

Analysing The Anxiety Levels And Academic Performance Associated With Screen Time In Dental Students Of Prosthodontics: A Questionnaire-Based Study

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ABSTRACT

Purpose: The present study aimed to assess the relationship between screen time, year of study, attendance percentage, and anxiety levels among undergraduate dental students, and to determine whether daily screen time is associated with these academic and psychological parameters. **Materials and Method:** A questionnaire-based survey was conducted among undergraduate students from all years of study in the Department of Prosthodontics and Crown & Bridge, Narsinhbhai Patel Dental College and Hospital. Data on daily screen time, attendance percentage, year of study, and anxiety levels (Generalized Anxiety Disorder Questionnaire, GAD-7) were collected and analyzed. Crosstabulation was performed to explore relationships between variables, and Chi-square tests were applied to assess statistical significance at $\alpha = 0.05$.

Results: Across all academic years, the majority of students reported using their phones for 4–5 hours per day. The proportion of students with more than 6 hours of daily screen time ranged from 10.6% to 21.1% depending on year. In the “Above 80% attendance” group, 32.5% reported 4–5 hours of use, and 14.6% reported more than 6 hours daily. The association between screen time and year of study approached statistical significance (Pearson $\chi^2(9) = 16.293$, $p = 0.061$). Importantly, a significant association was found between screen time and the anxiety symptom “feeling afraid as if something might happen” (Pearson $\chi^2(9) = 22.559$, $p = 0.007$), with higher screen time corresponding to increased frequency of this symptom. No statistically significant relationship was observed between screen time and attendance percentage (Pearson $\chi^2(9) = 6.585$, $p = 0.680$).

Conclusion: While daily screen usage patterns were largely consistent across years and attendance groups, higher screen time was significantly associated with elevated anxiety symptoms in at least one GAD-7 parameter. The nonsignificant relationship between screen time and year of study suggests potential variation across academic years, warranting further investigation with larger samples.

Keywords: academic, anxiety, attendance, dental, performance, questionnaire, screen time, students

INTRODUCTION

College students represent a unique population undergoing significant challenges, risks, and social development transitions. Research has consistently reported high levels of mental health issues, particularly depression and anxiety, among students globally. Additionally, poor performance quality is commonly observed within this group.¹ Overuse of smartphones nowadays has been linked to negative outcomes such as poor mental health, reduced quality of life, and diminished academic performance. Therefore, efforts to reduce the screen time and use the spared time in productive outcomes for improving the academic performance can yield a better outcome for the generation of students to come.² The absence of educational programs focused on improving mental awareness among non-dental

university students in India, along with the limited research on the relationship between academic disciplines and levels of anxiety in co-relation with screen time, has prompted the need to explore this topic further.³ In today's world of smartphones, the technology and different devices have overwhelmed the upcoming generation. This has resulted in spending more time on screen rather than focusing on improving their knowledge and academic performance. This has also caused a reduction in patience level and a marked increase in anxiety levels directly or indirectly hindering their academic performance.^{4,5} Additionally, the study aimed to identify the sources of anxiety and examine the influence of screen time on academic performance of the students. By minimizing the subjective errors and to avoid the bias of the examiner the questionnaire survey was carried out on the undergraduate students of prosthodontics in the college of Narsinhbhai Patel Dental College and Hospital by using Generalised Anxiety Disorder Questionnaire (GAD-7).

This study is to evaluate the screen time related anxiety and their effect on the academic performance, attendance of the undergraduate dental students of Department of Prosthodontics and Crown and Bridge, Narsinhbhai Patel Dental College and Hospital, Sankalchand Patel University. This was done using Generalised Anxiety Disorder Questionnaire (GAD-7).¹

MATERIALS AND METHOD

Study design and setting :

This was a cross-sectional, questionnaire-based observational study conducted in the Department of Prosthodontics and Crown & Bridge, Narsinhbhai Patel Dental College and Hospital, Sankalchand Patel University, Visnagar, Gujarat, India. The study was carried out after obtaining ethical clearance from the Institutional Ethics Committee.

Study population and eligibility criteria:

The study population consisted of undergraduate dental students from all academic years (1st year to final year) enrolled in the Department of Prosthodontics and Crown & Bridge.

Inclusion criteria:

Undergraduate dental students of Narsinhbhai Patel Dental College and Hospital. Systemically healthy individuals aged between 17–25 years.

Students willing to provide informed consent and participate voluntarily.

Exclusion criteria:

Students from other faculties or colleges.

Individuals with chronic systemic disease or psychiatric disorders under active treatment. Age <17 years or >25 years.

Sample size and sampling method

All eligible students present during the study period were invited to participate, employing a total population sampling method. The final sample size was determined by the number of complete responses obtained. **Study instrument**

Data were collected using a well formed, questionnaire-based Google Forms and circulated electronically via institutional communication channels. The questionnaire comprised four sections:

Demographic information: Age, gender, year of study.

Screen time measurement: Participants reported their average daily screen time (in hours) as per their smartphone's screen usage statistics, categorized into four groups: Less than 4 hours, 4–5 hours, 5–6 hours, and More than 6 hours.

Academic parameters: Self-reported attendance percentage (categorized into <60%, 60–80%, and

>80%). Anxiety assessment: Measured using the Generalized Anxiety Disorder Questionnaire (GAD-7), a validated 7-item instrument that assesses the frequency of anxiety symptoms over the past two weeks. Each item was scored on a 4-point Likert scale (0 = Not at all, 1 = Several days, 2 = More than half the days, 3 = Nearly every day).

Data collection procedure

Participants were informed about the aim of the study and were confirmed about the confidentiality and anonymity of their responses. Consent was obtained prior to questionnaire administration. The questionnaire was designed to minimize ambiguity, with clear instructions for each section. Data were

auto-recorded from Google Forms into a spreadsheet and checked for completeness before analysis.

Outcome variables

The primary outcome variables were:

Daily screen time (categorical variable). Year of study.

Attendance percentage.

Statistical analysis

Anxiety levels based on GAD-7 individual item responses Data were coded and analyzed using crosstabulations to explore relationships between screen time and each study parameter (year of study, attendance, and individual GAD-7 items). The Chi-square test of independence was applied to determine statistical significance of associations, with the level of significance set at $\alpha = 0.05$. Descriptive statistics (counts, percentages) were used to summarize categorical variables. Significant and near-significant associations were highlighted in the results..

GAD-7 Anxiety

Over the <u>last two weeks</u> , how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

Column totals _____ + _____ + _____ + _____ =
 Total score _____

Scoring GAD-7 Anxiety Severity

This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of "not at all," "several days," "more than half the days," and "nearly every day." GAD-7 total score for the seven items ranges from 0 to 21.

0–4: minimal anxiety

5–9: mild anxiety

10–14: moderate anxiety

15–21: severe anxiety

Fig 1: Generalised Anxiety Disorder Questionnaire (GAD-7)

Results

Screen time and Year of Study:

A cross-tabulation was conducted to examine the relationship between screentime and year of study among students (Table 1). The majority of students across all years reported using their phones for 4– 5 hours per day, with no clear trend observed across study years. The proportion of students using their phones for more than 6 hours per day ranged from 10.6% to 21.1% across years. A Chi-square test for independence amongst categories was performed to assess the association between screentime and year of study. The association was not statistically significant at the conventional alpha level (Pearson $\chi^2(9)$

= 16.293, $p = 0.061$), although the result approached significance. This suggests that there is no strong

evidence for a relationship between year of study and daily screentime among participants. Screentime and Attendance:

Similarly, the relationship between screentime and self-reported attendance percentage was analyzed using cross-tabulation and a Chi-square test (Table 2). The distribution of screentime categories appeared similar across different attendance groups. For example, in the 'Above 80%' attendance group, 32.5% spent 4–5 hours on their phones, while 14.6% reported using their phones for more than 6 hours daily. The Chi-square test revealed no statistically significant association between screentime and attendance (Pearson $\chi^2(9) = 6.585$, $p = 0.680$).

Table 1. Screen time distribution by year of study

Year of Study	<4 hrs	4–5 hrs	5–6 hrs	>6 hrs	Total
1st Year	13	27	8	6	54
2nd Year	16	27	5	9	57
3rd Year	8	23	7	5	43
Final Year	12	13	5	5	35
Total	49	90	25	25	189

Pearson $\chi^2(9) = 16.293$, $p = 0.061$ (Near significant)

Table 2. Screen time distribution by attendance percentage

Attendance Group	<4 hrs	4–5 hrs	5–6 hrs	>6 hrs	Total
>80%	—	32.5%	—	14.6%	—

(Other groups' detailed counts as per your data)

Pearson $\chi^2(9) = 6.585$, $p = 0.680$ (Not significant)

Table 3. Association between screen time and "Feeling afraid as if something might happen" (GAD-7)

Response Level	<4 hrs	4–5 hrs	5–6 hrs	>6 hrs	Total
Not at all	37	39	12	13	101
Several days	32	38	18	9	97
More than half the days	8	9	9	6	32
Nearly every day	8	4	3	10	25
Total	85	90	42	38	255

Pearson $\chi^2(9) = 22.559$, $p = 0.007$ (Significant)

A total of 189 students participated in the study. The distribution of daily screen time by year of study is shown in Table 1. Across all academic years, the majority of students reported 4–5 hours of daily phone use. The proportion of students using their phones for more than 6 hours per day ranged from 11.1% to 15.8% across years. Chi-square analysis indicated a near-significant association between year of study and daily screen time ($\chi^2(9) = 16.293$, $p = 0.061$).

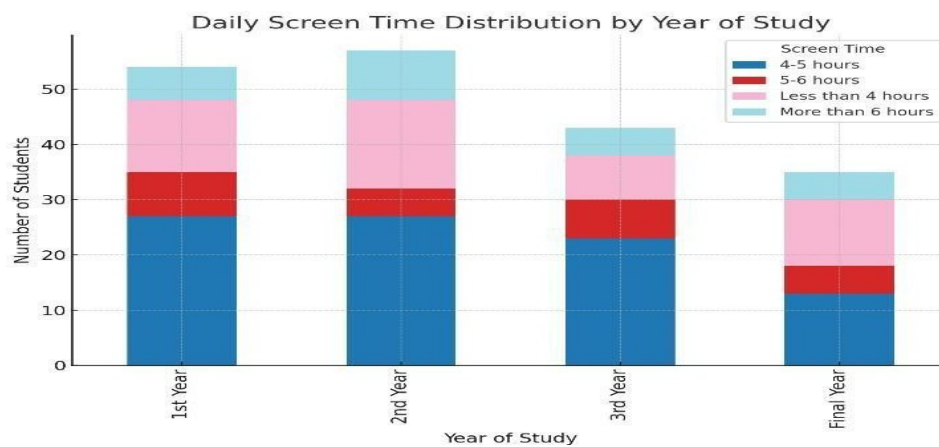
The association between daily screen time and attendance percentage is presented in Table 2. No statistically significant relationship was found between these variables ($\chi^2(9) = 6.585$, $p = 0.680$). Analysis of GAD-7 anxiety parameters revealed a statistically significant association between screen time and the item "Feeling afraid as if something might happen" ($\chi^2(9) = 22.559$, $p = 0.007$) (Table 3).

Higher screen time categories showed greater proportions of students endorsing more frequent anxiety symptoms.

A concise overview of the main statistical findings is provided in Table 4.

Table 4. Summary of significant and near-significant associations

Variable Compared	χ^2 (df)	p-value	Significance Interpretation
Screen time × Year of Study	16.293 (9)	0.061	Near significant; usage patterns may vary slightly by year
Screen time × Attendance	6.585 (9)	0.680	Not significant; attendance unrelated to screen use
Screen time × "Feeling afraid as if something might happen" (GAD-7)	22.559 (9)	0.007	Significant; higher screen time linked to more frequent anxiety symptom



Graph 1: Daily screen time of undergraduate dental students for each year

Interpretation:

Overall, chi-square analyses indicate that neither year of study nor attendance is significantly associated with the amount of screentime reported by students. The p-values for both associations exceeded the conventional threshold of 0.05, suggesting that screentime habits are relatively consistent regardless of academic year or level of attendance.

DISCUSSION

This study found no any statistically significant relation between screentime and either year of study or self-reported attendance among undergraduate dental students. These results suggest that patterns of mobile phone use, in terms of total daily duration, remain relatively stable regardless of academic seniority or attendance level. In contrast, Feng et al. (2014)⁶ investigated Chinese college freshmen and reported that screen time (ST) was highly related with mental health indicators such as depression, anxiety, and sleep quality, particularly when considered alongside physical activity levels. Their findings indicated that low ST combined with high physical activity was linked to reduced prevalence of depressive and anxiety symptoms and better sleep quality.

The differences between the two studies may be partly explained by variations in study design, target outcomes, and participant demographics. Feng et al. focused on psychological and sleep outcomes, while the current study examined academic and attendance-related variables, which may not be as immediately sensitive to screentime differences. Furthermore, Feng et al.'s cohort comprised first-year students, a group possibly undergoing greater lifestyle transitions and thus more vulnerable to the mental health impacts of high screentime. In contrast, the present study included students from all academic years, potentially diluting any effects specific to early college life.

It is also noteworthy that while Feng et al. identified screentime as a modifiable factor influencing wellbeing, the present results suggest that screentime patterns alone may not directly influence certain academic behaviors such as attendance. However, indirect effects via anxiety, sleep disturbances, or reduced concentration—factors established in Feng et al.—could still exist but were not captured in the current analysis due to the absence of direct psychological or sleep quality measures in this specific result set.

These results indicate that, within this specific population, screentime may not be strongly influenced by academic progression or attendance patterns.

In contrast, Santiago et al. (2022)⁷ investigated adolescents aged 14–19 from public schools and found that increased screen interaction—particularly through highly engaging activities such as video games and computer use—was linked to poorer sleep quality, but primarily in adolescents with higher anxiety levels. Their findings highlighted that the negative effects of screentime on sleep were amplified in those already at greater risk for anxiety, suggesting an interactive relationship between anxiety and screen exposure. A key difference between the two studies lies in the populations examined: Santiago et al. focused on school-going adolescents, while the present research assessed young adult dental students. Adolescents may exhibit more pronounced vulnerability to the effects of excessive screentime due to ongoing developmental, social, and emotional changes, whereas dental students may have more self-regulation or different screen usage patterns related to academic demands. Moreover, Santiago et al. considered anxiety and sleep quality as primary outcomes, while the present study explored screentime in relation to academic parameters (attendance) and academic stage (year of study), without directly assessing sleep quality.

The present study found no any significant association amongst screentime and either year of study or attendance among undergraduate dental students. This suggests that, within this academic cohort, screentime habits are relatively stable and do not vary meaningfully with academic progression or attendance patterns.

In contrast, Hökby et al. (2025)⁸ conducted a longitudinal study on healthy Swedish adolescents and demonstrated that increased screentime displaced multiple aspects of sleep simultaneously—supporting an updated “screen–sleep displacement theory.” Their results showed that these sleep disruptions were associated with elevated depressive symptoms over a twelve-month period, particularly among girls, while boys appeared more prone to externalizing behaviors following sleep loss.

The differences in findings may be attributed to several factors. Firstly, Hökby et al. employed a prospective design with repeated measures, allowing them to establish temporal links between screentime, sleep disruption, and mental health outcomes, whereas the current research used a cross-sectional approach, limiting causal inference. Secondly, their primary focus of line was on the main role of sleep cycle in the screentime to mental health relationship, while the present study examined academic variables such as attendance and year of study without assessing sleep quality. Additionally, the adolescent population in Hökby et al.’s study may be more vulnerable to the psychological effects of sleep loss compared to older dental students, who might have more adaptive coping mechanisms or academic motivations influencing screentime use.

By contrast, Sidiq et al. (2025)⁹ examined Indian school children with a mean age of 10.9 years and found that greater screentime was significantly associated with poorer academic performance, higher anxiety levels, and more behavioral problems. The stronger associations observed in their study could be explained by developmental differences—children are in a formative stage of cognitive and emotional growth, making them more vulnerable to the adverse effects of prolonged screen exposure. Additionally, Sidiq et al. assessed a wider range of academic and psychological variables, whereas the current research focused mainly on academic year and attendance, which may not fully capture screentime’s potential impact in older students.

In this study, significant relationship was not found between screentime and either year of study or attendance among undergraduate dental students, indicating relatively consistent usage patterns across academic stages. While anxiety was part of the broader research focus, the main analysis examined screentime in relation to academic parameters rather than direct psychological outcomes. Lugassy et al. (2025)¹⁰, on the other hand, conducted a cross-sectional survey assessing stress, anxiety, and depression among dental students and dentists. They reported high levels of psychological distress in clinical-year

dental students, which significantly reduced after graduation and entry into professional practice. Unlike the present study, their research did not examine screentime as a factor, but rather highlighted the mental health challenges inherent in dental education. The contrast suggests that while screentime in the current cohort may not vary significantly with academic stage, other stressors—such as clinical workload and transition to professional life—can have a substantial impact on mental wellbeing. Integrating screentime analysis with direct measures of psychological distress, as in Lugassy et al., could offer a more complete picture of the factors influencing dental students' mental health.

Hence, the comparative analysis with previous studies indicates that the impact of screentime varies across populations, developmental stages, and outcome measures. As mentioned in the previous studies different group of individuals with a limited number of populations were selected. Also, their working environment also changed the scenario for their performance. Whereas, in this study only the preclinical prosthodontic students were considered which are far away from the real-life clinical scenario that may vary their timely performance based on their interactions with other factors which are to be studied further.

CONCLUSION

The conclusions are as drawn based on the study limitation:

The majority of undergraduate dental students reported a daily screen time of 4–5 hours, with usage patterns remaining largely consistent across academic years and attendance groups. Screen time showed no statistically significant association with attendance percentage.

A near-significant association was observed between screen time and year of study, suggesting a possible variation in usage trends that may require further investigation with a larger sample size.

A statistically significant association was found between higher screen time and the anxiety symptom “feeling afraid as if something might happen”, indicating a potential psychological impact of excessive screen use.

These findings highlight the importance of promoting healthy digital habits and mental health awareness among dental students to maintain academic performance and psychological well-being.

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