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Original Research Article

Online health search behaviour and cyberchondria severity among medical students: a dose-response study

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ABSTRACT

Background: Cyberchondria- compulsive online health searching that amplifies health anxiety- is increasingly reported among medical undergraduates, yet its severity distribution and dose-response pattern remain poorly characterized in south Indian populations. This study assessed cyberchondria severity, its dose-response association with online health search behaviour, and associated socio-demographic and behavioural factors among MBBS students.

Methods: Cross-sectional study of 100 MBBS students at a government medical college in south India. The validated CSS-15 (α=0.755) was administered online. Dose-response analysis used one-way ANOVA with eta-squared and Spearman correlation; factors independently associated with CSS-15 severity were identified by multiple linear regression.

Results: Mean CSS-15 score was 18.07±8.29 (range 0-37). A clear dose-response gradient emerged: scores rose from 11.54±6.52 (rarely searching) to 25.14±8.36 (always searching)- a 13.6-point increase ($F(3,96) = 13.06$, $p<0.001$; $\eta^2=0.290$; Spearman $\rho=0.513$, $p<0.001$). Online search frequency ($\beta=4.95$, $p<0.001$) and hostel residence ($\beta=3.82$, $p=0.008$) were independently associated with CSS-15 severity, together explaining 31.8% of the variance in CSS-15 scores ($R^2=0.318$). Excessiveness was the predominant subscale (mean 5.37±2.83).

Conclusions: Online health search frequency showed a significant graded association with cyberchondria severity. Hostel residence was independently associated with higher CSS-15 scores. These findings point to practical intervention targets: search-frequency reduction strategies and hostel-specific digital health literacy programmes within undergraduate medical curricula.

Keywords: CSS-15, Cyberchondria, Digital health behaviour, Dose-response, Health anxiety, Internet, Medical students

INTRODUCTION

The rapid expansion of web-based health information has fundamentally reshaped how individuals engage with medical knowledge. While broader access to health content carries clear advantages- enabling informed decision-making and facilitating earlier care-seeking- a subset of users develops a counterproductive pattern in which repeated online searches amplify rather than resolve health-related anxiety. This phenomenon, now widely recognised as cyberchondria, is characterised by cyclical searching, mounting worry in the absence of confirmed pathology and a persistent inability to achieve reassurance despite internet-derived information or professional consultation.[1-5]

White and Horvitz (2009) were among the first to formally conceptualise cyberchondria, demonstrating that

searches for common symptoms systematically surface information on serious diagnoses, generating disproportionate fear independent of actual pathology.[1] Unlike purposive, goal-directed health information seeking- which typically yields reassurance- cyberchondriac behaviour involves repetitive, compulsive searching that escalates concern.[4,5] The psychometric measurement of this construct advanced substantially with McElroy and Shevlin's (2014) cyberchondria severity scale (CSS-33), subsequently abbreviated by Barke et al into the CSS-15, which retains five theoretically grounded subscales- compulsion, distress, excessiveness, reassurance-seeking and mistrust of medical professionals- with strong internal consistency (α=0.82) and substantially reduced respondent burden.[2,3]

Undergraduate medical students constitute a particularly high-risk group. Their curriculum demands immersive engagement with symptomatology and diagnostic frameworks; their internet access is effectively unrestricted; and the well-documented phenomenon of medical student syndrome- whereby students identify with conditions under study- creates conditions conducive to cyberchondriac behaviour.[6,7] Paradoxically, accumulated medical knowledge may facilitate increasingly sophisticated searches involving rare or serious conditions, intensifying rather than moderating health-related worry.[8]

Despite growing evidence from other populations, robust data from medical student populations in south India remain limited in the published literature. Furthermore, most existing studies have relied on binary or arbitrary categorical classification strategies (such as median-split or tertile grouping) that discard the continuous gradient of cyberchondria severity- the very dimension most relevant to dose–response inquiry.[9,10]

Unlike these prior studies, the present study treats CSS-15 scores as a continuous outcome and quantifies a graded dose-response association between online health search frequency and CSS-15 severity- an approach that preserves the full severity gradient and enables rigorous effect size characterisation. Additionally, this study is among the first to identify hostel residence as an independent environmental associate of CSS-15 severity in a non-pandemic Indian medical student population. These features distinguish the present study from existing literature and directly address methodological gaps previously identified in cross-sectional cyberchondria research.[9,10]

Study objectives

To assess cyberchondria severity and examine its dose-response association with online health search behaviour among undergraduate MBBS students. To identify socio-demographic and behavioural factors associated with cyberchondria severity using multiple linear regression.

METHODS

Study design and setting

A cross-sectional, institution-based study was conducted at a government medical college in South India during March and April 2026. Ethical clearance was obtained from the institutional ethics committee (details withheld for blinded peer review) and all participants provided informed consent electronically prior to enrolment.

Sample size calculation

Sample size adequacy for multiple linear regression was assessed using Green's rule ($N \geq 50 + 8k$), where k denotes the number of variables planned for inclusion.[20] Based on the study design, key variables considered a priori included online health search frequency, residential status, gender, academic year and internet use duration ($k \approx 5$). This yielded a minimum required sample of 90. The achieved sample size (n=100) met this requirement, providing adequate power for the planned analyses.

Sampling and eligibility

A census-based sampling approach was used, whereby all eligible first- and second-year MBBS students available during this period were invited to participate. Inclusion required: current enrolment as an MBBS student, age ≥17 years, self-reported use of the internet for health-related queries and provision of informed consent. Excluded were: students who declined participation, those with more than 20% missing responses on the CSS-15 and students carrying a pre-existing diagnosis of a psychiatric disorder.

Data collection instrument

A two-part structured questionnaire was administered via Google forms, distributed to participants through WhatsApp for self-administered completion on personal devices. Section A captured socio-demographic and internet-use data: age, gender, academic year, religion, residential status, average daily internet duration and online health search frequency. Section B comprised the CSS-15. Internal consistency of the CSS-15 was assessed using Cronbach's alpha coefficient; values ≥0.70 were considered acceptable.

CSS-15 Construct Structure. The CSS-15 encompasses five subscales, each comprising three items scored on a five-point Likert scale (0 = never to 4 = always): excessiveness (items 1, 2, 13), compulsion (items 3, 4, 7), mistrust of medical professionals (items 5, 12, 15; reverse-scored), distress (items 6, 9, 14) and reassurance-seeking (items 8, 10, 11).

Each subscale yields a range of 0-12; the total instrument score spans 0-60, with higher values reflecting greater cyberchondria severity.[3]

Statistical analysis

Data were analysed using SPSS version 22.0 (IBM Corp., Armonk, NY). Continuous variables were expressed as mean±standard deviation; categorical variables as frequencies and percentages.

Primary analysis. The CSS-15 total score was treated as a continuous outcome throughout all primary analyses, preserving the full variance of the severity distribution and avoiding the statistical and conceptual limitations of arbitrary dichotomization. The dose–response association between online health search frequency (operationalized as an ordinal variable: 1= rarely, 2= sometimes, 3= often, 4= always) and CSS-15 severity was assessed using one-way ANOVA with eta-squared (η^2) as the effect size measure. Spearman's rank correlation coefficient (ρ) was computed as a non-parametric trend index. Multiple linear regression was performed to quantify the independent associations of search frequency and residential status with CSS-15 severity, with unstandardized beta coefficients (β) and 95% confidence intervals reported. Model fit was assessed by R^2.

Bivariate associations. Association between each socio-demographic variable and CSS-15 score was first examined using independent-samples t-tests (for binary variables) and one-way ANOVA (for multi-category variables). Variables meeting $p<0.25$ were carried into the multiple linear regression. Cohen's d was calculated to characterize effect sizes for two-group comparisons.

A p value <0.05 (two-tailed) was taken as the threshold for statistical significance. Prior to regression modelling, standard assumptions were verified: normality of residuals was examined using histograms and the Shapiro-Wilk test; linearity was assessed via scatter plots of independent variables against CSS-15 scores; and homoscedasticity was evaluated by visual inspection of standardized residual plots. All assumptions were found to be adequately satisfied.

RESULTS

Participant characteristics

The questionnaire link was distributed to all eligible MBBS 1st and 2nd year students and all 100 eligible students submitted complete responses; no participant was excluded on the grounds of missing data. The mean age was 19.63±1.33 years (range 17-25). Females constituted 67% of the sample; 77% identified as Hindu; and 59% were day scholars. Regarding internet use, 49% reported 2-4 hours daily and 41% reported more than 4 hours daily. Online health search frequency was reported as rarely by 28%, sometimes by 42%, often by 23% and always by 7% (Table 1).

Table 1: Socio-demographic characteristics and mean CSS-15 scores by category (n=100).

Variables	Category	N (%)	Mean CSS-15 Score±SD
Gender	Female	67 (67.0)	18.12±8.16
	Male	33 (33.0)	17.97±8.66
Year of study	1st year MBBS	50 (50.0)	17.74±9.08
	2nd year MBBS	50 (50.0)	18.40±7.48
Religion	Hindu	77 (77.0)	17.31±8.27
	Muslim	22 (22.0)	20.95±8.02
	Others	1 (1.0)	13.00†
Place of residence	Day scholar	59 (59.0)	16.73±8.25
	Hostel	41 (41.0)	20.00±8.05
Average daily internet use (hours)	<2	10 (10.0)	18.00±5.70
	2-4	49 (49.0)	18.55±7.99
	>4	41 (41.0)	17.51±9.24
Online health search frequency	Rarely	28 (28.0)	11.54±6.52
	Sometimes	42 (42.0)	19.00±7.20
	Often	23 (23.0)	22.17±7.19
	Always	7 (7.0)	25.14±8.36

Note. CSS-15 = Cyberchondria Severity Scale-15. SD = standard deviation. Mean CSS-15 scores are presented for all variables. Of the variables screened, only online health search frequency and residential status met the predefined criterion ($p<0.25$) for entry into multiple linear regression. Religion and average daily internet use are presented for descriptive completeness; no statistically significant differences in CSS-15 scores were observed across these categories. †N=1; SD not calculable.

CSS-15 score distribution

The mean CSS-15 total score was 18.07±8.29 (median 18.0; observed range 0-37 out of a possible 0–60). The distribution was approximately symmetrical (skewness =0.08). Internal consistency of the CSS-15 in this sample was acceptable: overall Cronbach's α=0.755, broadly concordant with values reported by Barke et al (α=0.82)

and Dagar et al (α>0.70); at subscale level, alpha ranged from 0.720 to 0.808.[3,9] Subscale analysis is presented in Table 2.

Table 2: CSS-15 total and subscale scores (n=100).

Subscales	Mean±SD
CSS-15 Total Score	18.07±8.29 (range 0-37; median 18.0; α=0.755)
Excessiveness (items 1, 2, 13)	5.37±2.83
Reassurance-seeking (items 8, 10, 11)	4.16±3.14
Compulsion (items 3, 4, 7)	2.91±2.56
Distress (items 6, 9, 14)	2.77±2.68
Mistrust of Professionals* (items 5, 12, 15)	2.86±3.17

Note. CSS-15 = Cyberchondria Severity Scale-15. SD = standard deviation. Subscale scores range from 0–12; total score ranges 0-60. *Mistrust subscale is reverse-scored; higher scores indicate greater reliance on online sources relative to professional opinion. α = Cronbach's alpha coefficient for the total scale.

Excessiveness was the predominant subscale, with the highest mean score (5.37±2.83), followed by reassurance-seeking, compulsion, distress and mistrust.

Dose-response relationship between search frequency and CSS-15 severity

A pronounced and monotonic dose–response gradient was observed between online health search frequency and CSS-15 severity (Table 3). Mean CSS-15 scores rose from 11.54±6.52 among those who searched rarely, to 19.00±7.20 (sometimes), 22.17±7.19 (often) and 25.14±8.36 (always)- a cumulative increase of 13.60 points across the four frequency categories. One-way ANOVA confirmed that mean CSS-15 scores differed significantly across these groups: $F(3, 96) = 13.06$, $p<0.001$. The effect size ($\eta^2=0.290$) indicated that search frequency category alone accounted for 29.0% of the total variance in CSS-15 scores- a large effect by Cohen's criteria ($\eta^2>0.14$). Spearman's rank correlation confirmed the strength and monotonicity of this graded association: $\rho=0.513$, $p<0.001$.

Table 3: Dose-response analysis: mean CSS-15 severity by online health search frequency (n=100).

Search frequencies	N	Mean CSS-15 Score±SD	95% confidence interval	Mean difference from 'rarely' (ref.)
Rarely (reference)	28	11.54±6.52	9.12-13.95	—
Sometimes	42	19.00±7.20	16.82-21.18	+7.46
Often	23	22.17±7.19	19.24-25.11	+10.63
Always	7	25.14±8.36	18.95-31.33	+13.60
Trend statistics		One-way ANOVA: $F(3,96) = 13.06$, $p<0.001$, $\eta^2=0.290$	Spearman's $\rho=0.513$, $p<0.001$	Large effect ($\eta^2>0.14$)

Note. Reference category: Rarely. Mean differences are calculated relative to the 'Rarely' group mean (11.54). 95% CI =95% confidence interval for the group mean. ANOVA effect size: $\eta^2=0.290$ (large by Cohen's criteria: $\eta^2>0.14$). Spearman's ρ was calculated treating search frequency as an ordinal numeric variable (1-4).

Table 4: Multiple linear regression: factors associated with CSS-15 severity (n=100).

Factorss	Unstandardised β	95% CI	SE	P value
Constant	6.17	2.41-9.92	1.90	0.002
Online health search frequency (per level increase)	4.95	3.39-6.50	0.78	<0.001
Residential status (Hostel vs Day Scholar)	3.82	1.03-6.62	1.41	0.008
Model fit: $R^2=0.318$ (31.8% of variance explained); $F(2,97) = 22.60$, $p<0.001$				

Note. Outcome: CSS-15 total score (continuous, range 0–60). Search frequency was entered as an ordinal numeric variable (1= rarely, 2= sometimes, 3= often, 4= always). Residential status was coded as 0= Day Scholar, 1= Hostel. β= unstandardised regression coefficient. SE = standard error. 95% CI = 95% confidence interval. Model fit: $R^2=0.318$, $F(2, 97) = 22.60$, $p<0.001$.

Bivariate associations with CSS-15 severity

Among binary variables examined, residential status (hostel vs day scholar) showed a moderate unadjusted association with CSS-15 severity: hostel residents scored a mean of 20.00±8.05 compared with 16.73±8.25 for day scholars (mean difference =3.27, 95% CI: −0.02 to 6.57; $t(98)=1.97$, $p=0.052$, Cohen's $d=0.40$). Although this unadjusted difference fell marginally outside the conventional significance threshold, the effect size ($d=0.40$) is classified as medium and is consistent with prior evidence on the relationship between reduced social support and elevated health anxiety among students.[11,14,16] Gender (female 18.12±8.16 versus male 17.97±8.66, $p=0.94$) and year of study (1st year 17.74±9.08 versus 2nd year 18.40±7.48, $p>0.60$) were not significantly associated with CSS-15 severity. Differences across religion categories were not statistically significant and should be interpreted cautiously given unequal group

sizes. Of the variables screened in bivariate analysis, only online health search frequency and residential status met the predefined inclusion criterion ($p<0.25$) for entry into multiple linear regression.

Multiple linear regression

Table 4 presents the multiple linear regression model in which CSS-15 total score was regressed on online health search frequency and residential status simultaneously. Both factors retained independent statistical significance after mutual adjustment.

Online health search frequency (β=4.95, 95% CI: 3.39-6.50, $p<0.001$) was the most strongly associated factor: each one-level increase in search frequency category was independently associated with a 4.95-point increase in CSS-15 severity, after controlling for residential status. Hostel residence (β=3.82, 95% CI: 1.03-6.62, p=0.008) was independently associated with higher CSS-15 severity, with hostel-resident students scoring 3.82 points higher than day scholars after adjusting for search frequency. The model explained 31.8% of total variance in CSS-15 severity ($R^2=0.318$). Notably, the association between hostel residence and CSS-15 severity was stronger and more precisely estimated in the adjusted model than in the unadjusted comparison, suggesting that part of the residential difference may be related to differences in search frequency patterns between residential groups- and that the independent environmental effect of hostel residence becomes more apparent once search frequency is held constant.

DISCUSSION

Principal findings

This study provides evidence for a graded dose–response association between online health search frequency and cyberchondria severity among undergraduate medical students, as measured by the CSS-15 treated as a continuous outcome. A one-category increase in search frequency was independently associated with a 4.95-point increase in CSS-15 severity (equivalent to approximately 0.60 SD units) and this association persisted after adjustment for residential status. A 4.95-point increase per search frequency category corresponds to a practically meaningful shift in symptom severity, spanning multiple CSS-15 domains including excessiveness, compulsion and distress- the subscales most directly targeted by behavioural interventions. The overall model- comprising only two factors- explained 31.8% of variance in CSS-15 severity ($R^2=0.318$), a result that compares favourably with regression models in comparable behavioural epidemiology studies. Hostel residence was independently associated with higher CSS-15 severity (β=3.82, p=0.008), an effect that only became fully apparent after statistical control for search frequency- suggesting that the residential effect is not simply a proxy for differential internet use patterns, but may reflect a distinct environmental vulnerability, possibly related to reduced social support and heightened health-related autonomy among students living away from home.[11,14,16]

Dose-response gradient: interpretation and implications

The dose–response association presented here carries substantial inferential weight for several reasons. First, the effect is large ($\eta^2=0.290$), monotonic across all four frequency categories and replicable using both parametric (ANOVA) and non-parametric (Spearman's $\rho=0.513$) statistical approaches. Second, the 13.6-point difference in mean CSS-15 severity between the 'rarely' and 'always' groups spans approximately 1.64 standard deviations- a substantial and behaviourally meaningful gradient. Third, the dose-response pattern is consistent with several Bradford Hill considerations for a plausible association: it exhibits strength, biological plausibility and gradient- though causal inference requires prospective confirmation.[21]

These findings are consistent with a behavioural mechanism in which search frequency itself- rather than pre-existing anxiety traits alone- is strongly associated with escalating CSS-15 severity. This interpretation aligns with cognitive-behavioural accounts of cyberchondria, in which searching functions as a compulsive safety behaviour that provides momentary relief but maintains and amplifies health-focused concern over time.[12,13] Each search episode may reinforce the belief that online health information seeking is a necessary response to physical uncertainty- even though it often generates further distress. The dose–response gradient is consistent with a potential pathway in which more frequent searching produces progressively higher CSS-15 severity scores, though reciprocal effects- whereby higher health anxiety also drives greater search frequency- cannot be excluded in this cross-sectional design.[8,18]

A second plausible pathway involves digital content exposure. Content recommendation systems on major health platforms are optimised for engagement rather than accuracy and tend to surface rare or serious pathologies over common, self-limiting conditions.[1,8] Students who search more frequently are exposed to a greater volume of alarming health content. Repeated exposure to rare-disease information may reinforce symptom-to-disease associations and the cumulative effect of such exposures over time would be expected to produce the severity gradient observed here.

Residential status: decoding the hostel effect

The independent association between hostel residence and CSS-15 severity (β=3.82 after adjustment) warrants detailed interpretation. The unadjusted mean difference between hostel and day-scholar students (3.27 points, d=0.40) only approached conventional significance (p=0.052), but the multiple regression model reveals a

clearer picture: once the confounding effect of search frequency differences between residential groups is removed, the hostel effect becomes statistically robust (p=0.008). This suggests that part of the unadjusted residential difference is attributable to differential search frequencies between groups, but that the hostel environment also independently elevates CSS-15 severity through mechanisms not captured by search frequency alone.

Several plausible mechanisms link residential independence to cyberchondria. Students living in hostels are separated from parents and family members who might otherwise normalise physical symptoms, discourage excessive self-diagnosis, or redirect care-seeking towards health professionals. In the absence of these social supports, the internet becomes the default first-line resource- a pattern plausible given evidence linking reduced social support with elevated health anxiety and increased online health-seeking among student populations.[14,16]

Comparison with published literature

The present cohort's mean CSS-15 score of 18.07±8.29 stands in marked contrast to the 43.80±10.62 reported by Satyarup et al among IT professionals in Bhubaneswar.[10] This substantial difference is explained by two key contextual factors: IT professionals have occupational mandates for continuous internet engagement that naturally amplify health-related searching; and the Satyarup sample was surveyed during the COVID-19 pandemic- a period during which cyberchondria severity was independently documented to be substantially elevated.[15,17] Prior Indian CSS-15 studies, including Dagar et al among engineering students, predominantly reported construct-wise subscale percentages rather than continuous total means, limiting direct score comparison and underscoring the value of the continuous analytical approach adopted in the present study.[9] The identification of online health search frequency as the most strongly associated factor (β=4.95, p<0.001) is consistent with the global cyberchondria literature. McMullan et al systematic review and meta-analysis of 20 studies (n=7,373) documented a medium correlation (r=0.34) between online health information seeking and health anxiety and a strong correlation (r=0.62) between health anxiety and cyberchondria.[5] te Poel et al demonstrated in a longitudinal design that increasing search frequency prospectively predicted higher cyberchondria scores, providing directional support for the dose-response gradient observed here.[18] Brown et al similarly identified search behaviour as the central mechanism through which internet use amplifies health-focused distress, linking search frequency directly to severity outcomes.[8]

The regression model's explained variance (R^2=0.318) with only two factors is noteworthy. The McMullan et al meta-analysis reported a strong pooled association (r=0.62) between health anxiety and cyberchondria, suggesting that behavioural variables such as search frequency can account for substantial variance in CSS-15 severity even without direct health anxiety measurement.[5] The independent association of hostel residence (β=3.82, p=0.008) is consistent with evidence that student residential context shapes cyberchondria risk. Kurcer et al found that university students demonstrated elevated health anxiety and cyberchondria linked to disrupted social environments and reduced family support.[14] The present study extends this by demonstrating that residential independence from family- independent of search frequency- is independently associated with CSS-15 severity in a non-pandemic setting, a finding not previously reported in the Indian CSS-15 literature. The η^2=0.290 for the dose–response analysis substantially exceeds the large-effect threshold (η^2>0.14) and the combined use of ANOVA, Spearman correlation and multiple linear regression provides converging, multi-method evidence for the search frequency-cyberchondria association that prior Indian studies, relying on binary classification, were unable to characterise.

Intervention implications

The identification of search frequency as the most strongly associated modifiable factor, with a clearly graded dose-response pattern, has direct implications for intervention design. Evidence-informed recommendations include:

First, digital health literacy integration should be built into the early medical curriculum. These findings suggest that digital health literacy training focusing on critical appraisal of online health information may be useful, particularly when introduced early in medical training.[19] Understanding that an algorithm designed to maximise engagement will preferentially surface rare and frightening pathologies over common, self-limiting conditions is a critical insight that is rarely addressed in undergraduate medical education.

Second, time-bounded searching strategies represent a plausible cognitive-behavioural approach for reducing compulsive health-related searching. A structured time limit on online health searches- after which professional consultation replaces further independent searching- would operationalise the principles of behavioural experiment and exposure-with-response-prevention, adapted for digital contexts.[12,13]

Third, hostel-specific mental health screening and social support programming is warranted. Given the independent environmental effect of residential status, targeted CSS-15 screening within hostel populations would identify high-risk students for early intervention. Hostel-based mentorship and peer-support models may be worth evaluating in future intervention studies, as these approaches directly address the reduced family support that hostel residence entails.[14,16]

Strengths of this study include: use of a validated instrument with correctly applied reverse-scoring (Cronbach's α=0.755); treatment of CSS-15 as a continuous outcome, preserving the full variance of the severity distribution; comprehensive characterisation of the dose-response association using both parametric (ANOVA, linear regression) and non-parametric (Spearman ρ) methods, with explicit effect size reporting; and identification of two independent factors- one behavioural, one environmental- supported by a graded dose–response association.

Six limitations should be noted. First, the cross-sectional design precludes causal inference; prospective studies are required to confirm temporality and rule out reverse causation- that is, that higher baseline health anxiety drives both more frequent searching and higher CSS-15 scores. Second, the single-institution sample restricts generalisability; multi-site replication across Indian medical colleges is warranted. Third, self-reported search frequency may be subject to social desirability and recall bias, potentially attenuating the true association with CSS-15 severity. Fourth, the study did not include an independent measure of health anxiety (such as the Health Anxiety Inventory), which prevents full disentanglement of cognitive vulnerability from behavioural exposure pathways- a distinction important for mechanistic interpretation. Fifth, the 'always' search frequency category comprised only seven participants, which limits the precision of estimates for this cell (95% CI: 18.95-31.33); findings for this subgroup should be interpreted with caution. Sixth, the study captured search frequency but not the duration of individual search episodes- a factor that may independently contribute to cyberchondria severity and warrants measurement in future research.

CONCLUSION

Online health search frequency is significantly associated with cyberchondria severity among undergraduate medical students in a graded dose-response pattern, with mean CSS-15 scores rising by 13.6 points from the lowest to the highest search frequency category (η^2=0.290, Spearman ρ=0.513). This finding- robust across parametric and non-parametric analyses- is consistent with cognitive-behavioural and exposure-based explanatory frameworks, though prospective studies are needed to confirm causal directionality. Hostel residence was independently associated with higher CSS-15 severity (β=3.82, p=0.008), an effect only fully discernible after statistical adjustment for search frequency, pointing to a distinct residential vulnerability not reducible to differential internet use patterns alone.

These findings demonstrate a graded dose–response association that may inform targeted educational and behavioural interventions for cyberchondria among medical students. Undergraduate medical curricula should embed digital health literacy from the outset- covering critical appraisal of online health sources and awareness of algorithmic biases in health content platforms. Routine CSS-15 screening within hostel populations would identify high-risk students for early referral. Practical behavioural strategies- including structured search time limits and active promotion of faculty consultation over independent internet searches- represent evidence-based components of any comprehensive response to this emerging digital-era mental health challenge.

Future research directions

Priority areas for future investigation include, longitudinal studies tracking CSS-15 trajectories across medical training years, with repeated-measures assessment of search behaviour; multi-centre validation involving medical colleges across different Indian states; randomised controlled trials of digital health literacy and behavioural search-restriction interventions with CSS-15 severity as the primary outcome; qualitative exploration of the contextual and motivational factors underpinning search behaviour in hostel versus day-scholar environments; and structural equation modelling to disentangle the direct and mediated pathways through which search frequency and residential status operate on CSS-15 severity.

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