Pesquisa Brasileira em Odontopediatria e Clínica Integrada 2025; 25:e230165
https://doi.org/10.1590/pboci.2025.024
ISSN 1519-0501 / eISSN 1983-4632

ORIGINAL ARTICLE

Internet Addiction: Prevalence and Factors among Indian Dental Students

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Academic Editor: Alessandro Leite Cavalcanti

Received: August 25, 2023 / **Review:** May 14, 2024 / **Accepted:** May 20, 2024

How to cite: Nagarajappa R, Dhar U, Mohapatra A. Internet addiction: Prevalence and factors among Indian dental students. Pesqui Bras Odontopediatria Clín Integr. 2025; 25:e230165. https://doi.org/10.1590/pboci.2025.024

ABSTRACT

Objective: To assess the prevalence and determine the factors associated with Internet Addiction among Indian dental students. **Material and Methods:** A cross-sectional study was conducted among 250 dental students from different academic years of the Institute of Dental Sciences, Bhubaneswar. Information on demographic characteristics, purpose, and duration of Internet use was recorded. Internet Addiction was assessed using Young's 20-item Internet Addiction Test (IAT) questionnaire. Chi-square, One-way analysis of variance (ANOVA), and Pearson's Correlation tests were used for statistical analysis. The level of significance was set at $p \leq 0.05$. **Results:** The prevalence of Internet Addiction was found to be 20.4%. Third-year students showed the highest mean Internet Addiction (46.74 ± 10.26) score. Social networking was the main purpose of Internet use. Bivariate analysis showed that daily hours of Internet use were strongly associated with Internet Addiction, which was statistically significant ($p=0.033$). The major domains identified in our study towards the contribution of Internet Addiction were Dependence (10.74 ± 2.79) followed by Overuse (10.52 ± 2.58), Emotional state (9.70 ± 3.10), Inhibiting the Flow of Life (8.16 ± 2.74) and Non-restraint (6.37 ± 1.98). **Conclusion:** Internet Addiction often coexists with other psychological problems. Therefore, early interventions should be implemented, and students should be aware of the adverse effects of spending unnecessary time online.

Keywords: Internet Use; Internet Addiction Disorder; Technology Addiction.

Introduction

In today's world, technology is everywhere, and it is here to stay. The technology efficiently addresses the natural human needs for stimulation, interaction, and environmental changes. In a world where technology is changing fast and the Internet is a step forward with all its advancement, the Internet provides a global network of digital devices that gives knowledge and intercommunication podium. In the modern world, the Internet has played a vital role in providing people access to knowledge, connecting them, and keeping them updated with the world. People worldwide use the Internet on a wide scale in their daily lives. Data shows that, worldwide, the Internet is being used by more than 600 million people [1].

Exaggerated Internet use can lead to deleterious effects such as below-par academic performance [2] and detachment from society [3] and might impede adolescent's achievement of psychosocial developmental tasks [4]. Major Internet users are college students; they use it for pedagogical purposes, accessing virtual libraries, conducting research studies, and engaging in recreational activities. It's easy to access and understand, and there is an absence of self-control among young individuals of this age group. Thus, they become more prone to Internet Addiction [1].

It is high time now that we take steps to control the spread of this contagious habit, as nowadays it is common to come across words like problematic Internet use, pathological Internet use, compulsive Internet use, and or Internet Addiction. Young used the term 'Internet Addiction disorder' first and defined Internet Addiction as "an impulse control disorder which does not involve an intoxicant." Young remarked on the diagnostic criteria for Internet Addiction, which was almost the same as chemical substance dependence [5]. By definition, Internet addiction is "an individual's uncontrollable use of the Internet that has created psychological, social, and work problems in one's life" [1].

Studies in recent years have shown that Internet Addiction is one of the most critical international mental health problems, and particular consideration should be given to this issue [5,6]. The Indian population, especially adolescents and college students, have become unrestrained Internet users. There are not enough studies that have succeeded in confirming the association between Internet Addiction and the factors leading to addiction. Hence, this study was conducted to assess the prevalence and determine the factors associated with Internet Addiction among Indian dental students.

Material and Methods

Design and Ethical Clearance

A cross-sectional study was conducted to assess Internet addiction among dental students. A convenient (non-probability) sampling technique was used to select 250 students representing different academic years in a private Dental Institution of Bhubaneswar, India. The Ethical Committee of the related Institution reviewed the study protocol and was granted ethical clearance (ECR/627/Inst/OR/2020/RR-20). The study was completely anonymous and did not disclose personal details. Informed consent was obtained from all the participants before completing the questionnaire.

Participant Selection

Male and female students studying in the dental college were selected, and those who were willing to provide their agreement to participate in the study were included. Those who were unwilling to participate, those who did not cooperate with the assessment, and those who failed to respond to all the questions in the questionnaire were excluded.

Data Collection

Data collection was done from June to July 2020. Using an Internet platform (www.googleforms.com), survey questions were prepared through a convenience sampling technique, and they were either mailed to or shared via online platforms like WhatsApp to dental students. The initial part of the questionnaire included demographics like age, gender, year of study, duration, and purpose of Internet use. Young's 20-item Internet Addiction Test (IAT) questionnaire was used to assess the severity of Internet Addiction among the study population.

Internet Addiction Test evaluates symptoms and compulsivity in a variety of test settings [7]. The 20-item questionnaire measures characteristics and behaviours associated with pathological Internet use, including Overuse, non-restraint, emotional state, the inhibiting flow of life, and dependency [8]. The questionnaire (IAT) has good internal consistency and reliability combined with face and construct validity, as demonstrated by previous studies. Confirmatory Factor Analysis (CFA) has reduced data from 20 items to five sub-dimensions (Dependence, Overuse, Emotional state, Inhibiting the Flow of Life, and Non-restraint). Questions are randomized, and each statement is weighted along a Likert-scale continuum that ranges from 1 = totally agree to 5 = totally disagree for each item. The Total score ranges from 20-100. The individual was considered Internet Addicted if the scores were greater or equal to fifty.

Data Analysis

The collected data was analyzed using a statistical package for social sciences (SPSS) software, version 23.0 (SPSS Inc., Chicago, IL, USA). Kolmogorov Smirnov test revealed the normal distribution of data, and hence, parametric tests were used for testing the association between Internet Addiction and the factors leading to addiction. Descriptive statistics, Pearson's Chi-square, and One-way analysis of variance (ANOVA) tests were used to check the association of all items in the questionnaire with independent variables. Pearson's Correlation test was applied to check the correlation between total Internet addiction scores and other independent variables; The significance level was established at $p \leq 0.05$.

Results

A total of 250 students participated in the study. The mean age of dental students was 20.9±1.96 years. The majority of the students were females (74%) and predominantly belonged to the first year (32.8%) (Table 1).

Table 1. Demographic characteristics of the study population.

Variables	N	%
Age (in years)		
18-20	119	47.6
21-23	110	44.0
24-26	21	8.4
Gender		
Male	65	26.0
Female	185	74.0
Year of Study		
First Year	82	32.8
Second Year	45	18.0
Third Year	47	18.8
Fourth Year	35	14.0
Interns	41	16.4

The overall mean Internet Addiction score was found to be 45.49±10.56. The third-year students (46.74±10.26) showed a marginally higher Internet Addiction score, followed by fourth years (46.57±11.42). Interns showed the lowest Internet Addiction score (44.00±11.02). No significant difference (p=0.58) was observed in the mean Internet Addiction total score between different years of dental students. In the studied population, the prevalence of Internet Addiction was 20.4%. The differences observed between various academic years were not statistically significant (p=1.000) (Table 2).

Table 2. Mean internet addiction score and distribution according to year of study.

Year of Study	Internet Addiction Score Mean ± SD	Addicted N (%)	Not-Addicted N (%)
First Year	44.54 ± 9.84	17 (20.7)	65 (79.3)
Second Year	46.44 ± 11.15	09 (20.0)	36 (80.0)
Third Year	46.74 ± 10.26	10 (21.3)	37 (78.7)
Fourth Year	46.57 ± 11.42	07 (20.0)	28 (80.0)
Interns	44.00 ± 11.02	08 (19.5)	33 (80.5)
Total	45.49 ± 10.56	51 (20.4)	199 (79.6)
p-value	0.58 [a]	1.000 [b]	

[a]One way ANOVA; [b]Chi square test; Level of significance p<0.05.

The reasons reported as per the amount of Internet use include social networking (68%), followed by entertainment (33.2%), education (30.4%), e-mail communication (20%), and research (4%) (Table 3).

Table 3. Purpose of using the Internet.

Purposes	N (%)
Entertainment	83 (33.2)
Social Networking	170 (68.0)
E-mail Communication	50 (20.0)
Research	10 (4.0)
Educational	76 (30.4)

A bivariate analysis was done to identify the factors that were strongly associated with Internet Addiction among dental students (Table 4). Daily hours of Internet use showed a statistically significant difference (p=0.033) between those students who were addicted and those who were not addicted. No significant association was observed between other variables like age, gender, and year of study with Internet Addiction.

Table 4. Association of internet addiction with different factors.

Variables	Categories	Addicted N (%)	Not-Addicted N (%)	p-value
Age (in Years)	18-20	24 (20.2)	95 (79.8)	0.612
	21-23	21 (19.1)	89 (80.9)	
	24-26	6 (28.6)	15 (71.4)	
Gender	Males	13 (20.0)	52 (80.0)	0.926
	Females	38 (20.5)	147 (79.5)	
Year of Study	First-year	17 (20.7)	65 (79.3)	1.000
	Second year	9 (20.0)	36 (80)	
	Third year	10 (21.3)	37 (78.7)	
	Fourth-year	7 (20.0)	28 (80.0)	
	Interns	8 (19.5)	33 (80.5)	
Daily Hours of Internet Use	≤3	32 (17.2)	154 (82.8)	0.033*
	>3	19 (29.7)	45 (70.3)	

Chi-square test; *Statistically significant.

According to the Confirmatory Factor Analysis (CFA) reported in previous studies, all the items in the questionnaire have made significant contributions, resulting in a structure composed of five sub-dimensions. Accordingly, the central domain identified in our study population was Dependence (10.74 ± 2.79) followed by Overuse (10.52 ± 2.58), Emotional state (9.70 ± 3.10), Inhibiting the Flow of Life (8.16 ± 2.74), and Non-restraint (6.37 ± 1.98) (Table 5).

Table 5. Mean Internet Addiction Scores were distributed according to the sub-dimensions of Young's Internet questionnaire.

Sub-dimensions	Range	Mean ± SD
Overuse	5-18	10.52 ± 2.58
Non- restraint	3-15	6.37 ± 1.98
Inhibiting the Flow of Life	4-20	8.16 ± 2.74
Emotional State	4-20	9.70 ± 3.10
Dependence	3-15	10.74 ± 2.79

There was a slightly positive but statistically significant correlation between the total scores of IA and the daily hours of Internet use (r=0.274, p=0.001), indicating that Internet Addiction was higher among those students who spent more hours on the Internet (Table 6).

Table 6. Correlation between total scores of Internet addiction and other independent variables.

Variables	r-value	p-value
Age (in Years)	0.013	0.843
Gender	0.103	0.105
Year of Study	0.008	0.905
Daily Hours of Internet Use	0.274	0.001*

*Statistically significant.

Discussion

Both psychological and sociological issues have been associated with Internet Addiction [9]. The American Psychiatric Association included Internet Addiction as a disorder in its supplement of the Diagnostic and Statistical Manual for Mental Disorders, Fifth Edition [10]. The prevalence of Internet Addiction among our study population was assessed using Young's 20-item Internet Addiction Test (IAT) questionnaire. Different authors have already attested to this questionnaire for assessing Internet Addiction among college students in other areas of India [1,11,12].

In today's society, college students are found to be more vulnerable to Internet Addiction [13,14], and its prevalence among adolescents varies across different areas of the world [15]. In Western and Eastern countries, the prevalence of Internet Addiction is 1.98% to 35.8% among adolescents [16-18]. The overall prevalence of Internet Addiction was found to be 20.4% among our dental undergraduate students. A slightly higher proportion of 23% and 29.2% were reported in their respective studies on dental students [19,20]. Krishnamurthy and Chetlapalli [21] have also found a higher prevalence of Internet Addiction, i.e. 34% among university students. On the contrary, Frangos et al. [22] have observed a lower prevalence of Internet Addiction (12%). These variations may be due to the differences in sample size, research design, and diagnostic criteria used by diverse studies.

The mean Internet Addiction score in our study population was 45.49±10.56. No significant difference (p=0.58) was observed in the mean Internet Addiction total score between different years of dental students. The mean score was found to be maximum in third-year students. Kumar et al. [1] have reported conflicting results

that first-year students are more prone to Internet Addiction as they have extra leisure time and are more likely to participate in risk-taking behavior, which may contribute to the development of Internet Addiction.

Social networking, followed by entertainment, was the primary purpose for Internet use. These two activities are the most important activities related to Internet dependency, which is consistent with the fact confirmed by other researchers [23-27]. During adolescence, peer communication or social networking is the most common reason for using the Internet [28]. Similar findings were reported by Ozcan and Buzlu [13], who found that university students mainly use the Internet for social networking. Ceyhan's [29] finding supports similar results where "entertainment" and "communication" purposes are the main reasons for Internet use and are important predictors of Internet Addiction. As revealed by Whang et al. [30], students classified as Internet addicted make more use of Internet communication facilities and online game services when compared with nonaddicted groups. Its utility for academic purposes was moderate and drew immediate attention for enhancement.

According to our study, daily hours of Internet use showed a statistically significant difference between those students who were addicted and those who were not addicted. Preceding studies have shown that addicted users spend longer hours using the Internet, which is linked to one of the most significant concerns of poor functioning or academic performance [31,32].

In our study, there was no significant difference between genders concerning the level of IA, although numerous researchers found a male preponderance [11,23,26,29,31,33,34]. Generally, females are acknowledged to have high Maladaptive Internet use [5,18,35]. Males frequently reach the level of IA, whereas females have better control over them when internet use is considered. Similar to our study, there was no gender difference in the study population of Brenner [36] as well.

Most of the previous researchers had concluded that there was a significant relationship between the severity of Internet Addiction and age, so younger people are at higher risk for Internet addiction disorder [6,24,37]. However, our study reported contrary findings that IA was more prevalent among the older group (28.6%). This difference was insignificant and may be due to the age range, which was much narrower (18 to 26 years), where all the study participants can be considered almost equal.

In our study, there were five major domains, out of which the Dependence mean score was highest, followed by Overuse. The degree of Dependence on the Internet of the dental undergraduate was assessed by student activities (anxiety when a digital device is lost, taking digital devices when leaving home, keeping digital devices when going to sleep). The overuse criteria were assessed using activities (being occupied with digital devices while having food, having an eye on digital devices while with friends, overusing digital devices out of their purpose, checking devices even while working, even when busy looking into digital devices). Young [38] found that people who have Internet addiction are more involved in digital devices or tend to overuse digital devices to compensate for their lack of interpersonal interaction in the real world.

The study design's cross-sectional nature can be considered a limitation of this study. The generalizability of the study could be better as the sampling technique is non-probabilistic and also due to the lack of sample calculation. Additionally, self-reporting of information probably added to social desirability bias, as the study participants may have reacted to depict themselves in a good light.

Conclusion

This study revealed a high prevalence of problematic Internet use among dental students, and various factors were associated with it. The students need to be educated about the safe, valuable, and healthy practices

of Internet use. Accepting that Internet use can cause some mental disorder is still in its initial stages in India, and excessive Internet use is regarded as an emerging public health issue globally. Therefore, early intercessions should be realized, and such a population should be aware of the adverse impacts of investing excessive energy in the web.

Authors' Contributions

RN	https://orcid.org/0000-0002-0253-7720	Conceptualization, Methodology, Formal Analysis, Data Curation, Writing - Original Draft, Writing - Review and Editing, and Supervision.
UD	https://orcid.org/0000-0003-1866-4828	Conceptualization, Methodology, Formal Analysis, Data Curation, Writing - Original Draft and Writing - Review and Editing.
AM	https://orcid.org/0000-0001-6970-600X	Conceptualization, Methodology, Formal Analysis, Writing - Review and Editing and Supervision.
All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.		

Financial Support

None.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

Acknowledgments

The authors would like to thank all the study participants for their kind cooperation during the investigation.

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