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Original Research Article

Digital health literacy and its association with cyberchondria among non-medical undergraduate students in Malappuram district, Kerala

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ABSTRACT

Background: The increasing use of the internet for health information may influence health behaviour and anxiety among young adults. Digital health literacy may shape how individual access and evaluate online health information, while excessive searching may contribute to cyberchondria. This study assessed digital health literacy and cyberchondria and examined their association among non-medical undergraduate students in Malappuram district, Kerala.

Methods: A cross-sectional study was conducted among 209 students of MES Arts and Science College, Perinthalmanna, from March 2 to April 2, 2026. Participants were selected by simple random sampling. Data were collected using a questionnaire, the 8-item eHealth literacy scale (eHEALS), and the cyberchondria severity scale-12 (CSS-12). Descriptive statistics, chi-square test, multivariate logistic regression and Spearman correlation were used; $p<0.05$ was considered statistically significant.

Results: Participants' mean age was 20.05±1.55 years, and 51.2% were male. The median eHEALS score was 27 (IQR 24-31); 53.1% had higher perceived digital health literacy. The median CSS-12 score was 34 (IQR 26-39), with 56.5% having low, 37.8% moderate, and 5.7% high cyberchondria. Higher perceived digital health literacy ($p=0.03$) and female gender ($p=0.03$) were significantly associated with moderate/high cyberchondria severity ($p=0.005$). Positive correlations were observed with compulsion ($\rho=0.354$, $p<0.001$), distress ($\rho=0.136$, $p=0.049$), excessiveness ($\rho=0.235$, $p=0.001$), and reassurance-seeking ($\rho=0.220$, $p=0.001$).

Conclusions: Higher perceived digital health literacy was associated with cyberchondria and its domains, particularly compulsion. Promoting responsible online health-information seeking may help reduce excessive searching and its psychological consequences among young adults.

Keywords: Cyberchondria, Digital health literacy, eHealth literacy, Undergraduate students

INTRODUCTION

The internet has become an important source of health information, particularly among young adults. Online platforms provide rapid access to information about symptoms, diseases, treatment options and preventive health measures. The increasing availability of smartphones, search engines and social media has further integrated digital health information into everyday life. However, the ease of obtaining health information does not necessarily ensure that individuals can identify reliable information or interpret it appropriately.

Digital health literacy refers to an individual's perceived ability to seek, find, understand, evaluate and use health information obtained through electronic sources. The eHealth literacy scale (eHEALS), developed by Norman and Skinner, is an eight-item instrument designed to

assess perceived skills and confidence in finding, evaluating and applying electronic health information.[1] The ability to critically evaluate digital health information is particularly important because online health information varies considerably in quality and accuracy.

Repeated searching for health information can also have unintended psychological consequences. Cyberchondria is generally described as excessive or repeated online searching for health information that may be associated with increased health-related anxiety, distress, reassurance-seeking and compulsive searching.[2] A systematic review and meta-analysis found significant relationships between health anxiety, online health-information seeking and cyberchondria, highlighting the complex interaction between information-seeking behaviour and psychological responses.[2]

Cyberchondria has increasingly been studied among young adults and university students. Indian studies have reported that excessive online health-information seeking and compulsive behaviour are important manifestations of cyberchondria3. The cyberchondria severity scale-12 (CSS-12) is a brief instrument assessing four important dimensions: excessiveness, distress, compulsion and reassurance-seeking. Recent Indian psychometric work has provided further evidence supporting the use of the CSS-12 among Indian adults.[4]

The relationship between digital health literacy and cyberchondria is not straightforward. Higher digital health literacy might theoretically protect individuals by enabling them to critically evaluate online information. Conversely, individuals who are more confident and skilled in using online health resources may also search more frequently for health information, potentially increasing exposure to alarming or ambiguous information. Existing studies have therefore produced inconsistent findings. Kobryn and Duplaga reported a relationship between health literacy/eHealth literacy and cyberchondria in Polish internet users, while other studies have reported negative, weak positive or very weak relationship.[5]

This issue is particularly relevant among non-medical undergraduate students. Unlike medical students, they may have substantial exposure to digital information without equivalent formal training in interpreting medical information. Understanding the relationship between digital health literacy and cyberchondria in this population could help identify opportunities for health education and responsible digital health-information use.

In India, evidence regarding cyberchondria among non-medical undergraduate students remains limited. The present study was therefore undertaken among non-medical undergraduate students in Malappuram district, Kerala, to assess digital health literacy and cyberchondria and to determine the association between them.

METHODS

Study design, setting and period

A cross-sectional study was conducted among undergraduate students of MES Arts and Science College, Perinthalmanna, Malappuram district, Kerala. The study was conducted from 2 March 2026 to 2 April 2026.

Study population and sampling

Students aged 18 years or above who knew how to use a smartphone and had access to the internet were eligible for participation. Students unwilling to provide informed consent were excluded. A simple random sampling method was used. A list of eligible students was obtained from the college administration and served as the sampling frame. Each eligible student was assigned a unique identification number, and participants were selected using computer-generated random numbers until the required sample size was achieved.

Sample size

The sample size was calculated using the formula $n=Z^2pq/d^2$.

A prevalence of cyberchondria of 22.5% was considered based on a previous study among undergraduate students in Andhra Pradesh.[3] Taking p=22.5%, q=77.5% and an absolute error of 6%, the minimum required sample size was calculated as 186. A total of 209 students were ultimately included in the study.

Study variables and operational definition

The primary outcome variable was cyberchondria severity, assessed using the Indian-adapted cyberchondria severity scale (CSS-12).[4] The 12-item scale comprises four domains: excessiveness, distress, compulsion, and reassurance-seeking. Each item is scored on a five-point Likert scale, yielding a total score ranging from 12 to 60. Based on predefined Bloom's cut-offs, cyberchondria severity was categorized as low (12-35), moderate (36-47), or high (48-60). For binary logistic regression, moderate and high severity were combined into a moderate/high cyberchondria category.

The primary factor of interest was perceived digital health literacy, assessed using the eight-item eHealth Literacy Scale (eHEALS-8). Each item is rated on a five-point Likert scale, with a total score ranging from 8 to 40; higher scores indicate higher perceived digital health literacy.[1] As the scores were non-normally distributed, the median score of 27 was used as the cut-off. Participants scoring ≥27 were classified as having higher and <27 as having lower perceived digital health literacy.

Other study variables included age, gender, course of study, and sources of health information. Age was

categorized as <20 and ≥20 years, and course of study as arts/social sciences, commerce/management, and science/technology. Sources of health information included search engines, social media platforms, AI-based tools, and medical websites/mobile health applications.

Data collection

Data were collected using a semi-structured, self-administered questionnaire developed following a review of relevant literature. The questionnaire included sections on sociodemographic characteristics, health-information-seeking behaviour, perceived digital health literacy, and cyberchondria. It was pre-tested among participants with characteristics similar to the study population, and necessary modifications were made to improve clarity and comprehensibility. The final questionnaire was administered to eligible participants after obtaining informed consent.

Ethical considerations

The study protocol was submitted to and approved by the Institutional Ethics Committee of MES Medical College, Perinthalmanna (No: EC/NEW/INST/2024/KL/0460). Informed consent was obtained from all participants before data collection. Participation was voluntary, and participants were informed of their right to withdraw from the study at any stage without consequences. Confidentiality and anonymity of the participants were maintained throughout the study.

Statistical analysis

Data were coded and entered into Microsoft Excel and analysed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarize the data. Continuous variables were expressed using mean and standard deviation or median and interquartile range, depending on distribution. Categorical variables were presented as frequencies and percentages.

The association of perceived levels of digital health literacy and participant characteristics with cyberchondria severity was assessed using the chi-square test. Multivariable logistic regression was performed to identify independent factors associated with cyberchondria severity. Spearman's rank correlation coefficient was used to assess the relationship between total e-HEALS scores and the individual CSS-12 domain scores as the variables were not normally distributed. A p value <0.05 was considered statistically significant.

RESULTS

A total of 209 undergraduate students participated in the study. The mean age of the participants was 20.05 years (SD 1.55; range 18-24 years), with 119 (56.9%) participants aged 20 years and above. Further characteristics of the study population are presented in Table 1.

Table 1: Participant characteristics and health-information sources among undergraduate students (n=209).

Characteristics	Category	N (%)
Age (years)	<20	90 (43.1)
	≥20	119 (56.9)
Sex	Male	108 (51.7)
	Female	101 (48.3)
Course of study	Arts/social sciences	39 (18.7)
	Commerce/ management	127 (60.8)
	Science/technology	43 (20.6)
Primary source of health information	Search engines (Google)	82 (39.2)
	Social media platforms	75 (35.9)
	AI-based tools	34 (16.3)
	Medical websites/mobile health applications	18 (8.6)

Digital health literacy and cyberchondria

The distribution of total digital health literacy scores was non-normal. The median digital health literacy score was 27 (IQR 24-31). Using the median score as the cut-off, 111 (53.1%) participants were classified as having higher perceived digital health literacy (score ≥27), while 98 (46.9%) having lower perceived digital health literacy (score <27).

The median total cyberchondria score was 34 (IQR 26-39). Overall, 118 (56.5%) participants had low cyberchondria, 79 (37.8%) had moderate cyberchondria and 12 (5.7%) had high cyberchondria.

Cyberchondria severity varied significantly by gender and perceived digital health literacy. The proportion of moderate cyberchondria was higher among females than males (46.5% versus 29.6%; p=0.04). Similarly, high cyberchondria severity was more frequently observed among participants with higher perceived digital health literacy than among those with lower perceived digital health literacy (9.9% versus 1.0%; p=0.005). No significant differences were observed across age, course of study, or source of health information.

In multivariable logistic regression, female participants had nearly twice the odds of moderate/high cyberchondria compared with males (aOR=1.9, 95% CI: 1.1-3.4; p=0.02). Higher perceived digital health literacy was also independently associated with moderate/high cyberchondria (aOR=1.8, 95% CI: 1.04-3.2; p=0.03).

Table 2: Association of participant characteristics and perceived digital health literacy with cyberchondria severity (n=209).

Variables	Cyberchondria severity N (%)			P value
	Low	Moderate	High	
Age				
<20 years	53 (58.9)	32 (35.6)	5 (5.6)	0.82
≥20 years	65 (54.6)	47 (39.5)	7 (5.9)	
Gender				
Male	69 (63.9)	32 (29.6)	7 (6.5)	0.04
Female	49 (48.5)	47 (46.5)	5 (5)	
Course of study				
Arts/ Social sciences	25 (64.1)	12 (30.8)	2 (5.1)	0.6
Commerce/Management	69 (54.3)	49 (38.6)	9 (7.1)	
Science/Technology	24 (55.8)	18 (41.9)	1 (2.3)	
Source of health information				
Search engines (Google)	46 (56.1)	29 (35.4)	7 (8.5)	0.2
Social media platforms	46 (61.3)	27 (36)	2 (2.7)	
AI-based tools	15 (44.1)	18 (52.9)	1 (2.9)	
Medical websites/mobile health applications	11 (61.1)	5 (27.8)	2 (11.1)	
Perceived digital health literacy				
Lower	64 (65.3)	33 (33.7)	1 (1)	0.005
Higher	54 (48.6)	46 (41.4)	11 (9.9)	

Table 3: Binary logistic regression of factors associated with moderate/high cyberchondria.

Variables	Cyberchondria severity		Adjusted Odd's ratio [CI]	P value
	Low	Moderate/high		
Gender				
Male	69 (63.9)	39 (36.1)	Reference	0.02
Female	49 (48.5)	52 (51.5)	1.9 (1.1-3.4)	
Perceived digital health literacy				
Lower	64 (65.3)	34 (34.7)	Reference	0.03
Higher	54 (48.6)	57 (51.4)	1.8 (1.04-3.2)	

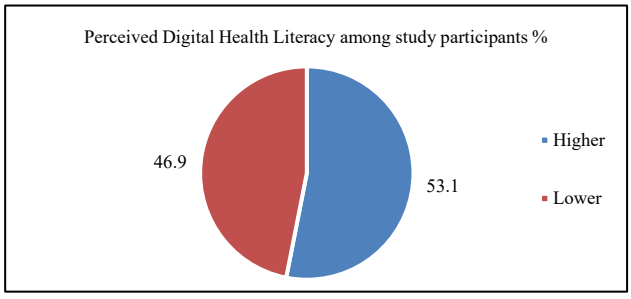


Figure 1: Distribution of study participants based on levels of digital health literacy.

Digital health literacy and domains of cyberchondria

Digital health literacy was positively correlated with all four domains of the cyberchondria severity scale-12. The strongest correlation was observed for the compulsion domain (Spearman's ρ=0.35, p<0.001). Weaker positive correlations were observed for excessiveness (ρ=0.23, p=0.001), reassurance-seeking (ρ=0.22, p=0.001), and distress (ρ=0.13, p=0.049) (Table 4).

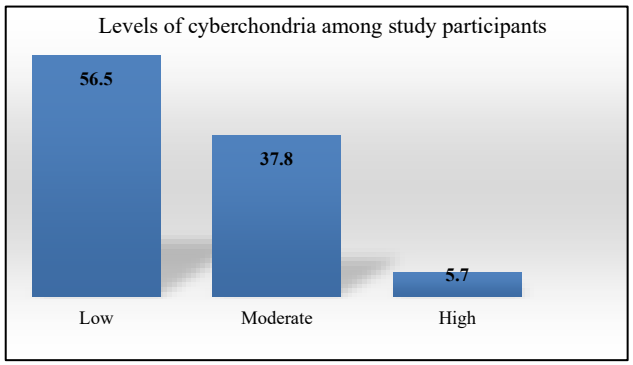


Figure 2: Cyberchondria severity among study participants (n=209).

Overall, higher digital health literacy was associated with greater cyberchondria severity, with the most pronounced

relationship observed for compulsive health-related online searching.

Table 4: Correlations between digital health literacy and domains of cyberchondria (n=209).

Domains	Spearman's ρ	P value
Compulsion	0.35	<0.001
Distress	0.13	0.049
Excessiveness	0.23	0.001
Reassurance	0.22	0.001

DISCUSSION

This study assessed digital health literacy and cyberchondria among non-medical undergraduate students and examined the relationship between the two. The participants were predominantly young adults, with a mean age of approximately 20 years, with slight predominance of males (51.7%). The prevalence of high cyberchondria was 5.7%, which was comparable to the 4.4% reported among Indian undergraduates but lower than the 20.1-23.8% reported among Pakistani students and clinical medical students.[6,7,9] More than half of the participants (53.1%) had higher perceived digital health literacy, with a median eHEALS score of 27. As eHEALS measures perceived rather than objectively assessed skills, these findings reflect students' confidence in accessing and using online health information rather than their actual ability to critically appraise it.[1]

The principal finding was a statistically significant positive association between digital health literacy and cyberchondria severity. Participants with higher perceived digital health literacy had greater proportions of moderate and high cyberchondria than those with lower perceived digital health literacy. This finding contrasts with studies reporting a protective effect of health or digital health literacy against cyberchondria.[8,9] However, other studies have reported weak positive or inconsistent associations, suggesting that the relationship may vary according to population characteristics, patterns of internet use and psychological factors.[10,11]

A study done by Yalcin stated that individuals with high e-health literacy experience reduced health anxiety, which in turn leads to a decrease in their cyberchondria level.[12] A large college-student study also reported that increasing eHealth literacy was associated with a greater likelihood of belonging to the high-severe cyberchondria group, supporting the possibility that digitally confident individuals may engage more frequently in online health-information seeking.[7]

One possible explanation is that greater confidence in searching for health information may encourage more frequent or prolonged health-related searches. Exposure to multiple and sometimes conflicting explanations for symptoms may increase uncertainty and promote repeated searching. However, this remains a possible explanation rather than a causal interpretation. The discrepancy from studies reporting a protective association may also be partly related to the use of eHEALS, which measures perceived confidence rather than actual information-evaluation ability.[1] Thus, high perceived digital health literacy may not necessarily indicate the ability to distinguish reliable information from misinformation or sensationalized content.

Digital health literacy was positively correlated with all four cyberchondria domains, with the strongest association observed for compulsion (ρ=0.354), while associations with excessiveness, reassurance-seeking and distress were weak. The stronger relationship with compulsion suggests that students who are more confident in navigating online health information may also have greater difficulty disengaging from health-related searches. Similar coexistence of higher eHealth literacy and cyberchondria has been reported previously5. However, domain-level findings have varied across populations. Studies among Iranian and Turkish students have reported different patterns across compulsion, excessiveness, reassurance-seeking and distress, while other studies have identified excessiveness as the predominant domain.[8,13,14] These variations support the multidimensional nature of cyberchondria and suggest that its relationship with digital health literacy may depend on individual and contextual factors.

The higher odds of moderate/high cyberchondria among females in the present study are consistent with some previous studies reporting greater cyberchondria severity among women.[9,12] However, a systematic review found that consistent age- and gender-related correlates have not been firmly established across the literature.[9] Another study shows that e-health literacy may increase the risk of cyberchondria, especially among men, who process online health information more anxiously than women, who use more adaptive strategies.[6] The weak positive association between digital health literacy and distress is also relevant, as cyberchondria involves not only repeated searching but also psychological consequences. Previous literature has linked cyberchondria with health anxiety and repeated online health-information seeking.[2]

The positive association observed in this study should not be interpreted as evidence that digital health literacy causes cyberchondria. Students with greater health concerns may search for health information more frequently and consequently become more confident in navigating online resources. Factors such as health anxiety, psychological stress, internet-use patterns, previous illness experiences and exposure to health-related social-media content may also influence both constructs. Future longitudinal and multicentre studies incorporating objective measures of digital health literacy and relevant psychological and internet-use variables are warranted.

This study contributes to the limited evidence on the relationship between digital health literacy and cyberchondria among non-medical undergraduate students. The use of validated instruments to assess perceived digital health literacy and cyberchondria is a key strength. The study also examined cyberchondria across its individual domains, providing a more detailed understanding of the pattern of online health-information seeking and its psychological effects.

The cross-sectional design prevents establishing a temporal or causal relationship between digital health literacy and cyberchondria. Digital health literacy was assessed using eHEALS, which measures perceived rather than objectively assessed skills. The findings may also be influenced by self-reporting and recall bias. As the study was conducted among undergraduate students from a single institution, the findings may have limited generalizability to other student populations.

CONCLUSION

The study found a significant positive association between perceived digital health literacy and cyberchondria among non-medical undergraduate students. Higher perceived digital health literacy and female gender were significantly associated with moderate/high cyberchondria severity, particularly the compulsion domain. These findings suggest that confidence in accessing online health information does not necessarily protect against cyberchondria. Digital health education should therefore emphasize not only access to information but also critical appraisal and responsible health-information-seeking behaviour.

Recommendations

Future studies should use longitudinal designs to clarify the temporal relationship between digital health literacy and cyberchondria. Objective assessment of digital health-literacy skills, health anxiety, and patterns of online health-information seeking may provide further insight into this association. College health-promotion programmes should incorporate digital health education focusing on critical appraisal of online health information, identification of misinformation, assessment of source credibility, and use of authoritative health resources. Students should also be encouraged to adopt responsible health-information-seeking practices and recognize when repeated symptom searching may contribute to anxiety.

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REFERENCES

1. Norman CD, Skinner HA. eHEALS: The eHealth Literacy Scale. J Med Internet Res. 2006;8(4):e27.
2. McMullan RD, Berle D, Arnáez S, Starcevic V. The relationships between health anxiety, online health information seeking, and cyberchondria: systematic review and meta-analysis. J Affect Disord. 2019;245:270-8.
3. Vemuri MTI, Prusty DB. Prevalence and manifestation of cyberchondria in Indian adults. Int J Indian Psychol 2025;13(2).
4. Dharshini R, Sharma MK, Anand N, Srivastava K. Psychometric properties and factor structure of the short form of the cyberchondria severity scale (CSS-12) amongst Indian adults. Indian J Psychiatr. 2025;67(12):1152.
5. Kobryn M, Duplaga M. Does health literacy protect against cyberchondria: a cross-sectional study? Telemed e-Health 2024;30(4):e1089-e1100.
6. Özbaş C, Yıldız ET, Tüzün H, Kara Çiğdem AG, Uğraş Dikmen A. Health literacy and sociodemographic determinants of cyberchondria: a cross-sectional study among outpatients of a university hospital in Turkey. InHealthcare 2025;13(19):2445.
7. Yao Z, Qin N, Shi S, Li X, Zhong Z. Cyberchondria among college students and associated factors: a latent profile analysis. Sci Rep. 2026;16(1):14767.
8. Yoon J, Yang S, Kang SJ, Lee M, Kim D, Park J, et al. Digital health literacy in the general population: National cross-sectional survey study. J Med Internet Res. 2025;27:e67780.
9. 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. Comprehens Psychiatr. 2020;99:152167.
10. Agrawal V, Khulbe Y, Singh A, Kar SK. The digital health dilemma: exploring cyberchondria, well-being, and smartphone addiction in medical and non-medical undergraduates. Indian J Psychiatr 2024;66(3):256-62.
11. Koc EG, Ozkan ET. The relationship between ehealth literacy and cyberchondria: a cross-sectional study. Eur J Public Health. 2025;35(4).
12. Yalçın B. The role of health anxiety in the relationship between e-health literacy and cyberchondria. TOGU EHM. 2025;2(1):1-21.
13. Zhao BY, Huang L, Cheng X, Chen TT, Li SJ, Wang XJ, et al. Digital health literacy and associated factors among internet users from China: a cross-sectional study. BMC Public Health. 2024;24(1):908.

14. Ugbe UM, Ezekiel EV, Elechi NF, Ugwuanyi CD, Ekam MS, Ibor GO, et al. Prevalence and factors associated with cyberchondria among undergraduates at the University of Cross River State, Nigeria. Discov Public Health. 2026;23(1):420.

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