

An Observational Cross-Sectional Study on the Impact of Smartphone Usage on the Lives of Undergraduate Medical Students at Government Medical College, Kota

Paras Rawal¹, Bhawana Kumari², Vinod Kumar Garg³, Amit Kumawat⁴, R. Monisha⁵, Ashok Moondra⁶

¹PG Resident, Department of Forensic Medicine, Government Medical College, Kota

²Associate Professor, Department of Pathology, Government Medical College, Kota

³Associate Professor, Department of Forensic Medicine, Government Medical College, Kota

⁴PG Resident, Department of Forensic Medicine, Government Medical College, Kota

⁵Senior Resident, Department of Forensic Medicine, CHRI, Chettinad, Tamilnadu

⁶Senior Professor, Department of Forensic Medicine, Government Medical College, Kota

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Corresponding Author: Dr. Vinod Kumar Garg

Conflict of interest: Nil

Abstract:

Introduction: The invention of mobile phones is credited to Martin Cooper of Motorola, with continuous advancements leading to the development of smartphones, now integral to daily life across all age groups. Initially used for basic functions like calling, texting, and scheduling, smartphones have evolved into multifunctional devices. This study explores the patterns of smartphone usage among undergraduate medical students, focusing on their primary use, whether for educational activities or social networking and assesses its impact on their academic and personal lives.

Material & Methods: A cross-sectional study was conducted at Government Medical College, Kota, using a structured and validated questionnaire distributed via Google Forms. Student responses were collected, tabulated, and analyzed to derive the results.

Result: Most respondents were second-year MBBS students, with nearly equal gender distribution. Over half began using smartphones after age 17, and 40.1% reported daily usage of 4–6 hours, mostly during nighttime. Social networking was the most common use, with Instagram being the preferred app. A significant proportion reported using smartphones during daily routines like eating and before sleeping. Physical complaints included eye strain (77.7%) and headaches (61.5%), while mental effects included guilt (95.1%), sleep disturbances (74.1%), and reduced concentration (78.6%).

Conclusion: The study highlights significant physical, mental, and social impacts of excessive smartphone usage among MBBS students, including reduced productivity, strained relationships, and preference for digital over real-life interactions. A majority expressed a desire to limit screen time and favored traditional learning methods. These findings emphasize the need for promoting responsible smartphone use and a balanced integration of technology in education.

Keywords: Digital Dependency, Mental Health, Smartphones.

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Introduction

The evolution of mobile phone technology began with Martin Cooper, a researcher at Motorola, who is credited with developing the first cellular phone—Motorola DynaTAC—in 1973. This early model lacked a display screen and weighed approximately 2.5 pounds. A significant milestone was reached in 1983 when Motorola released the first commercial mobile phone, the Motorola DynaTAC 8000X. In India, the mobile phone era began in 1995 with the first-ever mobile call made between Kolkata and New Delhi. Over the years, mobile phones underwent continuous improvements in

both function and form. Initially used for basic communication and as tools such as calculators, pagers, and address books, mobile phones have now been largely replaced by smartphones—multitasking devices that have transformed into indispensable digital companions. Today, India is the world's second-largest smartphone market, a remarkable achievement just 25 years since the first mobile call in the country [1]. With the rapid integration of smartphones into everyday life, a new behavioral phenomenon has emerged: nomophobia, or “no mobile phone phobia.” This term was first

introduced in a UK Post Office study in 2008 and describes the anxiety or fear experienced when individuals are unable to use or access their mobile phones. It is increasingly recognized as a modern-day psychological condition linked to excessive smartphone dependence. [2]

Smartphones have become essential in modern life and are widely used across all age groups. They have redefined how society communicates, accesses information, conducts business, and engages in social interactions. Far from being just communication devices, smartphones serve as portable computers, offering features like video calling, internet browsing, navigation, entertainment, and a multitude of applications that support both personal and professional activities. They open doors to vast knowledge but also expose users to misinformation, distraction, and overexposure. Their impact is far-reaching and deeply embedded in the cultural fabric of society. [3]

Despite their many advantages, it is important to recognize that smartphones can have unintended negative consequences. Overuse has been associated with mental fatigue, sleep disturbances, eye strain, reduced attention span, and deteriorating interpersonal relationships. While these devices were created to improve quality of life, their excessive use can disrupt the very balance they aim to support. [4]

In the context of digital learning and online education, smartphones have become nearly indispensable for students. In particular, medical students increasingly rely on smartphones for attending online classes, accessing academic materials, and staying connected with their peers and teachers. However, this dependency raises concerns about

the impact on their physical and mental well-being⁵. The present study investigates how medical students use smartphones, the number of hours they spend on them daily, and whether their primary use is academic or related to social networking. It further explores how smartphones influence aspects of students' lives such as mood and sleep patterns, aiming to determine whether smartphones serve as a beneficial academic tool or pose challenges that may undermine student health and performance.

Material and Methods

This descriptive observational cross-sectional study was conducted in the Department of Forensic Medicine, Government Medical College, and Kota. The study population included all undergraduate medical students enrolled at the institution. The data were collected using a structured, pre-validated questionnaire administered through Google Forms. The form was divided into two sections: the first section consisted of an informed consent form, and only those students who provided consent were allowed to proceed to the second section, which contained the questionnaire. No identifying personal information was collected to maintain confidentiality. The Google Form link was shared in the official WhatsApp groups of undergraduate students, and the form remained open for seven days to ensure maximum participation. The sample included all medical students who gave informed consent and submitted complete responses. Students who did not consent, those without access to smartphones, and those who submitted incomplete responses were excluded from the study. The responses were compiled and tabulated for analysis.

Observations:

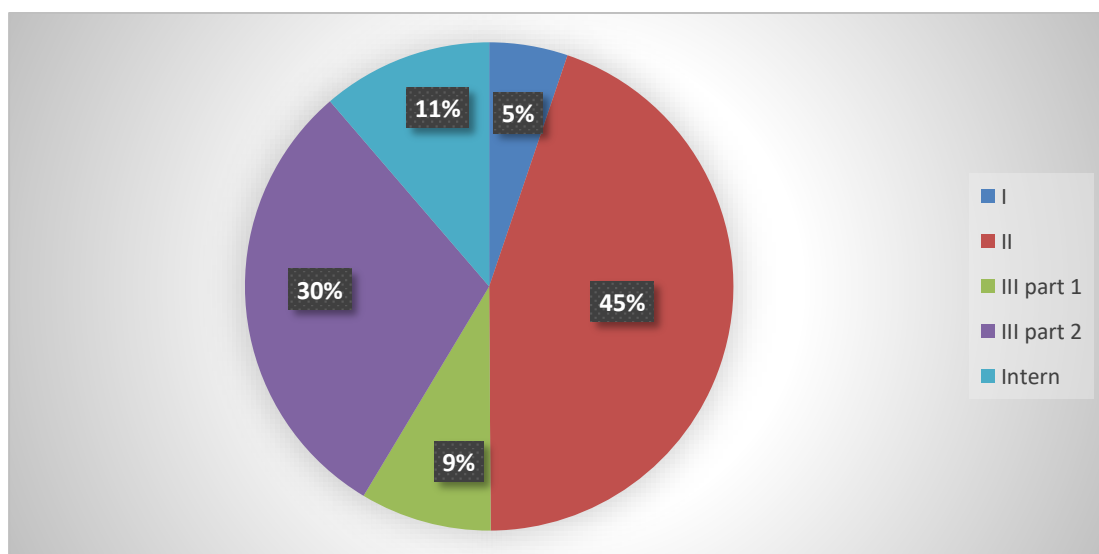


Chart 1: The proportion of medical students who participated in the study. (N=618)

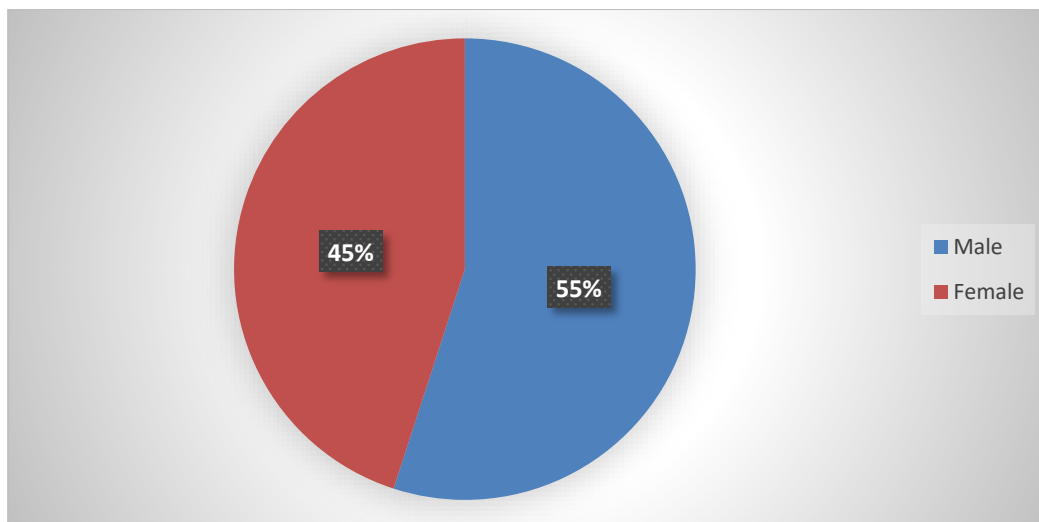


Chart 2: Proportion of sex among the participants. (N=618)

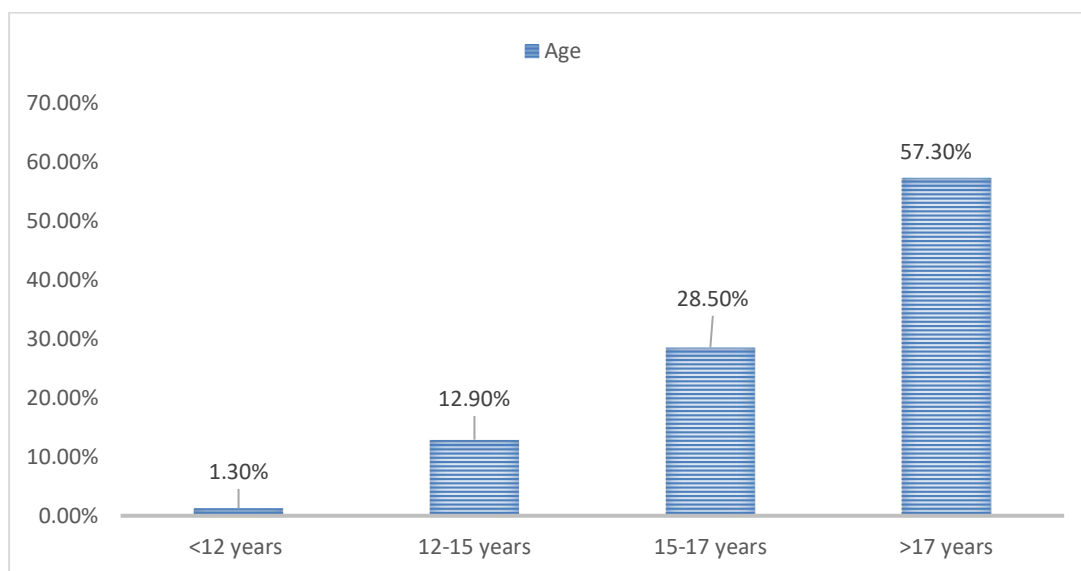


Chart 3: Age of onset of Smartphone usage observed among the participants (N=618)

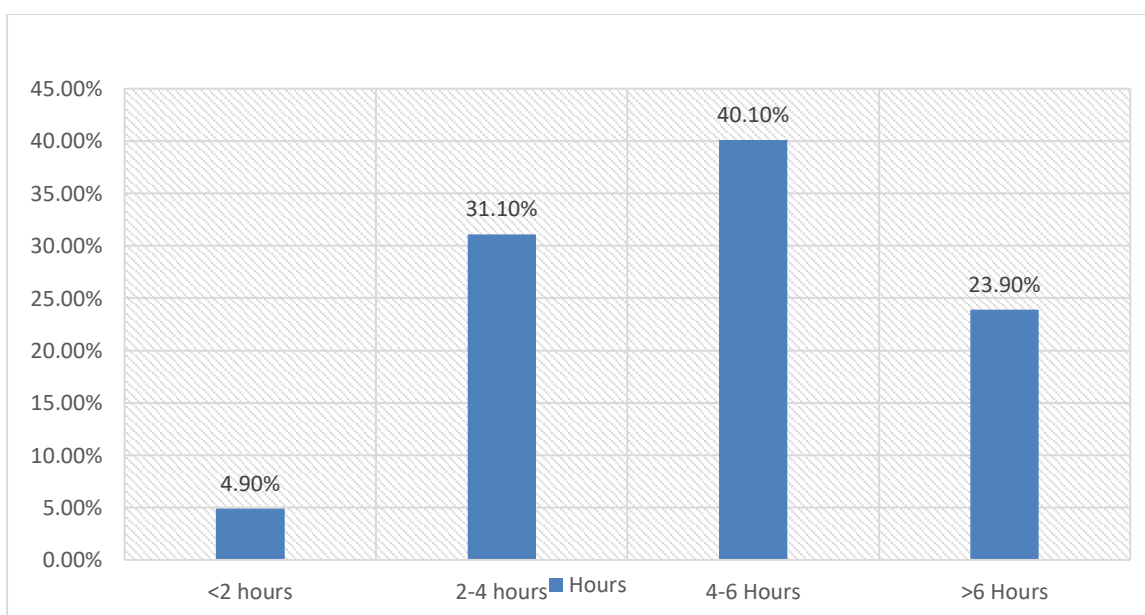


Chart 4: Average hours of Smartphone usage per day. (N=618)

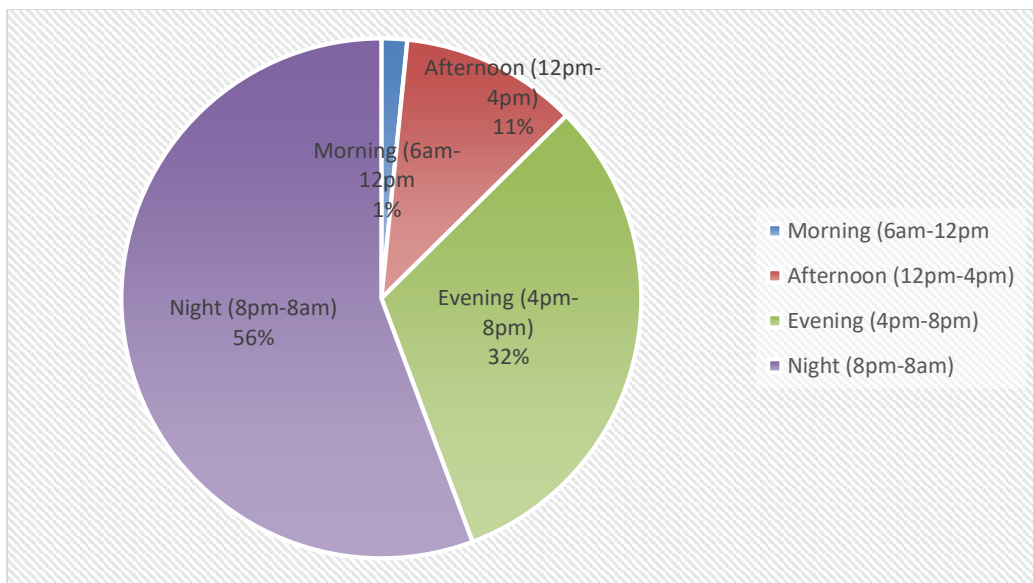


Chart 5: Distribution of smartphone usage among various hours of the day (N=618)

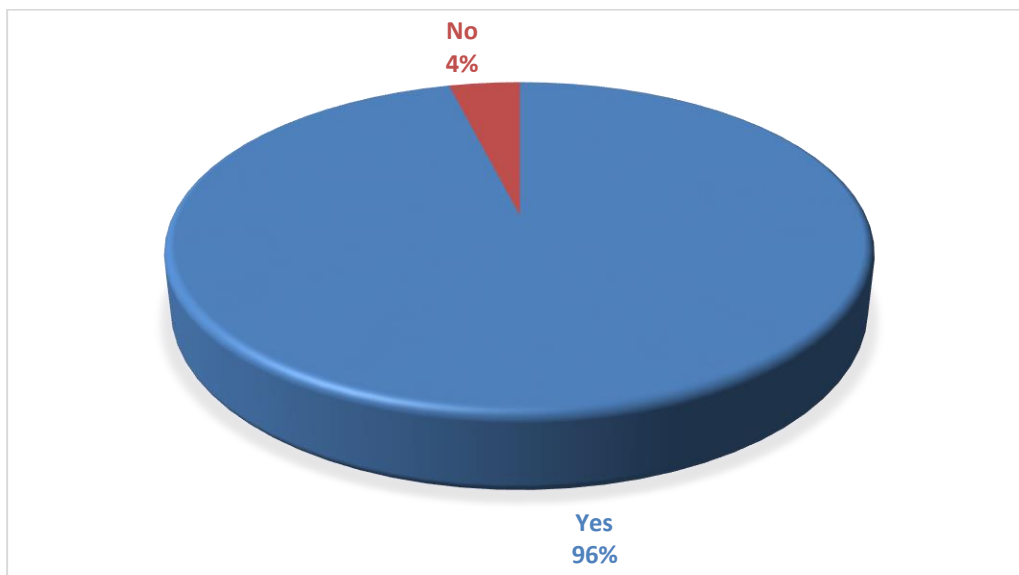


Chart 6: Security features used for smartphone usage (N=618)

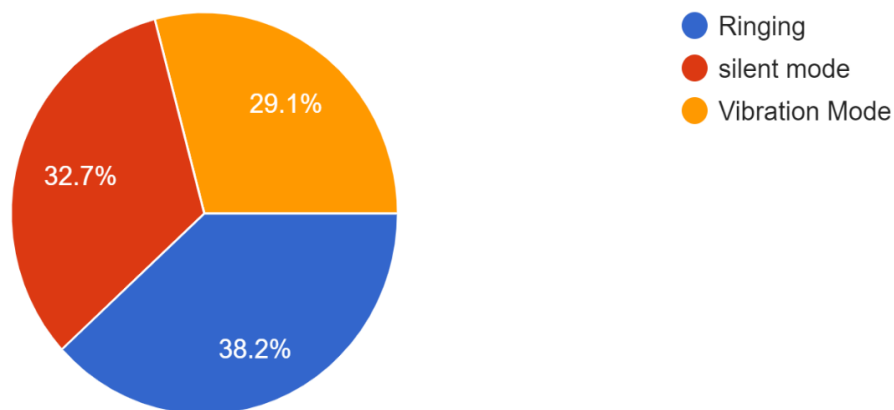


Chart 7: The preferred mode of getting notification by various participants. (N=618)

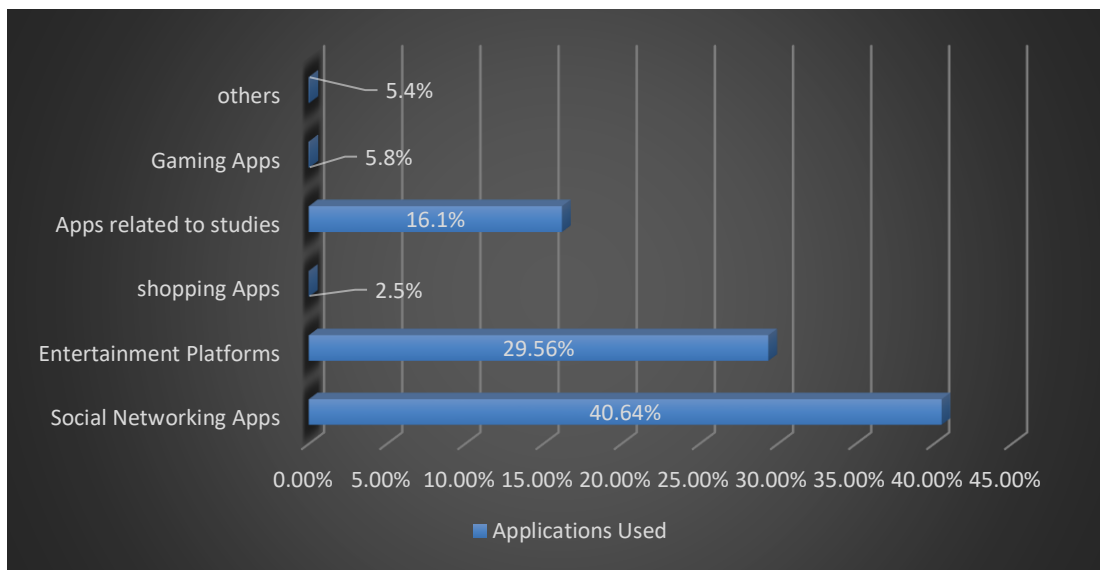


Chart 8: The various applications used by the participants (N=618)

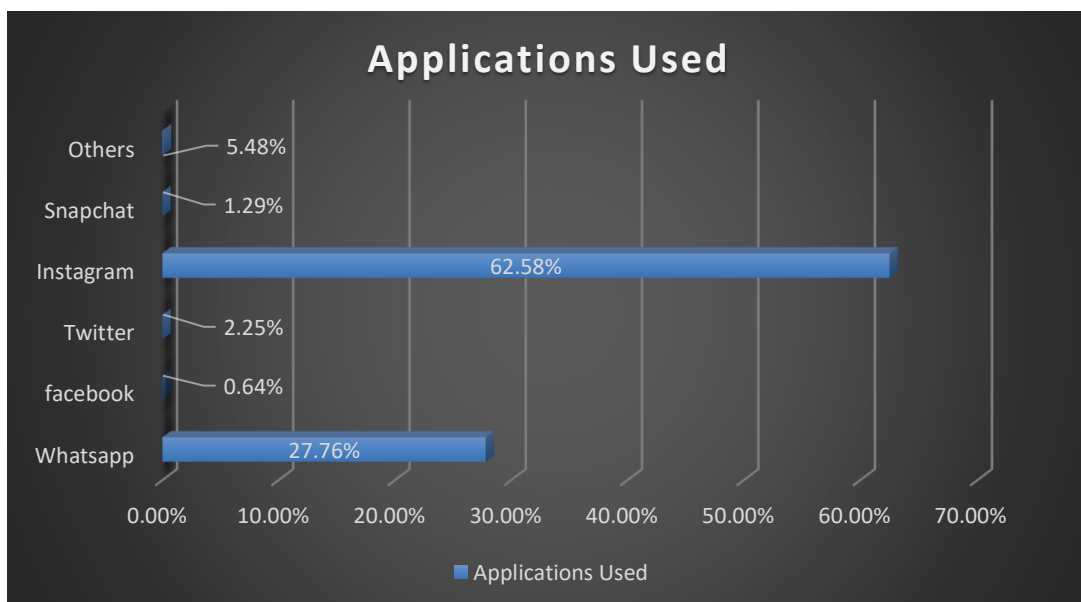


Chart 9: Various social networking used by the participants. (N=618)

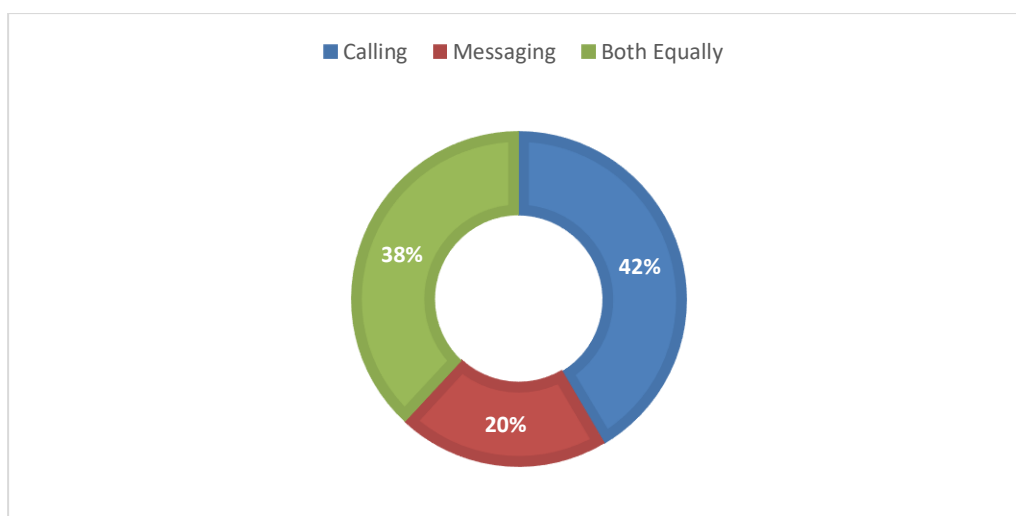


Chart 10: The preferred mode of communication stated by the participants. (N=618)

Table 1: The response observed among the participants regarding day-to-day usage of Smartphone. (N=618)

S. No.	Questions	% of participants who stated yes	% of participants who stated No
1.	Do you use your Smartphone while on the bed before sleeping?	93.9%	6.1%
2.	Do you check your Smartphone immediately after you wake up?	88%	12%
3.	Do you use your Smartphone while having food?	80.9%	19.1%
4.	Do you use your Smartphone even in your washroom?	36.9%	63.1%

Table 2: Questionnaire answered by participants regarding the physical well-being after smart phone usage (N=618)

S. No.	Questions	% of participants who stated yes	% of participants who stated No
1.	Do you experience eye strain after smart phone?	77.7%	22.3%
2.	Do you experience headache after using smart phone?	61.5%	38.5%
3.	Do you have Neck or back pain associated with Smartphone use?	44.7%	55.3%

Table 3: Questionnaire answered by participants regarding the mental well-being after smart phone usage (N=618)

S. No.	Questions	% of participants who stated yes	% of participants who stated No
1.	Do you feel happy or get a sense of satisfaction after using Smartphone for a longer period?	45%	55%
2.	Do you feel a sense of guilt or regret after spending so much time on Smartphone?	95.1%	4.9%
3.	Do you experience any sleep disturbance that you think are related to the Smartphone use?	74.1%	25.9%
4.	Do you feel anxious if you don't have access to your Smartphone?	66.7%	33.3%
5.	Do you feel depressed or lonely even after social media interactions with friends via your Smartphone?	63.4%	36.6%
6.	Do you find it hard to concentrate on task after using your Smartphone?	78.6%	21.4%
7.	Do you use your Smartphone as a mean to escape from real life problems or emotions?	73.1%	26.9%

Table 4: Questionnaire answered by participants regarding the social wellbeing after smart phone usage (N=618)

S. No.	Questions	% of participants who stated yes	% of participants who stated No
1.	Do you prefer communicating by a Smartphone rather than face to face interaction?	69.9%	40.1%
2.	Do you feel your Smartphone use affects your relationship with your family and real-life friends?	64.7%	35.3%
3.	Do you use your Smartphone during any gatherings rather than talking to people?	69.9%	30.1%
4.	Do you find your Smartphone use interferes with your study?	91.6%	8.4%
5.	Do you consider your Smartphone use postpone your important work?	74.8%	25.2%
6.	Do you feel that you could be more productive if you reduce your Smartphone use?	93.5%	6.5%
7.	Do you feel the compulsion to use your Smartphone between the routine conversation with your friends?	64.7%	35.3%
8.	Do you spend money on App purchase frequently?	31.4%	68.6%

9.	Do you feel your Smartphone affects your monthly expense other than the routine normal recharge?	27.8%	72.2%
10.	Do you feel studying through Smartphone is better than studying through hardcopy of books /materials.	20.1%	79.9%
11.	Do you use any tool/app to monitor or limit your Smartphone usage?	38.5%	61.5%
12.	Have you tried to reduce your Smartphone usage?	84.5%	15.5%

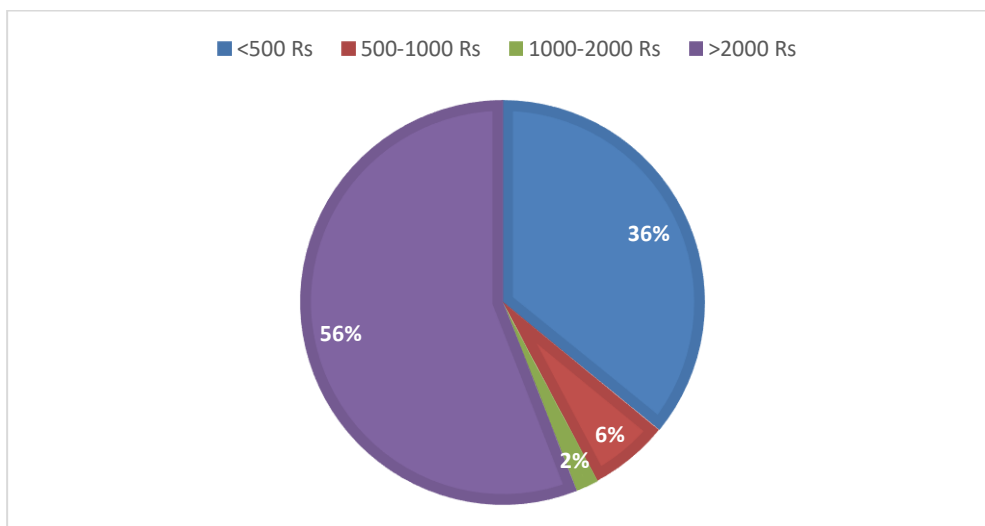


Chart 10: Average money expenditure by the participants on smartphone (N=618)

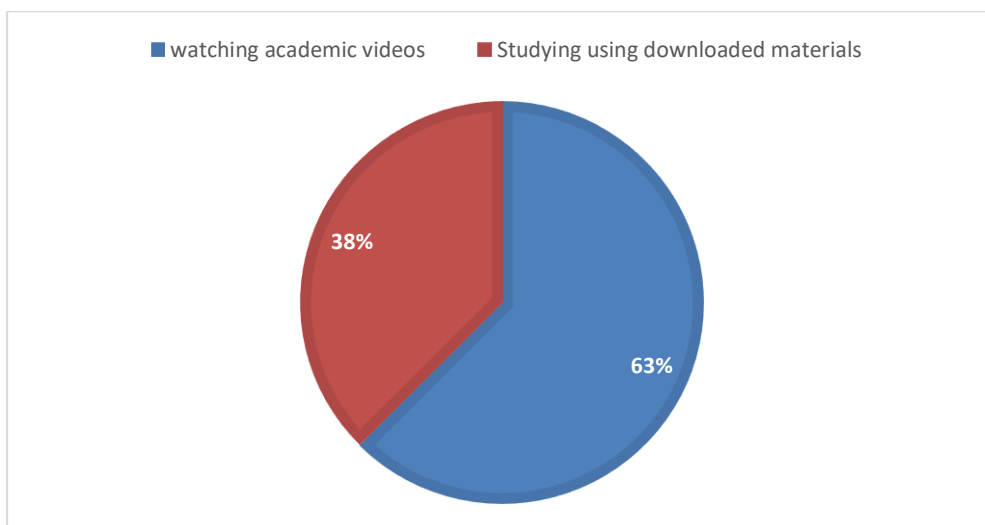


Chart 12: Mode of preference of reading on Smartphone (N=618)

Table 5: Questionnaire answered by the participants regarding the changes they want with Smartphone usage. (N=618)

S. No.	Questions	% of participants who stated yes	% of participants who stated No
1.	Do you want to limit your screen time in the future	94.2%	5.8%
2.	Do You feel that your Smartphone usage affects your physical, mental health and social health	79.9%	20.1%
3.	Do you feel the study from the conventional classroom classes are better than the online lectures	72.2%	27.8%
4.	Do you feel studying through the printed textbooks are better than the E-books	88.6%	11.4%

Results and Discussion

The present study received the maximum number of responses from second-year MBBS students (Chart 1), with nearly equal participation from male and female students (Chart 2), ensuring gender-balanced representation. Analysis of the age at which participants began using smartphones revealed that a majority (57.3%) started after the age of 17, while 28.5% began between 15–17 years, 12.9% between 12–15 years, and a small proportion before the age of 12 (Chart 3).

Regarding daily smartphone usage, 40.1% of students reported using their phones for 4–6 hours per day, followed by 31.1% using them for 2–4 hours, and 23.9% exceeding 6 hours of use daily (Chart 4). Most participants (over 50%) indicated their highest usage occurred during nighttime hours (8 PM to 8 AM), while 31.7% reported evening usage between 4 PM and 8 PM (Chart 5).

Privacy and notification preferences were also evaluated. Approximately 96.1% of participants used privacy or security features on their smartphones. The most commonly preferred notification mode was ringtone (38.2%), followed by silent mode (32.7%) and vibration (29.1%) (Chart 7). In terms of application use, social networking apps were the most frequently accessed (40%), followed by entertainment platforms (30%), while only 16.1% reported using smartphones for study-related applications (Chart 8). Among social media platforms, Instagram was the most popular, used by 62.58% of respondents (Chart 9). The preferred mode of communication remained voice calling, chosen by 42% of participants.

Patterns of smartphone use revealed that 93.9% of students reported using their smartphones while in bed before sleeping, and 88% checked their phones immediately upon waking. Additionally, 80.9% used smartphones while eating, and 36.9% reported using them even in the washroom (Table 1). These findings illustrate the pervasive integration of smartphones into daily routines. Extended smartphone use was associated with various physical symptoms.

A significant proportion (77.7%) reported experiencing eye strain, while 61.5% reported frequent headaches, and 44.7% experienced neck or back pain (Table 2). These findings underscore the negative physical consequences of prolonged screen time. Mental health concerns were also prominent among respondents. A sense of guilt or regret, after extended smartphone use, was reported by 95.1% of participants, and 74.1% acknowledged sleep disturbances related to usage. Interestingly, a similar percentage also reported using smartphones before bedtime, suggesting a strong association. About 66.7% of participants reported feeling anxious when not having access to their smartphone,

and 63.4% expressed feelings of loneliness or depression, despite active social media engagement. Additionally, 78.6% stated that they found it difficult to concentrate on tasks after using their smartphones (Table 3).

These findings are consistent with a meta-analysis by Leow MQH et al. (2023), which reported smartphone addiction in 57% of medical students, with an average usage time of 4.9 hours per day. The study found a moderate positive correlation ($r = 0.30$) between smartphone addiction and poor sleep quality. Smartphone use also significantly influenced social behavior and academic performance. Approximately 69.9% of respondents preferred communicating via smartphone rather than face-to-face interaction, and an equal percentage reported using smartphones during social gatherings instead of engaging with people around them. Notably, 91.6% believed their smartphone usage interfered with their academic activities (Table 4).

In terms of relationships and productivity, 64.7% felt that smartphone usage negatively affected their relationships with family and friends, while 74.8% believed that smartphone use led to the postponement of important tasks. Furthermore, 93.5% acknowledged that they could be more productive if they reduced their smartphone usage. About 31.4% of students reported frequent spending on smartphone apps, and 27.8% felt their usage impacted monthly expenses.

When asked about study preferences, only 20.1% preferred studying via smartphones, while a vast majority (79.9%) favored traditional hardcopy materials. Additionally, 62% reported using their smartphones primarily to watch academic videos (Chart 12). Awareness regarding the need to monitor smartphone usage was relatively high. About 38.5% of participants used tools or apps to monitor or limit their screen time, and 84.5% had made conscious efforts to reduce their usage. Financially, 77% of respondents reported spending less than ₹500 on smartphone-related expenses monthly (Chart 11).

When asked about desired changes in smartphone usage behavior (Table 5), 94.2% expressed a desire to limit screen time in the future. Additionally, 79.9% believed that their smartphone usage adversely affected their physical, mental, and social health. A strong preference for conventional classroom learning was evident, with 72.2% preferring face-to-face teaching over online classes. Similarly, 88.6% preferred printed textbooks over e-books, indicating a continued reliance on traditional learning methods.

A similar study conducted at Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, by Santhi V et al. (2020), involving 200 MBBS students aged 17–25 years, revealed that 44.2% of partici-

pants felt distracted by smartphones, and 34.2% reported difficulty concentrating on studies due to overuse. Additionally, 40% believed their performance in examinations was adversely affected. Similar concerns were echoed in a study by Hashmi AM et al. (2019), conducted at King Edward Medical University, Pakistan, involving 700 medical students. Their findings suggested a significant association between smartphone use during lectures and academic decline, interpersonal issues, and emotional dependency on texting for communication.

Conclusion:

The widespread use of smartphones has revolutionized communication, information access, and daily functioning. However, their excessive use has raised concerns about physical, mental, and social well-being.

This study examined smartphone usage patterns among undergraduate MBBS students and its impact on their daily lives. Findings revealed that 94.2% of students wished to reduce their screen time, indicating strong awareness of potential negative effects.

A majority (69.9%) preferred digital communication over face-to-face interaction and admitted to using smartphones during social gatherings, suggesting a shift in social norms. Additionally, 64.7% felt their smartphone use strained relationships, while 74.8% believed it led to procrastination and reduced productivity. Academically, students favored traditional learning methods, with 72.2% preferring classroom teaching and 88.6% choosing printed textbooks over digital resources. These results highlight the need for balanced technology use, digital wellness education, and institutional measures to mitigate the adverse impacts of excessive smartphone use among medical students.

Suggestion:

1. Establish Smartphone Free Zones and Hours: Designate specific areas and time slots as smartphone-free to encourage face-to-face interaction and improve focus.

2. Promote Digital Literacy: Implement programs to educate students on responsible smartphone use, digital etiquette, and online safety.
3. Encourage Traditional Study Methods: Support the use of printed textbooks and handwritten notes alongside digital tools for a balanced learning approach.

References

1. Your Story. 25 years of mobile phones: India's journey to becoming the world's second-largest Smartphone market [Internet]. 2020 Jul [cited 2020 Apr 13]. Available from: <https://yourstory.com/2020/07/india-mobile-phones-smartphone-market-25-years>
2. G D. 45 Smartphone Addiction Stats in 2020 [The Scary Nomophobia] [Internet]. Tech Jury. 2019 [cited 2020 Apr 13]. Available from: <https://techjury.net/stats-about/smartphone-addiction/>
3. Kaur N. Impact of mobile phone usage on the academic performance of students. *Pramana Res J.* 2018; 8(12):241–55.
4. Aman T, Shah N, Hussain A, Khan A, Khan A, Asif S, Qazi A. Effects of mobile phone use on the social and academic performance of students at a public sector medical college in Khyber Pakhtunkhwa, Pakistan. *Khyber J Med Sci.* 2015; 8(1):99–103.
5. Santhi V, Rajesh B. Impact of smartphone usage on the academic performance among medical students. *J Evolution Med Dent Sci.* 2020; 9(2):105–10. doi: 10.14260/jemds/2020/23
6. Leow MQH, Chiang J, Chua TJX, Wang S, Tan NC. The relationship between smartphone addiction and sleep among medical students: a systematic review and meta-analysis. *PLoS One.* 2023 Sep 15; 18(9):e0290724. doi: 10.1371/journal.pone.0290724. PMID: 37713408; PMCID: PMC10503710.
7. Hashmi AM, Naz S, Ali AA, Asif A. Smartphones and medical students: pleasant distraction or dangerous addiction? *J Pak Med Assoc.* 2019 Dec; 69(12):1891–5. doi: 10.5455/JPMA.299735. PMID: 31853123.