Original Article

Internet Addiction and its Relationship with the Need for Cognition among Law and Unani Medical Students in Calicut, India

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Abstract

Background and Objective: Internet addiction (IA) is associated with a reduced propensity for cognitive engagement, leading people to show disinterest in mentally demanding tasks. Despite the importance of this problem, there is a lack of research. This study aims to examine the prevalence of IA, identify associated factors, and evaluate the impact of IA on the need for cognition(NFC).

Materials and Methods: We conducted a cross-sectional study with participants chosen through a random sampling method. The Young's Internet Addiction Test was utilized to assess IA, while the Need for Cognition Scale (NCS) measured students' inclination towards thinking, reasoning, and decision-making.

Results: The results showed that 42.5% of students in both groups were classified as normal Internet users. However, 47.2% and 10.2% of students had mild and moderate IA, respectively. Among the law and Unani students, 21.25% were classified as normal internet users, 27.5% as mild users, and 19.6% as moderate internet users. In comparison, 7.08% and 3.14% of the law and Unani students were respectively classified as moderately addicted to the Internet. No statistically significant correlation was found between IA and NFC (r=-0.041, P>0.001). Regression analysis revealed that NFC could not be predicted by IA (F(1,125)=0.207, P>0.001). The Fisher test used to examine the association between IA and gender did not yield a significant result (Fisher test=4.76, P= 0.082).

Conclusions: The study highlights varying levels of IA among students, with significant proportions falling into the "mild" and "moderate" categories. It is noteworthy that law and Unani students exhibited different prevalence rates. These results highlight the complexity of Internet usage patterns and their relationship with cognitive factors and gender. An epistemic cognition intervention should be carried out to convince how effectively the Internet can be used without causing a decline in cognitive functions.

Keywords: Indian students, Internet addiction, Law, Need for cognition, Unani

Background

Strict commutation restrictions forced individuals to confine themselves to their homes and workplaces during the lockdown [1,2]. The sudden transition to online platforms during this time has been accompanied by both positive and negative results [3,4]. Digital advances facilitated remote work, education, and social interactions with minimal physical effort and time commitment. According to the International Telecommunications Union [5], internet usage penetration increased significantly during the lockdown, reaching 4.9 billion users in 2021 compared to 4.1 billion in 2019. Research shows a worrying rise in problematic Internet use among young people is attributed to various factors, such as emotional distress, loneliness, excessive social media engagement, and the pursuit of escapism [6,7].

Research on the prevalence of Internet addiction (IA) among college students before the pandemic found that 25.3% fell into the addictive category [8]. An exploratory cross-sectional study among Indian university students found that 93.8% of respondents had problems with Internet addiction, with 48.2% reporting moderate addiction, 42.3% reporting mild addiction, and 3.3% reporting severe addiction. However, 6.2% of respondents did not exhibit addiction [9]. Another cross-sectional study during the lockdown period, focusing on students pursuing vocational courses in India, found moderate levels of addiction in 62% of the samples [10]. Furthermore, a

study conducted in the city of Varanasi, Uttar Pradesh, India, to measure the prevalence of IA showed that 50.29% of the participants had mild addiction, 18.29% had moderate addiction, and 1.71% had severe addiction [11].

A study assessing IA among medical students in Delhi found that 18% of participants exceeded normal IA limits [12]. This study also revealed a striking connection between Internet addiction, sleep disorders, and depression. Moreover, a multicenter cross-sectional study was conducted on college students from central India to examine the association between IA and psychological well-being. The results showed a negative relationship between IA and psychological well-being (r=0.572, P<0.01) [13]. In addition, research suggests that an excessive tendency to use the Internet is associated with a decline in social adjustment, reduced emotional management skills [14], impaired social interactions [15], increased feelings of loneliness [16], and enhanced levels of depression and anxiety [17,18].

Research examining the cognitive abilities of individuals struggling with IA indicates significant impairments in executive functioning. These include difficulties in response inhibition [19,20], inability to manage emerging cognitive conflicts [21], reduced cognitive flexibility [21,22], and impaired decision-making abilities [23,24]. Excessive Internet users have been observed to exhibit reduced activation in the ventrolateral prefrontal cortex, indicating deficits in cognitive control, a region crucial for higher-order functions [23]. Studies have found a negative association between Internet Addiction Test (IAT) scores and the strength of connectivity between the dorsolateral and medial prefrontal cortex, resulting in reduced cognitive and self-regulatory abilities [25]. The cognitive impairments observed in Internet addicts are predominantly associated with deficits in cognitive control [26], which involves consciously selecting appropriate thoughts, emotions, and behaviors while suppressing inappropriate actions by task demands and social contexts [27].

The Supreme Court of India has recognized Internet access as a fundamental right of citizens, in line with the recommendations of the United Nations [28]. Nonetheless, global studies highlight the widespread occurrence of IA among college students. This phenomenon correlates with a reduced propensity for cognitive engagement, referred to as a lower need for cognition (NFC), in which individuals show reduced enthusiasm for mentally demanding tasks [29]. Research suggests that IA occurs more frequently in men than in women [30]. However, there is a gap in the understanding of IA between law and Unani college

students in Kerala, a southern state of India known for pioneering the declaration of internet access as a basic civil right in 2017. This study aims to examine the prevalence of IA, its influencing factors and its impact on the NFC. We hypothesize that there is no significant association between IA and NFC.

Objectives
This study aims to examine the prevalence of IA, identify associated factors, and evaluate the impact of IA on the need for cognition(NFC).

Materials and Methods
Design and Procedure
The cross-sectional survey was conducted on law and Unani students through a Google Form on October 20-21, 2022. First, participants were invited to fully participate in the study, offering them the opportunity to opt in or opt out with simple yes or no answers. They had the freedom to withdraw when they felt disinterested or tired. The estimated time required to complete the questionnaire was clearly stated on the first page of the form to reassure participants that the study would only take a few minutes of their time. Permission to collect primary data was obtained from the respective university heads beforehand, after which the Google Form questionnaires were distributed to the students. The confidentiality of participants' information was strictly maintained to prevent public disclosure.

The research used descriptive statistics and one-way analysis of variance (ANOVA) techniques. The analysis tool used was SPSS software (version 24). Young people from Law and Unani colleges in Calicut, Kerala, were recruited for this study. The participants were asked to read the letter presented by Dr. Kimberly S. Young to complete the IAT. A total of 127 students, including 71 from the law course and 56 from the Unani medicine course, aged between 17 and 23 years, participated in the study by filling out the questionnaires distributed through a Google form.

Study measures
Internet Addiction Test (IAT)
Young developed an Internet Addiction Diagnostic Questionnaire consisting of eight items based on the DSM-IV criteria [31]. Subsequently, 12 additional items were incorporated into the original eight ones, resulting in the formulation of the IAT. Widyanto and McMurran (2004) conducted an evaluation of Young's IAT to assess its psychometric properties [32]. The replies to IAT are rated on a five-point Likert scale of 1 to 5. The maximum achievable value is 100. Higher values

indicate greater severity of IA. Values between 0 and 30 suggest normal Internet use, 31 to 49 mild addiction, 50 to 79 moderate addiction, and 80 and 100 severe susceptibility to IA.

Need for Cognition Scale

The Need for Cognition Scale (NCS) was used to measure participants' disposition and enjoyment of cognitive engagement [33]. The questionnaire includes 18 items that are rated on a five-point Likert scale from 0 to 4. Nine of these items are reverse-scored. The maximum achievable score on the scale is 72, which is obtained by multiplying the total number of items (18) by the highest possible score (4 points each).

Inclusion and exclusion criteria

The participants in the study were students who provided informed consent and were actively enrolled in law and Unani programs in government-recognized colleges in Calicut, Kerala. Excluded from the study were students who did not regularly attend their law and Unani studies at these institutions, did not complete questionnaires, showed disinterest, or did not provide informed consent.

Data analysis

The SPSS software (version 24) was used for data entry and analysis. Fisher's exact test was used to examine the association between the level of IA (mild, moderate, and severe) and gender (male and female). Additionally, a regression analysis was conducted to evaluate the influence of IA on the need for knowledge.

Results

Table 1 provides detailed demographic information about the participants. Of the 127 participants involved, 37.80% were male and 62.20% female, with an average age of 22 years. The distribution by educational background showed that 55.90% were from the School of Law and 44.10% were from the Unani Medical College. It is noteworthy that women accounted for a higher proportion (62.20%) than men (37.80%). Among the participants, 55.90% were law students and 44.10% were from Unani Medical College. Regarding internet usage, 33.10% reported spending more than 5 hours online every day, followed by 14.20% between 4 and 5 hours, 18.90% between 3 and 4 hours, 23.60% between 2 and 3 hours, 8.70% between 1 and 2 hours, and 1.60% less than 1 hour. The maximum achievable score on the NCS was 72, with no participant achieving less than 25% of the total score. Only 4.70% achieved a score between 26% and 50%, while 79.50% achieved a score between 51% and 75%, and only 15.70% achieved a score between 76% and 100% of the total NCS score.

Figure 1 displays that 57.40% of the participants showed signs of IA, while 42.50% were classified as regular Internet users. Within the addict group, 47.20% and 10.20% of students had mild and moderate IA scores, respectively.

Figure 2 illustrates that 21.25% of Law and Unani participants were classified as regular Internet users. Meanwhile, 27.50% of law students and 19.60% of Unani students showed signs of mild IA. Additionally, 7.08% of law students and 3.14% of Unani students reported moderate levels of IA.

The correlation between IA and NFC was not statistically significant ($r=-0.041$, $P>0.001$). Fisher's exact test (4.76, $P=0.082$) yielded no significant results. Furthermore, the results of the regression analysis examining whether IA significantly predicted NFC were not statistically significant ($F_{(1,125)}=0.207$, $P>0.001$), indicating that IA did not exert a significant influence on NFC in the present study.

Table 1. Distribution of Demographic Variables and Internet Addiction

| Measures	Dimension	Frequency	Percentage
Gender	Male	48	37.80%
	Female	79	62.20%
Type of College	Law	71	55.90%
	Unani	56	44.10%
Time IA	0-1 hours	02	1.60%
	1-2 hours	11	8.70%
	2-3 hours	30	23.60%
	3-4 hours	24	18.90%
	4-5 hours	18	14.20%
	5+ hours	42	33.10%
Internet Addiction	Normal	54	42.50%
	Mild	60	47.20%
	Moderate	13	10.20%
	Severe	00	0.00%
Need for Cognition	0-25%	00	0.00%
	26-50%	06	4.70%
	51-75%	101	79.50%
	76-100%	20	15.70%

Prevalence of Internet addiction
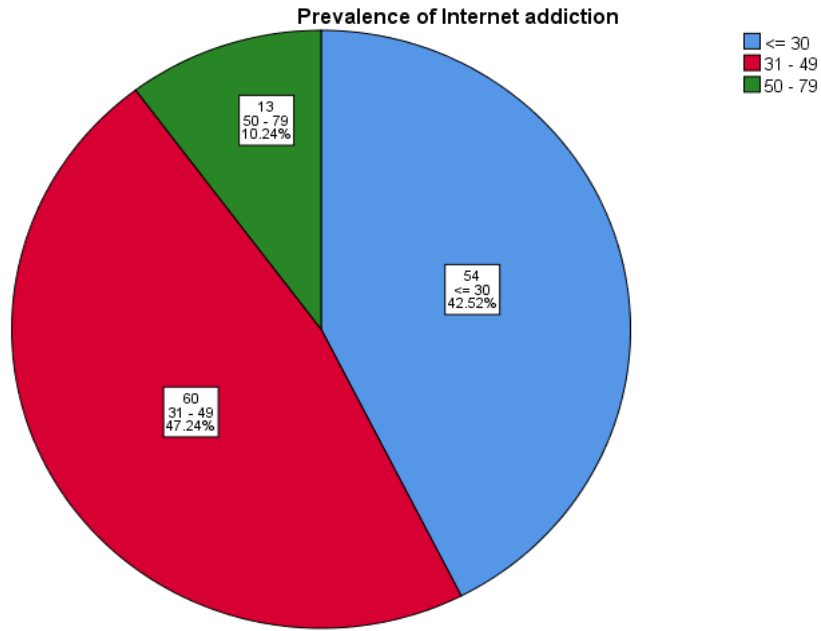
Figure 1. Degree of internet addiction among participants
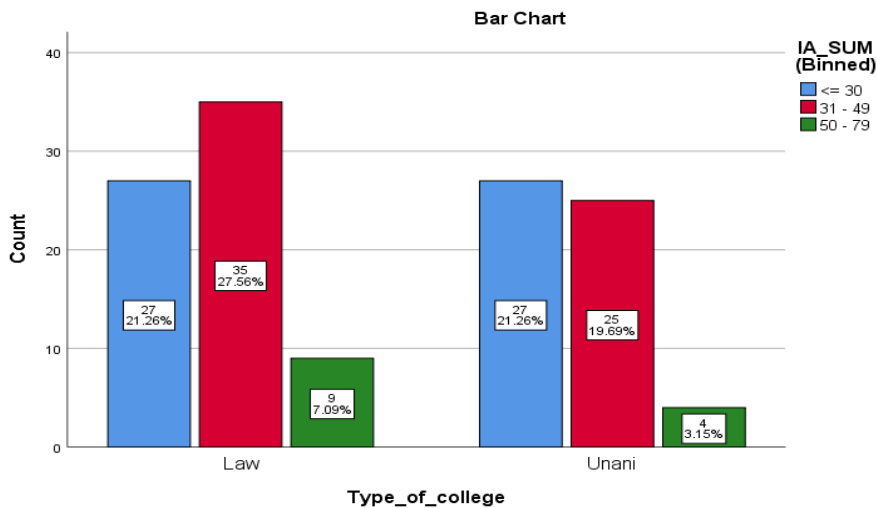

Figure 2. Distribution of Internet users

Discussion

The Internet serves as a primary resource for both knowledge acquisition and entertainment. India has mandated universal access to the Internet for its citizens. To our knowledge, there is little research on IA among law and Unani medical students in India. However, recent research has found that IA is an important predictor of the NFC [34]. Shi et al. (2010) found a significant negative relationship between the NFC and problematic Internet use [35]. Furthermore, IA has been reported to be significantly negatively correlated with the NFC [34]. This finding contradicts previous research [35] that suggested a significant positive relationship between IA and the NFC.

Further research examining the cognitive functioning of internet addicts has shown deficits in key executive functions, such as response inhibition [19,20], difficulty managing cognitive conflicts [21], diminished cognitive flexibility [21,22], and impaired decision-making ability [23,24]. In particular, research reported reduced ventrolateral prefrontal cortical activation in excessive internet users, indicating deficits in cognitive control [23]. Our current findings failed to identify the connection between IA and the NFC. This discrepancy may have stemmed from variations in lifestyle and characteristics of the study sample.

To the best of our knowledge, there is no previous research examining IA among Law and Unani medical students in India. Numerous earlier studies have indicated that despite a significant increase in internet use during the COVID-19 pandemic, the prevalence of severe IA cases remained lower

compared to mild and moderate levels of addiction [9,11,36]. In contrast to previous research that reported 23.60% severe IA among college students in the Indian city of Bhubaneswar with a mean age of 18.81±1.189 years [37], no severe Internet addicts were identified in our current study. This discrepancy could be attributed to various demographic factors within the population, such as literacy rates and a high human quality index.

The present study is consistent with previous research regarding the prevalence rates of mild, moderate, and severe IA in descending order. For example, a study carried out on Indian engineering students [36] found that 27.1% were mildly addicted, 9.7% were moderately addicted, and only 0.4% were severely addicted. Similarly, a study on medical students from South India [38] showed that 27% had mild addiction, 10.4% had moderate addiction, and 0.8% had severe addiction. The current study consistently found a higher prevalence of mild IA compared to moderate and severe cases, reflecting the trends observed in the above studies. Although the prevalence of moderate addiction in our study was in line with that of previous studies, it is noteworthy that the proportion of mild addiction exceeded that of previous studies. While there were significantly fewer cases of moderate addiction in our study than cases of mild addiction, it is important to recognize that the number of regular Internet users was lower than the total number of Internet addicts.

Our findings revealed that participants had a higher incidence of mild, moderate, and severe IA than participants with normal Internet usage levels, making it difficult to generate conclusive empirical evidence. Several factors may contribute to the fact that this study observed a larger proportion of participants who were above the normal threshold for IA than within the normal range. With the outbreak of the COVID-19 pandemic, people increasingly turned to digital platforms to relieve themselves from negative emotions, such as stress, loneliness, and limited social interaction. It appears reasonable to hypothesize that increased Internet usage during the pandemic continued in participants' daily routines even after the pandemic subsided.

In the realm of 21st-century competencies, the ability to construct knowledge and the competent use of information and communication technology are considered mandatory skills [39]. Mastery of sophisticated epistemic cognition is critical to the effective synthesis of knowledge and full use of technology. Interventions that target epistemic cognition are essential to elucidate optimal Internet use while protecting against cognitive decline.

Epistemic cognition encompasses the complex cognitive processes that individuals employ to achieve sophisticated epistemic goals, including understanding, judgment, and acquisition of appropriate knowledge [40]. The AIR model of epistemic cognition describes three key components: epistemic goals and values, epistemic ideals, and the distinction between reliable and unreliable cognitive processes [40]. Engaging in sound reasoning proves to be a reliable process for producing sophisticated epistemic results and requires individuals to carefully consider diverse perspectives to reach informed conclusions.

However, excessive Internet use, leading to addiction, can impair a person's ability for cognitive control and flexibility, impeding intentional cognitive processing and sound reasoning. This deficit in cognitive control may further hinder the resolution of cognitive conflicts and the selection of optimal cognitive processes necessary for effective decision-making in knowledge contexts. Consequently, excessive Internet consumption not only promotes anxiety and negative mental health outcomes but also undermines reliable paths to achieving epistemic goals [37]. Given that negative emotions are considered unreliable for achieving epistemic goals, IA can adversely affect epistemic cognition, creating a significant barrier to the development of higher-order thinking skills and hindering intellectual and cognitive progress within society.

A study examining the psychological impact of the COVID-19 lockdown found significant improvement in relationships with various people, such as spouses/partners (47.4%), children (44.20%), neighbors (61.80%), colleagues (59.60%), and parents (47.30%) [41]. This improvement in relationship dynamics may be attributed to the longer periods of physical interaction with loved ones. Prolonged proximity likely led individuals to recognize the importance of intimacy and deepen their affection for their significant ones [42]. Despite an observed increase in internet usage during the lockdown compared to pre-pandemic times, increased physical interaction with loved ones may have acted as a buffer against excessive internet consumption and potential addiction.

Future research could examine the relationship between reciprocal physical interaction with significant ones and IA, particularly in the context of lockdown measures. As governments gradually lifted lockdown restrictions, there might have been an expectation that individuals would re-engage with the external social sphere rather than relying heavily on Internet use, driven by feelings of boredom and loneliness arising from reduced social interactions. However, our current study found a

higher prevalence of IA compared to pre-pandemic levels, suggesting that further research is needed into the underlying factors contributing to this phenomenon. Policymakers should consider implementing interventions to curb IA by promoting constructive avenues for intellectual engagement. The present study included a limited number of participants. To improve the generalizability of the results across the population, future research endeavors should involve a larger sample size. The study underscores the varied levels of IA among students, with distinct differences between law and Unani students. To address this, future research should investigate the underlying causes of these differences, considering cultural, academic, and lifestyle factors. Additionally, exploring interventions targeting epistemic cognition could help students harness the Internet's benefits while mitigating its adverse effects on cognitive engagement. Longitudinal studies may offer insights into the long-term impact of IA on the NFC. Emphasizing gender-specific approaches could also be valuable, given the nuanced findings related to gender and IA in this study.

Conclusions

In conclusion, this study sheds light on the prevalence of IA among students and shows that significant proportions fall into the categories of mild and moderate addiction. Of particular note are the different prevalence rates between law and Unani students, suggesting an influence of academic discipline on IA tendencies. Despite these findings, the study failed to find a statistically significant correlation between IA and NFC, nor did it predict NFC based on IA values. Furthermore, examining the association between IA and gender revealed non-significant results. These results highlight the complexity of Internet usage patterns and their relationship with cognitive factors and demographic variables. In the future, interventions targeting epistemic cognition are recommended to promote effective Internet use without impairing cognitive functions. By addressing the complexities of IA and its impact on cognitive engagement, such interventions can contribute to healthier Internet habits among students and mitigate the negative effects of excessive Internet use.

Authors' contributions
All authors contributed equally to the manuscript.

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