

Research Article

Correlation between Screen Time and Internal Assessment Scores among First-Year MBBS Students: A Cross-Sectional Analytical Study

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ABSTRACT

Background: Smartphone use has become an integral part of medical education, providing access to educational resources while simultaneously increasing exposure to recreational digital media. Excessive screen time has been associated with reduced academic performance, impaired concentration, and behavioral changes among university students. However, the influence of different types of screen time on academic achievement among undergraduate medical students remains insufficiently explored.

Objective: To evaluate the correlation between smartphone screen time and Internal Assessment (IA) scores among first-year MBBS students and to compare screen use patterns across different academic performance categories.

Methods: A cross-sectional analytical study was conducted among 250 first-year MBBS students who provided informed consent. Weekly smartphone screen-time data were obtained from the Digital Wellbeing application. Total, educational, and recreational screen times were recorded and correlated with mean IA scores using Pearson's correlation analysis.

Results: Total daily screen time demonstrated a strong negative correlation with IA scores, whereas educational screen time showed a significant positive correlation. Recreational screen time was strongly associated with lower academic performance. Students with lower IA scores exhibited the highest recreational and total screen time.

Conclusion: Excessive recreational smartphone use is associated with poorer academic performance, whereas educational smartphone use appears beneficial. Encouraging responsible and purpose-oriented smartphone use may improve academic outcomes among medical students.

Keywords: Screen Time, Smartphone Use, Internal Assessment, Medical Students, Academic Performance, Digital Wellbeing.

INTRODUCTION

Smartphones have become indispensable tools in modern medical education, offering immediate access to online textbooks, clinical guidelines, educational videos, interactive learning platforms, and communication resources. These technological advances have transformed conventional learning methods and enabled students to acquire knowledge beyond the traditional classroom environment. Nevertheless, the rapid increase in smartphone use has also resulted in excessive recreational screen exposure through social networking applications, video streaming platforms, online gaming, and other digital entertainment, raising concerns regarding its potential influence on students' academic performance and overall well-being (1,2).

Medical students represent a population particularly vulnerable to excessive smartphone use because of their demanding academic curriculum and continuous dependence on digital educational resources. While smartphones facilitate academic learning, prolonged exposure may contribute to distraction, reduced concentration, impaired time management, sleep disturbances, and smartphone addiction, all of which may negatively influence academic achievement. Previous studies have demonstrated significant associations between excessive smartphone use and reduced academic performance, increased stress levels, anxiety, and lower life satisfaction among university students (1,3). Screen time has emerged as an important public health concern because of its effects on physical, psychological, and cognitive health.

Excessive exposure to electronic media has been associated with sleep deprivation, reduced attention span, emotional disturbances, and impaired executive functioning, factors that may indirectly influence academic outcomes (4,5,6). In addition, prolonged recreational screen use often replaces productive study time, physical activity, and adequate sleep, thereby adversely affecting students' educational performance.

Recent evidence suggests that not all forms of screen time have identical academic consequences. Educational screen use, including online learning platforms, e-books, educational videos, and medical applications, may enhance learning efficiency and improve academic performance. Conversely, recreational screen activities such as social media browsing, video streaming, and entertainment applications have consistently demonstrated negative associations with academic achievement (7,8). Therefore, distinguishing educational from recreational screen exposure is essential when evaluating the relationship between smartphone use and academic success.

Medical students increasingly rely on specialized educational applications such as digital anatomy resources, online lecture platforms, and examination preparation applications. However, the same device also provides unrestricted access to recreational content, making self-regulation challenging. Psychological factors including fear of missing out (FOMO), anxiety, and habitual smartphone checking further contribute to problematic smartphone use among young adults (9). Consequently, evaluating both educational and recreational screen time may provide a more comprehensive understanding of their respective influences on academic performance.

Although several international studies have examined smartphone addiction and academic outcomes, limited evidence is available regarding Indian undergraduate medical students, particularly first-year MBBS students who experience significant academic transition during the initial phase of medical education. Understanding the relationship between smartphone screen time and academic performance in this population may assist educators in developing targeted interventions that promote healthier digital habits while maximizing the educational benefits of smartphone technology.

Aim

To evaluate the correlation between smartphone screen time and Internal Assessment (IA) scores among first-year MBBS students.

Objectives

1. To assess the relationship between total smartphone screen time and IA scores.
2. To evaluate the association between educational screen time and academic performance.
3. To evaluate the association between recreational screen time and academic performance.
4. To compare total, educational, and recreational smartphone screen time across different academic performance categories.

MATERIALS AND METHODS

Study Design: A cross-sectional analytical study was conducted to evaluate the relationship between smartphone screen time and academic performance among first-year Bachelor of Medicine and Bachelor of Surgery (MBBS) students. The study aimed to determine whether different patterns of smartphone use were associated with variations in Internal Assessment (IA) scores.

Study Setting: The study was conducted in the Department of Anatomy at S. Nijalingappa Medical College, Bagalkote, Karnataka, India. Data collection was performed among first-year MBBS students enrolled during the study period.

Study Population: The study included 250 first-year MBBS students who voluntarily participated after providing informed consent. Only students willing to share their smartphone screen-time records through the Digital Wellbeing application were included in the study.

Data Collection: Data were collected after obtaining informed consent from the participants. Each student was asked to provide a screenshot of the weekly smartphone screen-time report generated by the Digital Wellbeing application available on Android smartphones. This application objectively records the duration of smartphone usage across different applications and categories, thereby minimizing recall bias associated with self-reported screen-time estimation.

The collected screenshots were reviewed to record the average daily smartphone screen

time. Screen usage was categorized into educational and recreational activities based on the primary purpose of application use.

Classification of Screen Time: Smartphone usage was categorized into the following components:

Total Screen Time: Total screen time represented the cumulative duration of daily smartphone usage irrespective of the type of application used.

Educational Screen Time

Educational screen time included the duration spent on applications and digital resources used for academic purposes. According to the study protocol, educational platforms included:

- Marrow application
- Educational YouTube channels
- E-books and other educational resources

These applications were considered supportive of undergraduate medical education.

Recreational Screen Time

Recreational screen time included smartphone usage primarily intended for entertainment and social interaction. Applications included:

- YouTube (non-educational use)
- Instagram
- Facebook
- Twitter

These platforms were classified as recreational because they were mainly used for leisure and non-academic activities.

Academic Performance Assessment

Academic performance was assessed using the mean Internal Assessment (IA) marks obtained by first-year MBBS students.

Based on their IA scores, students were classified into three academic performance categories:

- **High Achievers:** IA score $\geq 75\%$
- **Moderate Achievers:** IA score 50–74.9%
- **Low Achievers:** IA score $< 50\%$

This categorization enabled comparison of screen-time patterns across different academic achievement levels.

Study Variables

The primary outcome variable was the mean Internal Assessment score.

The independent variables included:

- Average daily total screen time
- Average daily educational screen time
- Average daily recreational screen time
- Gender

Correlation between these variables and IA scores was evaluated to determine the direction and strength of association.

Statistical Analysis

Descriptive statistics were used to summarize participant characteristics, academic performance categories, and smartphone screen-time variables. Continuous variables were expressed as mean values, whereas categorical variables were presented as frequencies and percentages. Pearson's correlation coefficient (r) was used to evaluate the relationship between different screen-time variables and Internal Assessment scores. The strength and direction of correlation were interpreted using Pearson's correlation coefficient. A positive value indicated a direct relationship, whereas a negative value indicated an inverse relationship. Statistical significance was determined using p -values, and a value of $p < 0.001$ was considered statistically significant for the observed correlations.

RESULTS

A total of 250 first-year MBBS students participated in the study. Academic performance was evaluated using the mean Internal Assessment (IA) scores, and smartphone screen-time data were obtained from the Digital Wellbeing application. Screen time was categorized into total, educational, and recreational usage. The relationship between screen-time variables and academic performance was assessed using Pearson's correlation analysis. Gender-wise comparisons were also performed. The results are presented in four tables.

Table 1. Academic Performance Categories of the Study Participants (N = 250)

Academic Performance Category	Number (%)	Mean Ia Marks
High Achievers ($\geq 75\%$)	2 (0.8%)	79.0
Moderate Achievers (50–74.9%)	197 (78.8%)	57.62
Low Achievers ($< 50\%$)	51 (20.4%)	44.98

Among the 250 first-year MBBS students, the majority (78.8%) belonged to the moderate academic performance category, whereas 20.4% were classified as low achievers. Only 0.8% of students achieved IA scores of 75% or

above. Mean IA scores declined progressively from 79.0 among high achievers to 57.62 among moderate achievers and 44.98 among low achievers.

Table 2. Correlation between Screen Time Variables and IA Marks

Variable	Pearson's R	P-Value	Interpretation
Average Daily Total Screen Time	-0.692	<0.001	Strong Negative Correlation
Average Daily Educational Screen Time	+0.599	<0.001	Moderate Positive Correlation
Average Daily Recreational Screen Time	-0.662	<0.001	Strong Negative Correlation

Pearson's correlation analysis demonstrated a strong statistically significant negative correlation between average daily total screen time and IA marks ($r = -0.692$, $p < 0.001$), suggesting that students with longer overall smartphone use tended to obtain lower academic scores. Educational screen time showed a moderately strong positive correlation

with IA marks ($r = 0.599$, $p < 0.001$), indicating that greater use of smartphones for academic purposes was associated with improved academic performance. Conversely, recreational screen time exhibited a strong inverse relationship with IA marks ($r = -0.662$, $p < 0.001$).

Table 3. Mean Screen Time According To Academic Performance Category

Academic Category	Total Screen Time (H/Day)	Educational Screen Time (H/Day)	Recreational Screen Time (H/Day)
High Achievers	2.75	1.80	1.95
Moderate Achievers	4.50	3.23	1.74
Low Achievers	7.52	1.54	5.55

Students classified as low achievers reported the highest mean total smartphone screen time (7.52 hours/day) and recreational screen time (5.55 hours/day). In contrast, moderate achievers demonstrated the greatest

educational screen time (3.23 hours/day), suggesting greater engagement with academic digital resources. High achievers had the lowest overall screen exposure (2.75 hours/day).

Table 4. Gender-Wise Comparison of IA Marks and Screen Time

Variable	Female (N=114)	Male (N=135)
Mean IA Marks	57.11	53.64
Mean Total Screen Time (H/Day)	4.94	5.24
Mean Educational Screen Time (H/Day)	2.93	2.82
Mean Recreational Screen Time (H/Day)	2.34	2.67

Female students demonstrated a slightly higher mean IA score (57.11) than male students (53.64). Male students reported higher average total daily smartphone screen time (5.24 vs. 4.94 hours/day) and recreational screen time (2.67 vs. 2.34 hours/day). Educational screen time was marginally higher among female students (2.93 vs. 2.82 hours/day).

DISCUSSION

The present cross-sectional analytical study evaluated the relationship between smartphone screen time and Internal Assessment (IA) scores among first-year MBBS students. The

findings demonstrated that greater total and recreational smartphone screen time were significantly associated with poorer academic performance, whereas educational screen time showed a positive association with IA scores. These observations suggest that the academic impact of smartphone use depends not only on the duration of use but also on the purpose for which smartphones are utilized.

One of the most important findings of the present study was the strong negative correlation between total daily screen time and IA scores ($r = -0.692$, $p < 0.001$). Students with longer overall smartphone exposure

consistently demonstrated lower academic performance. This finding is consistent with the study by Alosaimi et al. (10), who reported a high prevalence of smartphone addiction among university students and observed that excessive smartphone use adversely affected academic activities and study habits. Similarly, Chen et al. (11) found that problematic smartphone use among medical students was associated with reduced academic efficiency and identified gender-related differences in smartphone addiction.

Unlike studies that evaluate only overall smartphone use, the present study separately assessed educational and recreational screen time. Educational screen time demonstrated a moderate positive correlation with IA scores, indicating that smartphones can serve as effective learning tools when used appropriately. Medical students increasingly depend on digital educational platforms, online lectures, e-books, and examination preparation applications for self-directed learning. Therefore, educational smartphone use should not be discouraged; instead, its appropriate utilization should be promoted while minimizing unnecessary recreational use.

The study also demonstrated that recreational screen time had a strong negative association with academic performance. Students with lower IA scores spent substantially more time on recreational applications than students with better academic performance. This observation may be explained by displacement of productive study time, reduced concentration, frequent interruptions, and prolonged engagement with social networking and entertainment platforms. These findings support the observations of Canadian Paediatric Society Digital Health Task Force (12), which recommends limiting non-essential recreational screen exposure while encouraging purposeful educational use of digital technology.

Another important observation was the variation in screen-time patterns across academic performance categories. Low-achieving students reported the highest total and recreational screen time, whereas moderate achievers demonstrated the greatest educational screen time. This finding suggests that the quality and purpose of smartphone use may influence academic achievement more than the absolute duration of screen exposure. Students using smartphones primarily for educational purposes may derive academic benefits despite moderate daily screen use.

Gender-wise analysis revealed that female students had slightly higher mean IA scores and lower recreational screen time than male students. Although the present study did not statistically compare gender differences, these findings are broadly consistent with previous observations reported by Chen et al. (11), who demonstrated gender-related differences in patterns of smartphone use and problematic smartphone behaviour among medical students.

Recent literature has emphasized that excessive screen exposure may influence not only academic performance but also psychological well-being. Orben and Przybylski (13) reported that the relationship between screen time and psychological well-being is complex and depends on the type and duration of digital media use rather than screen exposure alone. Likewise, Stiglic and Viner (14), in their systematic review, concluded that excessive recreational screen time is associated with adverse physical, behavioural, and psychological outcomes, although evidence varies according to study design and outcome measures. These observations support the present findings, where recreational rather than educational smartphone use demonstrated the strongest negative relationship with academic performance.

Furthermore, the results of the present study agree with the meta-analysis conducted by Kates et al. (15), which concluded that increased mobile phone use is generally associated with reduced academic performance across educational settings. Their findings suggest that excessive smartphone engagement may impair learning through distraction, multitasking, and reduced attention during study. The strong negative correlation observed in the present study further reinforces this evidence among undergraduate medical students.

CONCLUSION

The present study demonstrates that excessive total and recreational smartphone screen time is significantly associated with poorer Internal Assessment performance among first-year MBBS students, whereas educational smartphone use shows a positive association with academic achievement. These findings emphasize that the purpose of smartphone use is an important determinant of its educational impact. Encouraging responsible digital behaviour and promoting educational rather than recreational smartphone use may

contribute to improved academic performance and healthier technology habits among undergraduate medical students.

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