological progress.[4,5] Cyberchondria is not explicitly cited in the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5), but it is indirectly referred in the explanation of Illness Anxiety Disorder in which it is

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explained that clients "compulsively research their presumed disease (e.g., on the internet)".[6] Cyberchondria is not directly addressed in the International Classification of Diseases-11th Edition (ICD-11), but "information seeking" is recognised as one of the fundamental diagnostic attributes of hypochondriasis that relates to the preoccupation or worry of having an illness.[5,6] Cognitive-behavioural paradigm of cyberchondria states that the majority of individuals with this condition suffer from health anxiety. Because of their need for reassurance, individuals seek the internet excessively for information about health. Online health information exacerbates their anxiety about their health rather than reducing it and bringing them reassurance.[7] In a further model of cyberchondria, illness-related attention bias is present. People who are worried about their health condition have a tendency to pay attention primarily to online content that strengthens and validates their anxieties of being sick.[7] According to a third cyberchondria theory, those who experience health anxiety have a low tolerance for uncertainty.[8] Excessive online research for medical information yields ambiguous results that fail to offer a "perfect explanation" for individual's problems. Hence, the health anxiety is made worse by their intolerance for uncertainty.[8, 9]

Cyberchondria has five dimensions; "excessiveness" as a first dimension refers to a pattern of searches brought on by worry and anxiety over compulsively looking up medical information.[9] The second dimension is "distress" which describes the degree of severe worry and anxiety brought on by seeking health information online. The third dimension "compulsion" refers to the degree of anxiety/worry brought on by searching for health information online which in turn reduces time and inhibits individuals from participating in both offline and online channels.[10,11,5] The fourth dimension "reassurance" is defined as the level of worry and anxiousness that prompts a person to visit a doctor to confirm the accuracy of details acquired from the internet. "Mistrust of medical professionals" is the final dimension which shows how looking for healthcare information online can make people sceptical of expert health advice.[2,12] Subscales are utilised to determine the relevant behaviour in response to cyberchondria. The mistrust subscale was not further explored[9] because prior research has proved it to be meaningless.[13]

People in Pakistan frequently turn to the internet when they suspect they have a medical problem. About 50% of the healthy participants had mild cyberchondria, while a quarter showed severe symptoms. Cyberchondria was more prevalent among males than women among healthy individuals,[3] with disturbingly high number of individuals engaging in the practice of self-medication.[14] Due to the content or information received from internet sites, people have a tendency to experience certain problems, including health-related anxiety, distress and depression.[15] A recent study found that more than half of walk-in patients in hospitals had significant levels of depressive symptoms and had also looked up information about their medical conditions via the internet.[4] Another research of information technology (IT) industry personnel was conducted in Chennai, India, which revealed that the majority of the respondents had some degree of cyberchondria.[16]

Similarly, people in Pakistan frequently turn to the internet when they suspect they have a medical problem. In recent years, more and more young individuals have expressed their health concerns via the internet.[3] The current study was planned to explore the prevalence of cyberchondria among university students, and to explore their self-diagnosis behaviour.

Subjects and Methods

The cross-sectional study was conducted in different cities of Pakistan from September 2021 to July 2022 after approval from the ethics review committee of the National Institute of Psychology, Quiad-i-Azam University, Islamabad, Pakistan, and permission from the chairpersons of the relevant departments from the participating educational institutions.

The sample size was calculated using OpenEpi version 3[17], and taking the population size as unknown, the prevalence of the outcome factor as 50%, confidence level 95%, and the margin of error 5%.

Potential participants were approached through purposive sampling, and those included students at different universities of Islamabad, Rawalpindi and Lahore cities having individual access to internet and using the internet to look up health-related concerns, and at least 30 min of internet usage per day. Those with psychiatric/psychological disorder were excluded. Also, survey forms with incomplete or erroneous responses were excluded.

Data was collected online after taking informed consent from each participant.

Short version of Cyberchondria Severity Scale (CSS-12) that has 12 items was used. The scale has four subscales: excessiveness (items 1,3,6); compulsion (items 2,7,10); distress (items 4,8,9); and reassurance (items 5,11,12). The responses are marked on a 5-point scale, with 1 = 'never' and 5 = 'always'. Possible total score range is 12-60.

Cyberchondria is more severe when the score is higher, and vice versa. The Cronbach alpha value for the scale was found to be 0.90. The reliability coefficient of the subscale ranges 0.73-0.87.10 The scale was used after formal permission from the author to measure relevant construct. The scale was in the English language and required 10-15 minutes to complete it.

Information regarding gender, programme enrolled for, diagnosed medical condition, self-diagnosis behaviour, and self-rated health status were noted using a demographic sheet. Level of cyberchondria severity among university students was obtained by determining percentiles and raw CSS-12 scores. Scores at or below the 25th percentile indicated a low degree of cyberchondria, while scores above the 25th and below the 75th percentile indicated a moderate level, and scores above the 75th percentile indicated a high level of cyberchondria.[3]

Data was analysed using SPSS 26. The nature of the data was parametric. Considering the group differences, a t-test was performed to see whether there were statistically significant variations among mean values of two groups. $P<0.05$ was considered statistically significant.

Results

Of the 565 survey forms distributed, 519(91.85%) were returned, and another 19(3.36%) forms were discarded for being incomplete. As such, the final sample stood at 500(88.5%) subjects; 248(49.6%) males and 252(50.4%) females. The over all mean age was 24.14±3.68 years (range: 18-45 years) Most of the participants were undergraduates 280(56%), those with a diagnosed medical condition were 286(57.2%), and those with self-diagnosed medical condition were 214 (42.8%). Besides, 302(60.4%) subjects rated their health status as fair, 320(64%) did not check the accuracy of health-related information found online (Table 1). Responding to CSS-12, 176(35.2%) participants admitted that if they noticed an unusual body sensation, they would often look it up on the internet, 194(38.8%) claimed they read different online articles or web pages regarding the same condition they perceived they had, 183(36.6%) would sometimes think that they are fine till they read a health condition via the internet, 178(35.6%) reported feeling more worried,

Table-1: Demographic data (N = 500)

Demographic Variables	n	%
Gender		
Male	248	49.6
Female	252	50.4
Programme Enrolled for		
Bachelors/Masters	280	56
MPhil	147	29.4
Ph.D.	73	14.6
Diagnosed medical condition		
Yes	286	57.2
No	214	42.8
Self-diagnosis		
Yes	235	47
No	265	53
Self-rated health status		
Excellent	75	15
Good	123	24.6
Fair	302	60.4
Checking the accuracy of online heath related information		
Yes	180	36
No	320	64

Table-2: Responses on the Cyberchondria Severity Scale (N = 500).

	Never (%)	Rarely (%)	Sometimes (%)	Often(%)	Always (%)
1. If I notice an unexplained bodily sensation I will search for it on the internet.	(2.2)	(7.6)	(34.2)	(35.2)	(20.8)
2. Researching symptoms or perceived medical conditions online distracts me from reading news/sports/entertainment articles online.	(12.6)	(27.2)	(40.8)	(17)	(2.4)
3. I read different web pages about the same perceived condition.	(3.0)	(8.2)	(38.6)	(38.8)	(11.4)
4. I start to panic when I read online that a symptom I have is found in a rare/serious condition.	(10.2)	(11.8)	(34.2)	(30.6)	(13.2)
5. Researching symptoms or perceived medical conditions online leads me to consult with my GP.	(10.2)	(22.4)	(39.6)	(22.6)	(5.2)
6. I enter the same symptoms into a web search on more than one occasion.	(8.2)	(11.8)	(44.4)	(30.6)	(5.0)
7. Researching symptoms or perceived medical conditions online . interrupts my work	(16.4)	(24)	(34.4)	(22)	(3.2)
8. I think I am fine until I read about a serious condition online.	(14.2)	(6.2)	(36.6)	(32.2)	(10.8)
9. I feel more anxious or distressed after researching symptoms or . perceived medical conditions online	(12)	(10.2)	(35.6)	(31.4)	(10.8)
10. Researching symptoms or perceived medical conditions onlin e interrupts my offline social activities.	(20.6)	(23.6)	(31.4)	(22.8)	(1.6)
11. I suggest to my GP/medical professional that I may need a diagnostic procedure that I read about online.	(24.2)	(30.4)	(40.2)	(3.6)	(1.6)
12. Researching symptoms or perceived medical conditions online leads me to consult with other medical specialists (e.g. consultants).	(16)	(33.8)	(37.6)	(11.4)	(1.2)

Table-3: Cyberchondria severity level among university students (N=500)

Categories	Level of Cyberchondria	n (%)	Gender	
			Men n (%)	Women n (%)
At or below the 25th percentile	Low	129 (25.8)	82 (33.1)	47 (18.6)
Above 25th and below 75th	Moderate	252 (50.4)	101 (40.7)	151 (60)
At or above the 75th percentile	High	119 (23.80)	65 (26.2)	54 (21.4)

all scores related to students with diagnosed and self-diagnosed medical conditions were significant (Table 4).

The scoring distribution for each of the four subscales showed that that the mean score was lowest for compulsion and reassurance, and highest for excessiveness and distress (Figures 1-4).

Table-4: Comparison of gender, diagnosed medical condition and self-diagnosis on cyberchondria severity (N = 500)

Variables	Gender		*t*	Diagnosed Medical Condition		*t*	Self-diagnosis		*t*
	Men (n= 248) Mean±SD	Women (n= 252) Mean±SD		Yes (n= 285) Mean±SD	No (n= 214) Mean±SD		Yes (n= 235) Mean±SD	No (n= 265) Mean±SD	
CS(t)	34.35±9.41	36.73±7.74	-3.08**	37.28±8.10	33.25±8.94	-5.18***	38.49±6.88	32.96±9.29	-7.61***
Subscales									
1. EXC	10.10±2.46	10.38±2.09	-1.41	10.50±2.23	9.90±2.32	-2.88**	10.96±1.97	9.62±2.36	-6.92***
2. COMP	7.60±2.67	8.43±2.54	-3.58***	8.60±2.23	7.25±2.68	-5.76***	8.84±2.29	7.30±2.72	-6.87***
3. DIST	9.19±3.28	10.05±2.77	-3.14**	10.21±2.75	8.84±3.28	-4.91***	10.55±2.45	8.81±3.31	-6.74***
4. REAS	7.45±2.46	7.86±2.18	-1.95	7.97±2.30	7.25±2.30	-3.44***	8.14±2.08	7.24±2.46	-4.41***

SD: Standard deviation, CS(t): Cyberchondria severity total, EXC: Excessivness, COMP: Compulsion, DIST: Distress, REAS: Reassurance, p<0.05*; p<0.01**; p<0.001***

distressed or disturbed after looking up symptoms or illnesses online, 172(34.4%) participants revealed that researching symptoms or alleged medical ailments on the internet caused disruption in daily routine, and 204(40.2%) suggested to their family physicians/medical professionals that they may require a screening test which they had read about online (Table 2).

Overall, 129(25.8%) subjects had low level of cyberchondria, 252(50.4%) moderate and 119(23.80%) severe. Women 151(60%) exhibited moderate cyberchondria severity compared to men 101(40.7%) (Table 3).

Mean differences across gender were significant in terms of the total CSS-12 score and the subscales of compulsion and distress (p<0.05). Similarly, mean differences across

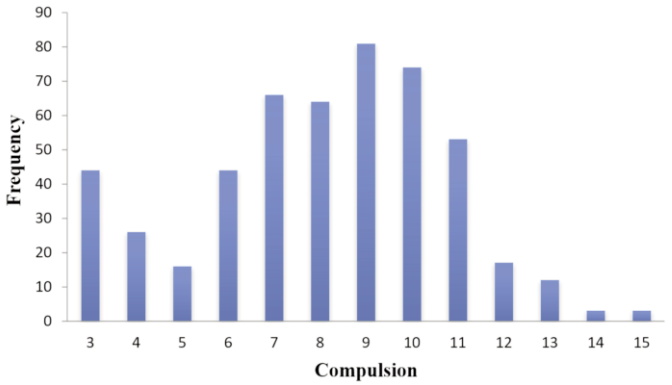

Figure-2: Score distribution for compulsion subscale (mean 8.02; standard division 2.63; N = 500).

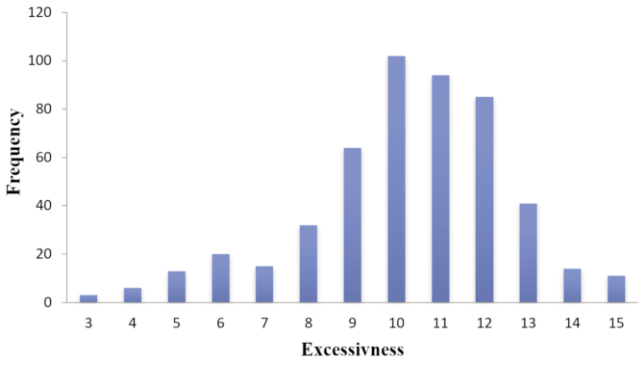

Figure-1: Score distribution for excessiveness subscale (mean 10.25; standard division 2.28; N = 500).

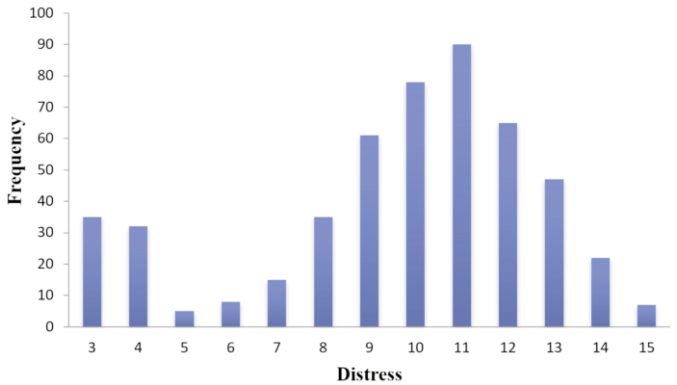

Figure-3: Score distribution for distress sub-scale (mean 9.63; standard division 3.06; N = 500).

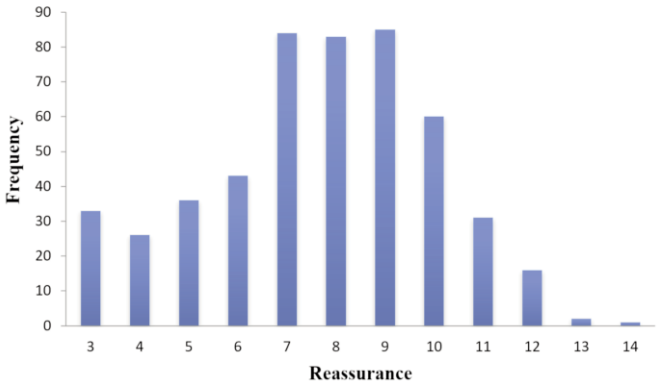

Figure-4: Score distribution for reassurance sub-scale (mean 7.66; standard division 2.33; N = 500).

Discussion

The present study showed that more than half of the subjects had moderate level of cyberchondria which is in accordance with other studies.[3,16] Additionally, the prevalence of cyberchondria was moderate in women compared to men. A study also reported that the internet searches for any inexplicable bodily sensation were substantially more common among women than men[18]. Furthermore, the pattern of cyberchondria explored among university students was prevailing by excessiveness, since the mean scores for excessiveness and distress were the highest, and the least for compulsion and reassurance. This shows an individuals' pattern of repetitive searches related to their health concerns which can cause worry and distress by looking up medical information. A similar finding was reported in the Indian context.[16] Research has shown that looking for health information might actually make people feel more anxious and distressed about their health.[12,19,20] Participants apparently found it difficult to restrain their thoughts about symptoms or perceived medical issues that they had read about online. Similarly, reassurance seeking was also prevalent among individuals. Although acquiring reassurance is a normal and reasonable response to health concerns, its anxiety-reducing impacts are relatively brief and can adversely reinforce health concern in health-anxious people. This is supported by research, which indicated that people who are concerned about their health seek reassurance by looking up internet health information that is relevant to their personal symptoms.[21]

Women scored high on cyberchondria than men in the current study, which was consistent with a previous study.[13] Participants with diagnosed medical condition reported a slightly higher score on cyberchondria severity scale than participants without any formal diagnosis. This could be due to their medical concerns which led them to search for medical information via the internet. A prior research presented similar findings.[22] Another study showed that people with prior diagnoses had somewhat higher cyberchondria severity scores than those who had no prior diagnoses.[23]

Similarly, more than half of the participants reported that they searched health-related information to self-diagnose their medical concerns. The findings were consistent with earlier research.[24] Self-diagnosis can lead to premature assumptions about one's health status and unnecessarily high levels of anxiety and distress.[25] Also, majority of the participants did not check the accuracy of online health-related information. A previous study showed that despite the abundance of online resources, accessing reliable and accurate health information might be difficult.[26] The findings are consistent with earlier research that showed commercial websites, discussion boards, internet forums and newsgroups regularly disseminate inaccurate or poor health information. The quality and safety of health-related information are often compromised.[27]

In the current study, majority of the participants reported their self-rated health status as fair. The reason for this finding could be the individual's diagnosed medical condition and their concerns related to their health. Those individuals who were already diagnosed with medical condition or had self-diagnosed their medical signs could think that their health was not good and they sought health information via the internet.

To the best of the researcher's knowledge, the current study might be the first to demonstrate the prevalence of cyberchondria among university students in Pakistan. However, future researchers should take into account the study's limitations. To further investigate the phenomena, a random sample approach is advised because purposeful sampling might introduce bias when generalising data. In addition, only university students were included in the sample, excluding a large number of other possible participants. It is advised that future studies should take into account adults regardless of their level of education. Due to the cross-sectional design of the study, it is not possible to infer any causal relationship between internet use and the development of cyberchondria symptoms. Future researches should focus more on doing longitudinal studies to establish that link.

Conclusion

The study revealed a significant prevalence of cyberchondria among university students. Based on the

findings, cyberchondria must be seen as a serious public health concern.

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References

1. Vismara M, Caricasole V, Starcevic V, Cinosi E, Dell'Osso B, Martinotti G, et al. Is cyberchondria a new transdiagnostic digital compulsive syndrome? A systematic review of the evidence. Compr Psychiatry 2020;99:152167. doi: 10.1016/j.comppsych.2020.152167.
2. McElroy E, Shevlin M. The development and initial validation of the cyberchondria severity scale (CSS). J Anxiety Disord 2014;28:259-65. doi: 10.1016/j.janxdis.2013.12.007.
3. Akhtar M, Fatima T. Exploring cyberchondria and worry about health among individuals with no diagnosed medical condition. J Pak Med Assoc 2020;70:90-5. doi: 10.5455/JPMA.8682.
4. Wang J, Wu X, Lai W, Long E, Zhang X, Li W, et al. Prevalence of depression and depressive symptoms among outpatients: a systematic review and meta-analysis. BMJ Open 2017;7:e017173. doi: 10.1136/bmjopen-2017-017173.
5. Starcevic V, Berle D. Cyberchondria: towards a better understanding of excessive health-related Internet use. Expert Rev Neurother 2013;13:205-13. doi: 10.1586/ern.12.162.
6. Mathes BM, Norr AM, Allan NP, Albanese BJ, Schmidt NB. Cyberchondria: Overlap with health anxiety and unique relations with impairment, quality of life, and service utilization. Psychiatry Res 2018;261:204-11. doi: 10.1016/j.psychres.2018.01.002.
7. Te Poel F, Baumgartner SE, Hartmann T, Tanis M. The curious case of cyberchondria: A longitudinal study on the reciprocal relationship between health anxiety and online health information seeking. J Anxiety Disord 2016;43:32-40. doi: 10.1016/j.janxdis.2016.07.009.
8. Fergus TA. Anxiety sensitivity and intolerance of uncertainty as potential risk factors for cyberchondria: A replication and extension examining dimensions of each construct. J Affect Disord 2015;184:305-9. doi: 10.1016/j.jad.2015.06.017.
9. Norr AM, Albanese BJ, Oglesby ME, Allan NP, Schmidt NB. Anxiety sensitivity and intolerance of uncertainty as potential risk factors for cyberchondria. J Affect Disord 2015;174:64-9. doi: 10.1016/j.jad.2014.11.023
10. McElroy E, Kearney M, Touhey J, Evans J, Cooke Y, Shevlin M. The CSS-12: Development and Validation of a Short-Form Version of the Cyberchondria Severity Scale. Cyberpsychol Behav Soc Netw 2019;22:330-5. doi: 10.1089/cyber.2018.0624
11. Singh K, Brown RJ. Health-related internet habits and health anxiety in university students. Anxiety Stress Coping 2014;27:542-54. doi: 10.1080/10615806.2014.888061.
12. White RW, Horvitz E. Experiences with web search on medical concerns and self diagnosis. AMIA Annu Symp Proc 2009;2009:696-700.
13. Barke A, Bleichhardt G, Rief W, Doering BK. The Cyberchondria Severity Scale (CSS): German Validation and Development of a Short Form. Int J Behav Med 2016;23:595-605. doi: 10.1007/s12529-016-9549-8.
14. Ahmed N, Tariq MT, Ahmed F, Memon RS, Saquib J, Jabeen Z, et al. Hypochondriasis and its association with internet use among medical students. Int J Curr Med Pharm Res 2019;5:4680-5. DOI: 10.24327/23956429.ijcmpr201911775.
15. Fergus TA. Cyberchondria and intolerance of uncertainty: examining when individuals experience health anxiety in response to Internet searches for medical information. Cyberpsychol Behav Soc Netw 2013;16:735-9. doi: 10.1089/cyber.2012.0671.
16. Makarla S, Gopichandran V, Tondare D. Prevalence and correlates of cyberchondria among professionals working in the information technology sector in Chennai, India: A cross-sectional study. J Postgrad Med 2019;65:87-92. doi: 10.4103/jpgm.JPGM_293_18.
17. Dean AG, Sullivan KM, Soe MM. OpenEpi: Open Source Epidemiologic Statistics for Public Health, Version 3.01. [Online] 2013 [Cited 2021 Oct 04] Available from URL: http://www.openepi.com/SampleSize/SSPropor.htm
18. Turkistani A, Mashaikhi A, Bajaber A, AlghamdI W, Althobaity B, Alharthi N, et al. The prevalence of cyberchondria and the impact of social media among the students in Taif University. International Journal of Medicine in Developing Countries (IJMDC) 2020;4:1759-65. Doi: 10.24911/IJMDC.51-1598363146.
19. Baumgartner SE, Hartmann T. The role of health anxiety in online health information search. Cyberpsychol Behav Soc Netw 2011;14:613-8. doi: 10.1089/cyber.2010.0425.
20. Doherty-Torstrick ER, Walton KE, Fallon BA. Cyberchondria: Parsing Health Anxiety From Online Behavior. Psychosomatics 2016;57:390-400. doi: 10.1016/j.psym.2016.02.002.
21. Singh K, Brown RJ. From headache to tumour: An examination of health anxiety, health-related Internet use and 'query escalation'. J Health Psychol 2016;21:2008-20. doi: 10.1177/1359105315569620.
22. Wong DK, Cheung MK. Online Health Information Seeking and eHealth Literacy Among Patients Attending a Primary Care Clinic in Hong Kong: A Cross-Sectional Survey. J Med Internet Res 2019;21:e10831. doi: 10.2196/10831.
23. Gandla SD, Dayala PP, Kadiyala PK. Cyberchondria: An emerging form of health anxiety. Arch Ment Health 2021;22:148-52. DOI: 10.4103/amh.amh_49_21.
24. Marino C, Fergus TA, Vieno A, Bottesi G, Ghisi M, Spada MM. Testing the Italian version of the Cyberchondria Severity Scale and a metacognitive model of cyberchondria. Clin Psychol Psychother 2020;27:581-96. doi: 10.1002/cpp.2444.
25. Muse K, McManus F, Leung C, Meghreblian B, Williams JM. Cyberchondriasis: fact or fiction? A preliminary examination of the relationship between health anxiety and searching for health information on the Internet. J Anxiety Disord 2012;26:189-96. doi: 10.1016/j.janxdis.2011.11.005.
26. Moretti FA, Oliveira VE, Silva EM. Access to health information on the internet: a public health issue? Rev Assoc Med Bras (1992) 2012;58:650-8. doi: 10.1590/s0104-42302012000600008.
27. Britt MA, Aglinskas C. Improving students' ability to identify and use source information. Cogn Instr 2002;20:485–522.doi: 10.1207/S1532690XCI2004_2.