International Journal of Research in Medical Sciences
Maladar UR et al. Int J Res Med Sci. 2025 Dec;13(12):5300-5305
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20253954

Original Research Article

Mobile phones and minds: linking usage to stress and academic performance in undergraduates

Umme Ruman Maladar, Vijaya S. Dandannavar*

Department of Physiology, KLE Academy of Higher Education and Research, Jawaharlal Nehru Medical College, Belagavi, Karnataka, India

Received: 06 October 2025
Revised: 12 November 2025
Accepted: 20 November 2025

***Correspondence:**
Dr. Vijaya S. Dandannavar,
E-mail: jnmcvijaya@gmail.com

ABSTRACT

Background: Mobile phones have become ubiquitous among students, providing easy access to communication and information. However, excessive use has been associated with negative outcomes, including decreased academic performance and increased psychological stress. Understanding the relationship between mobile phone usage, stress and academic achievement is essential to promote healthy study habits and overall well-being among undergraduate students.

Methods: This cross-sectional study included 110 first-year Allied Health and Physiotherapy students from JN Medical College, Belagavi, who provided informed consent. Participants completed a structured questionnaire detailing demographic information, mobile phone usage patterns and study habits. Academic performance was assessed using self-reported grades and recent examination scores, while stress levels were evaluated using a standardized stress assessment scale.

Results: Students reporting higher daily mobile phone usage exhibited significantly lower academic performance compared with those with limited usage ($p<0.05$). Additionally, frequent mobile phone use was associated with elevated stress levels, suggesting a direct relationship between screen time, psychological stress and learning outcomes. Students who managed mobile phone usage effectively demonstrated better academic scores and lower stress, highlighting the potential impact of controlled use on educational achievement and mental health.

Conclusions: Excessive mobile phone usage among undergraduates is linked to poorer academic performance and higher stress levels. Awareness and strategies to regulate mobile phone use may help improve learning outcomes and reduce stress in this population.

Keywords: Academic performance, Health sciences students, Mobile phone usage, Psychological well-being, Stress

INTRODUCTION

Mobile phones are indispensable communication tools, with their penetration rates increasing rapidly across all age groups. In students, they serve educational purposes but are also widely used for entertainment and social networking. However, excessive or inappropriate use has been associated with poor concentration, attention deficits, increased stress and academic difficulties.[1-3] Reaction time is a sensitive, non-invasive measure of cognitive processing, attention and motor coordination.[4] Delayed auditory and visual reaction times may reflect impaired attention and slower central processing, which could translate into reduced academic performance and higher mental load. Recent studies have highlighted that smartphone addiction among medical students correlates with increased anxiety, stress and poor academic outcomes.[5] Similarly, research from 2024 demonstrated that decreased physical activity mediated the negative effect of excessive smartphone use on learning engagement.[6] Moreover, in 2025, a study reported that entertainment-related phone use was negatively associated

with academic outcomes, while purposeful academic use improved performance.[7]

Despite global evidence, limited research exists in the Indian context, particularly among Allied Health and Physiotherapy students, where academic demands are high. Therefore, this study was undertaken to evaluate the impact of mobile phone usage on auditory and visual reaction times in undergraduate students.

Need for the study

With the exponential rise in mobile phone usage among young adults, there is concern regarding its potential negative impact on mental health, cognitive functioning and academic performance.[1,5-7] Given the importance of reaction time as a marker of central processing, it is essential to investigate whether concomitant mobile phone use alters auditory and visual reaction times. Furthermore, as Indian literature on this subject is scarce, this study addresses a critical gap by providing evidence specific to health sciences students.

METHODS

Study design

This was a cross-sectional study.

Study duration

The study period was from January 2018-December 2018.

Study place

Research Lab, Department of Physiology, J.N. Medical College, Belagavi.

Study population

1st-year Allied Health and Physiotherapy students (Academic year 2018–2019) willing to participate in the study and gave informed consent were enrolled for participation in the study.

Inclusion criteria

Age 17-20 years. Possess and use mobile phones. Medically fit.

Exclusion criteria

This study excludes students not willing to participate.

Sample size

The sample size determined by using this formula

$$n=\frac{1.96^2\times SD^2}{d^2}$$

Where,

SD–Standard Deviation; d–tolerable error; n–sample size

Taking SD =20 %

$n=(1.96)^2 \times SD^2 / d^2$

with d = 20% of SD

$(0.2)^2\ SD^2$

Add 10% Attrition

$=1.962\times10\%=0.22$

$=105.04 \approx 110$

Sample size (n) =110

Calculated using standard formula with SD=20%, tolerable error = 20% of SD, 10% attrition→final n=110.

Parameters

A self-made demographic performa

It was administered to know the personal details i.e. duration and purpose of mobile usage to all the enrolled participants.

Academic performance

Marks-list details of their 1st Internal Assessment (Academic year 2018-2019) in Physiology, Anatomy and Biochemistry were collected from their respective department office of JNMC- Belagavi with duly prior written permission taken from respective heads of the departments. Average percentage of individual subjects and combined percentage of all the three subjects was taken for analysis.

Stress levels

These were measured by STAI (State-Trait Anxiety Inventory) questionnaire. This questionnaire has 2 sheets for measuring State- Anxiety Scale & Trait-Anxiety Scale (refer Annexure III). Interpretation: Both the sheets consists of statements which indicate “high level of anxiety” (Ex: I feel frightened, I feel upset) as well as “absence of anxiety” (Ex: I feel calm, I feel relaxed).Scores are reversed for absence of anxiety statements i.e. responses marked 1,2,3,4 are scored 4, 3, 2, 1. Scores for both S-Anxiety and and T- Anxiety scales were added separately. A cut off point of >40 was selected for both State and Trait- Questionnaire was evaluated for each subject.

Statistical analysis

Data analyzed using SPSS version 20. Demographics and their effects on academic performance and stress analyzed using Chi-square test. Correlation analysis (Pearson or Spearman) between mobile phone usage, academic performance and stress levels.

RESULTS

Socio-demographic profile of study participants

Graph 1a and 1b gives description of respondents for distribution of gender and age respectively. The results are expressed in percentage distribution. Out of 110 study participants, Males respondents were 37.27% (n= 41) and female respondents were 62.73% (n=69). Most participants were 18 years old (57.3%), followed by 19 years (24.5%), 20 years (10.9%) and 17 years (7.3%).

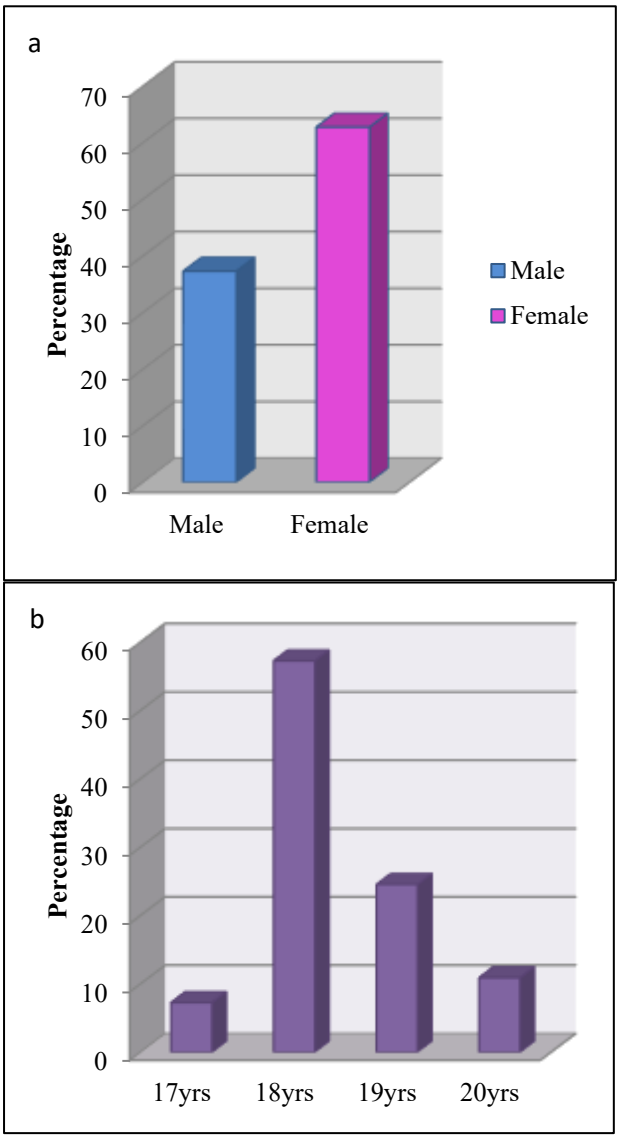

Figure 1 (a, b): Gender wise distribution of respondents. Age wise distribution of respondents.

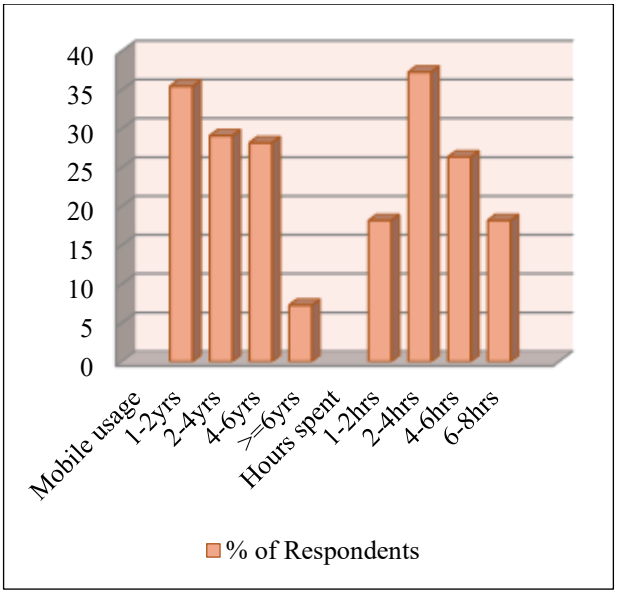

Figure 2: Distribution of respondents on the basis of estimated years of mobile usage and no. of hours spent/day on mobile phone.

35.45% (n=39) respondents were using mobile phones since 1-2 years, 29.09% (n=32) respondents were using mobile since a period of 2-4 years, 28.28%(n=31) were using since 4-6 years and 7.27% respondents were using mobile phone≥6 years. The usage of mobiles by the respondents per day in hours was as follows; 18.18 % (n=20) respondents used mobile for period of 1-2 hours, 37.27% (n=41) respondents used mobile for a period of 2-4hours, 26.36% (n=29) used mobile for 4-6 hours, 18.18% (n=20) respondents used mobile for a period of 6-8 hours/day.

Academic performance

Multiple regression analysis indicated no statistically significant association between estimated years of mobile usage or daily hours spent on mobile phones and academic performance ($p>0.05$). This suggests that students' academic outcomes were resilient to the extent of mobile phone use.

Stress levels

State anxiety (Form-Y1): Overall, 70% of participants experienced stress. Female students (71.0%) reported slightly higher stress than males (68.3%). Higher stress levels were observed in participants with 4-6 years of mobile use (74.2%) and those using mobile phones 1–2 hours/day (80%), although these differences did not reach statistical significance ($p>0.05$).

Trait anxiety (Form-Y2)

Stress levels were higher among females (85.5%) than males (85.4%). Students aged 20 years (91.7%) and those using mobile phones 4–6 years (93.6%) or 4–6 hours/day

(93.1%) exhibited the highest stress levels. A significant correlation was observed between estimated years of mobile usage and trait anxiety (p=0.0178).

Correlation between academic performance and stress

Academic performance did not show a statistically significant correlation with either state anxiety or trait anxiety (p>0.05). This indicates that even when mobile usage is associated with elevated stress levels, it does not appear to adversely affect students' academic performance.

Table 1: Socio-demographic profile of study participants (n=110).

Variable	Category	Frequency (N)	Percentage (%)
Gender	Male	41	37.27
	Female	69	62.73
Age (years)	17	8	7.27
	18	63	57.27
	19	27	24.55
	20	12	10.91

Table 2: Association and correlation of mobile phone usage with academic performance and stress levels among undergraduate students.

Variables	Measure	Findings	Statistical significance
Academic performance	Average marks (Physiology, Anatomy, Biochemistry)	No significant association with estimated years of mobile use or hours spent/day	Multiple regression: p>0.05
Stress-state anxiety (Form Y1)	STAI Score	Higher stress in females (71.01%) vs males (68.29%); highest among 20-year-olds; slightly higher in 4–6 years of mobile use	Chi-square: p>0.05 (not significant)
Stress-trait anxiety (Form Y2)	STAI Score	Higher stress in females (85.51%) vs males (85.37%); highest among 20 years old, 4–6 years of mobile use and 4–6 hours/day users showed higher stress	Chi-square: p>0.05 (except years of mobile usage correlation, p=0.0178*)
Correlation-estimated years of mobile usage	Stress Y2	Positive correlation with Trait Anxiety (r = 0.2257, p=0.0178*)	Significant
Correlation–mobile phone use purpose	Stress Y1 & Y2	No significant correlation	p>0.05
Correlation-academic performance	Age & Mobile Usage	Weak, non-significant correlations (r<0.25, p>0.05)	Not significant

*Statistically significant.

DISCUSSION

Mobile phones have become a routine part of academic and social life for undergraduate students and concerns have grown regarding their potential to influence learning and psychological health. Previous literature indicates that excessive or unregulated smartphone use can interfere with attention, engagement, sleep quality and may elevate stress levels.[8-14] These established findings provide an important context for the interpretation of the current study outcomes. In the present study, academic performance showed no significant association with either the duration of daily mobile use or the number of years of ownership.

This observation partly supports earlier reports suggesting that not all forms of smartphone use adversely affect academic outcomes. Li et al, noted that the purpose of phone use whether academic or entertainment largely determines its impact on performance.[9] Similarly, Sun et al, suggested that lifestyle-related factors, such as reduced physical activity, mediate the influence of mobile addiction on learning behaviors.[10] Some studies, such as that by Lepp et al, have reported poorer academic outcomes with high smartphone use, but the lack of such an association in the present study may indicate better academic coping strategies or more balanced mobile use patterns among the participants.[8]

Conversely, mobile phone use demonstrated a clear relationship with stress, particularly higher State and Trait Anxiety scores among students with longer usage hours and more years of exposure. This pattern aligns strongly with the work of Samaha and Hawi, who found a significant link between smartphone addiction and elevated stress, as well as studies on medical and Indian student populations showing higher psychological distress with problematic mobile usage.[1,12,13] The present findings reinforce the notion that the psychological effects of prolonged screen exposure may be more immediate and pronounced than its academic consequences.

A significant positive association was found between more years of mobile phone use and higher trait anxiety scores suggests that long-term, habitual exposure may contribute to persistent stress characteristics. Physiological studies have shown that problematic smartphone use can shift autonomic balance toward sympathetic dominance, while EEG research indicates increased cortical arousal with smartphone overuse.[13,14] These physiological changes help explain why students with prolonged or frequent mobile engagement may experience heightened stress even in the absence of academic decline.

Although academic outcomes were preserved, the significant rise in stress levels observed in this study highlights an area of concern. Persistent stress, even when not immediately reflected in academic scores, can gradually impair concentration, emotional well-being and overall learning capacity. The higher anxiety levels noted among female students may reflect gender-specific differences in coping strategies, emotional responsiveness or mobile usage patterns, a trend also noted in earlier literature.[18] The findings of the present study underscore the need for targeted interventions focusing on stress reduction and healthy mobile use practices rather than imposing strict phone restrictions. Strategies that promote digital hygiene, balanced screen time, sleep hygiene, physical activity and structured study routines may be beneficial. Educational institutions may consider incorporating awareness programs that encourage mindful and purposeful use of smartphones, helping students maintain mental well-being while leveraging mobile technology for academic benefit.

In summary, while mobile phone use did not adversely affect academic performance, it was significantly associated with increased stress among undergraduates. These results draw attention to the psychological implications of prolonged smartphone exposure and highlight the importance of preventive measures to safeguard student health and well-being.

The study was cross-sectional, so it cannot prove that mobile phone use directly causes stress or changes in academic performance. Data came from two batches only, which may limit how well the results apply to other student groups. Mobile phone usage was self-reported, which may lead to inaccurate reporting or memory errors. Other factors that could affect stress or academic results, like sleep, lifestyle or social support, were not considered.

CONCLUSION

Academic performance remained stable despite increased stress levels associated with mobile phone use. The findings suggest that stress management and healthy mobile phone habits may be more important than restricting phone use altogether. Awareness programs and guidance for students on balancing mobile use and well-being could help reduce stress without affecting academic outcomes.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Samaha M, Hawi NS. Relationships among smartphone addiction, stress, academic performance and satisfaction with life. Comput Human Behav. 2016;57:321-5.
2. Alhazmi AA, Alzahrani SH, Baig M, Salawati EM, Alkatheri A. Prevalence and factors associated with smartphone addiction among medical students at King Abdulaziz University, Jeddah. Pak J Med Sci. 2018;34(4):984-8.
3. Elhai JD, Levine JC, Hall BJ. Problematic smartphone use and mental health problems: current state of research and future directions. Dialogues Clin Neurosci. 2019;21(3):255-62.
4. Lakhani P, Tandon OP. Auditory and visual reaction times in patients of major depressive disorder. Indian J Physiol Pharmacol. 2015;59(2):151-6.
5. Davey S, Davey A. Assessment of smartphone addiction in Indian adolescents: a mixed-method study. Int J Prev Med. 2014;5(12):1500-11.
6. Sun R, Mao J, Zeng P, Chen S. Mobile phone addiction and learning engagement: the mediating role of physical activity. BMC Public Health. 2024;2:21250.
7. Li Y, Yang L, Zhang H. Mobile phone use and academic performance among university students in China: the role of usage patterns. Front Psychol. 2025;16:1474340.
8. Lepp A, Barkley JE, Karpinski AC. The relationship between cell phone use, academic performance, anxiety and satisfaction with life in college students. Comp Human Behav. 2014;31:343–50.
9. Li X, Liu X, Zhang Y. The effects of mobile phone use on academic performance: A meta-analysis. Comp Edu. 2025;174:104314.
10. Sun Y, Zhang Y, Wang L. The effects of mobile phone addiction on learning engagement of college students: The mediating role of physical activity and academic self-efficacy. BMC Public Health. 2024;24:1221.

11. Alhazmi A, Alghamdi S, Alzahrani A. Prevalence and factors associated with smartphone addiction among medical students. J Fam Med Prim Care. 2018;7(6):1320–4.
12. Kolhar M, Douris P, Jung M. Screen time and university students' life: Exploring the impact of screen time on sleep quality, mental health and academic performance. Asian Pac J Med Educ. 2021;11(1):1–10.
13. Casale S, Fioravanti G, Rugai L. Psychological processes linking problematic smartphone use to sleep disturbances and academic performance. J Behav Addict. 2021;10(2):352–61.
14. Sharma MK, Sharma R. Cognitive and psychological issues in postural tachycardia syndrome. J Clin Neurosci. 2014;21(3):405–9.
15. Samaha M, Hawi NS. Relationships among smartphone addiction, stress, academic performance and satisfaction with life. Comput Human Behav. 2016;57:321–5.
16. Lepp A, Barkley JE, Karpinski AC. The relationship between cell phone use, academic performance, anxiety and satisfaction with life in college students. Comput Human Behav. 2014;31:343–50.
17. Thomée S, Härenstam A, Hagberg M. Mobile phone use and stress, sleep disturbances and symptoms of depression among young adults—a prospective cohort study. BMC Public Health. 2011;11:66.
18. Walsh SP, White KM, Young RM. Needing to connect: The effect of self and others on young people's involvement with their mobile phones. Australas J Psychol. 2008;60(4):194–203.

Cite this article as: Maladar UR, Dandannavar VS. Mobile phones and minds: linking usage to stress and academic performance in undergraduates. Int J Res Med Sci 2025;13:5300-5.