Section: Community Medicine

Original Research Article

A CROSS-SECTIONAL STUDY ON SMARTPHONE ADDICTION AMONG THIRD - YEAR UNDERGRADUATE MEDICAL STUDENTS IN A PRIVATE MEDICAL COLLEGE IN KALABURAGI

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ABSTRACT

Background: Smartphone use is now becoming a mandatory part of the daily life of students; however, excessive use can adversely affect their academic self-regulation and sleep quality. The increased rate at which the youths are using smartphones has created concerns regarding the impact of smartphones on attention, performance, and overall health. **Aims/Objectives:** The study aimed to determine the prevalence and pattern of smartphone use; assess the level of Smartphone Addiction; examine its association with sleep quality and academic self-regulation; and identify socio-demographic and behavioral predictors of smartphone addiction among third-year undergraduate medical students.

Methods and Materials: A cross-sectional study was conducted among third year MBBS students of M.R. Medical College, Kalaburagi through an online questionnaire, which was standardized and was administered using Google Forms. The tool contained some socio-demographic data, smartphone use characteristics, and some validated measures, such as the Smartphone Addiction Scale-Short Version (SAS-SV), Pittsburgh Sleep Quality Index (PSQI). Sleep disturbances were assessed using PSQI items 5–16 (each scored 0–3) and summed to generate a PSQI-derived sleep disturbance score (range 0–36) for analysis. Academic Self-Regulation Questionnaire (SRQ-A), which assesses academic self-regulation and motivation. The relationship between the variables of smartphone addiction, academic self-regulation and sleep quality was explored with descriptive statistics, chi-square tests and regression analysis.

Results: Smartphone addiction was reported in 37.3% of third-year MBBS students. Regression analysis showed that higher PSQI-derived sleep disturbance scores were significantly associated with increased smartphone addiction ($p = 0.0018$). Nonetheless, academic self-regulation (SRQ-A) had no significant association with smartphone addiction ($p = 0.53$).

Conclusion: The regression results showed that there was a significant association between Smartphone Addiction and sleep quality but there was no significant association between Smartphone Addiction and academic self-regulation. The findings explain why the institution needs to intervene and spread compassion messages urging people to use digital platforms ethically and in a balanced manner to improve academic achievements and welfare.

Keywords: Smartphone addiction, Medical students, Cross-sectional study, quality of sleep and academic self-regulation.

INTRODUCTION

Smartphone have become integral to students' life.[1] Individuals do not want to use phones detrimentally or let them to inflict damage. The behavior of students towards their phones and the duration of their use has rendered them subservient to these gadgets, transforming them into addicts.[2] In recent years, the concept of behavioral addiction has garnered significant attention. Behavioral addiction to mobile phones is referred to by several terms, including mobile phone dependency, problematic mobile phone usage, issue cell phone use, mobile phone abuse, and nomophobia.[3] Research indicates that excessive mobile phone use is associated with several mental health issues, including anxiety, sadness, diminished self-esteem, internet addiction, heightened impulsivity, loneliness, and social isolation4. Students often underestimate their reliance on their mobile phones. Smartphone addiction, referred to as Smartphone anxiety or mobile phone syndrome, is a behavioral addiction. It entails the coercive and excessive use of cellphones, which may result in diminished social skills and psychological and behavioral issues in individuals.[5] A number of medical students have developed an addiction to their phones as a result of extensive use in recent years. The pandemic, virtual education and prolonged isolation from social environments have exacerbated this issue.[6] Research results indicate a significant correlation between mobile phone use among medical students and other mental health concerns. These include personal sensitivity, fear of others, despair, anxiety, rage, and compulsive behaviors. All of these adversely affect their academic performance and have emerged as a significant public health concern.[7] Medical students, as the future leaders of healthcare, have a substantial academic burden.[8]

Mobile phones have become an integral aspect of our daily existence. Telephones facilitate life by enhancing convenience and safety in a unique manner. Excessive usage of mobile phones results in several adverse consequences, including fatigue, anxiety, headaches, and difficulty concentrating.[9,10] These issues undoubtedly impede academic performance. The World Health Organization defines addiction as the persistent use of a substance for relief, comfort, or stimulation. Its absence often induces cravings in individuals.[11] Excessive cellphone use may be seen as a behavioral addiction. Kwon and colleagues said that smartphone addiction results in consumers being unaware of the duration of their phone use. Or they are unable to regulate their use. This has unfavorable outcomes in everyday life.[12] Research indicates that 41.9% of medical students in Asia exhibit smartphone addiction. It is closely associated with poor sleep quality.[13,14] This may occur due to demanding academic schedules, prolonged study durations, examination-related anxiety, parental expectations, and the use of digital media. The use of mobile phones, particularly on social media platforms, elicits a sense of pleasure. It assists individuals in evading real-life concerns. This establishes a reward system that often results in increased phone use.[15] Sleep is essential for optimal physical and mental wellbeing. Lowry and colleagues discovered that, on average, 15% of college students express dissatisfaction with their sleep quality.[15]

Aim: To assess the relationship between Smartphone addiction, academic self-regulation, and sleep quality among third-year MBBS students, and to determine the influence of socio-demographic variables on the level of smartphone addiction.

Objectives

1. To determine the prevalence and pattern of smartphone use among third-year MBBS students.
2. To assess the level of Smartphone addiction using the Smartphone Addiction Scale–Short Version (SAS-SV).
3. To evaluate the association between Smartphone addiction and sleep quality as well as academic self-regulation.
4. To identify socio-demographic and behavioral predictors of Smartphone addiction among third-year MBBS students.

MATERIALS AND METHODS

A cross-sectional observational research was performed among third-year MBBS students at Mahadevappa Rampure Medical College, Kalaburagi, in September 2025. The research included all students who had used cellphones for a minimum of six months and had given informed permission via an online form. Students who failed to complete or submit the questionnaire, declined permission, or had serious mental or cognitive impairments that may undermine the reliability of replies were eliminated. A thorough enumeration procedure was used to guarantee the complete inclusion of all eligible people, resulting in a sample size of 161 participants. Data were gathered using a pre-formulated and pre-validated semi-structured questionnaire disseminated via paper formats and Google Forms. Participation was optional and confidential. The questionnaire included socio-demographic information, smartphone use habits, and factors associated with Smartphone addiction, academic self-regulation, and sleep quality. Data were input into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics, including frequencies, percentages were used to summarize the data. Relationships between Smartphone addiction and independent variables, including gender, duration of smartphone use, academic self-regulation, and sleep quality, were evaluated using Chi-square test. A regression analysis was conducted to ascertain independent predictors of Smartphone

addiction, with a p-value of less than 0.05 being statistically significant.

RESULTS

Table 1: Demographic variables

S. No	Variable	Category	Frequency (n)	Percent (%)
1	Age (Years)	20	13	8.1
		21	48	29.8
		22	69	42.9
		23	22	13.6
		24	6	3.7
		25	3	1.9
	Total		161	100.0
2	Gender	Male	87	54.0
		Female	74	46.0
	Total		161	100.0
3	Duration of Smartphone Use (Years)	Less than 2 years	7	4.3
		3 to 5 years	107	66.5
		6 to 8 years	35	21.7
		More than 8 years	12	7.5
	Total		161	100.0
4	Average Daily Smartphone Use (Hours)	Less than 2 hours	24	14.9
		3 to 5 hours	83	51.6
		6 to 8 hours	42	26.1
		More than 8 hours	12	7.4
	Total		161	100.0
5	Residential Status	Day scholar	87	54.0
		Hosteller	74	46.0
	Total		161	100.0
6	Family Type	Nuclear	129	80.1
		Joint	32	19.9
	Total		161	100.0
7	Socioeconomic Status (Modified BG Prasad – 2024)	Class I (≥ ₹10,250)	119	73.9
		Class II (₹5,125–₹10,249)	25	15.5
		Class III (₹3,075–₹5,124)	9	5.6
		Class IV (₹1,537–₹3,074)	6	3.7
		Class V (< ₹1,537)	2	1.2
	Total		161	100.0
8	Total Monthly Family Income (₹)	Less than 15,000	12	7.5
		15,000–30,000	27	16.8
		30,001–50,000	47	29.2
		50,001–1,00,000	32	19.9
		More than 1,00,000	43	26.7
	Total		161	100.0

Table 1: The survey had 161 individuals, mostly aged 22 years (42.9%), with a greater percentage of men (54%) and day students (54%). The majority of participants had used cellphones for 3–5 years (66.5%), engaged with them for 3–5 hours everyday (51.6%), were part of nuclear households (80.1%), and belonged to Class I socioeconomic position (73.9%).

Table 2: Impact of Smartphone addiction on socio-demographic variables

	Unstandardized Coefficients		R Square	T value	P value
	Beta	SE			
(Constant)	-2.075	2.090	0.134	-0.993	0.322
Age	0.167	0.088		1.901	0.059
Gender	0.131	0.182		0.718	0.474
Duration of smartphone use	-0.025	0.131		-0.192	0.848
Average daily smartphone use	0.418	0.113		3.693	0.000**
Residential Status:	-0.282	0.179		-1.574	0.118
Family Type:	0.035	0.216		0.163	0.871
Socioeconomic status	0.223	0.109		2.054	0.042
Monthly Family Income	0.050	0.075		0.662	0.509

Dependent Variable: Smartphone addiction, *p<0.05

Table 2: Regression analysis indicated that average daily smartphone use (p=0.000) and socioeconomic level (p=0.042) significantly influenced Smartphone addiction. Other socio-demographic characteristics, including age, gender, family structure, and income, exhibited no significant correlation (p>0.05).

Table 3: SAS-SV scale

S. No	Statement	Strongly Disagree (n, %)	Disagree (n, %)	Weakly Disagree (n, %)	Weakly Agree (n, %)	Agree (n, %)	Strongly Agree (n, %)	Total (n)
1	I miss planned work due to smartphone use	34, 21.1	25, 15.5	36, 22.4	28, 17.4	12, 7.5	26, 16.1	161
2	I have a hard time concentrating in class because of smartphone use	49, 30.4	37, 23.0	39, 24.2	17, 10.6	7, 4.3	12, 7.5	161
3	I feel pain in the wrists or neck due to smartphone use	62, 38.5	30, 18.6	36, 22.4	13, 8.1	10, 6.2	10, 6.2	161
4	I spend more time on my smartphone than I intend	27, 16.8	27, 16.8	23, 14.2	37, 23.0	24, 14.9	23, 14.3	161
5	People around me complain about my smartphone use	66, 41.0	23, 14.3	30, 18.6	14, 8.7	12, 7.5	16, 9.9	161
6	I lose sleep due to smartphone use at night	44, 27.3	26, 16.1	31, 19.3	24, 15.0	20, 12.4	16, 9.9	161
7	I feel restless or irritated when not using a smartphone	66, 41.0	30, 18.6	31, 19.3	16, 9.9	10, 6.2	8, 5.0	161
8	I have difficulty controlling the urge to use my smartphone	54, 33.5	30, 18.6	30, 18.6	23, 14.3	15, 9.3	9, 5.6	161
9	I feel impatient when I'm not holding my smartphone	68, 42.2	28, 17.4	31, 19.3	15, 9.3	11, 6.8	8, 5.0	161
10	I check my smartphone continuously so I don't miss anything	40, 24.8	23, 14.3	39, 24.2	25, 15.5	22, 13.7	12, 7.5	161

Table 3: The majority of participants expressed disagreement or significant disagreement with assertions of smartphone addiction, especially about restlessness in the absence of a phone (41.0%) and physical pain (38.5%). A significant percentage acknowledged exceeding their planned smartphone use (23.0% weakly agree) and experiencing sleep deprivation as a result of smartphone use (15.0% weakly agree).

Table 4: PSQI Index (a)

S. No	Variable	Category	Frequency (n)	Percent (%)
1	Bedtime	9:00 p.m. – 10:00 p.m.	17	10.6
		10:00 p.m. – 12:00 a.m.	107	66.5
		12:00 a.m. – 2:00 a.m.	37	22.9
	Total		161	100.0
2	Time to Fall Asleep (Minutes)	Less than 10 minutes	50	31.1
		10 – 15 minutes	30	18.6
		15 – 30 minutes	36	22.3
		30 minutes – 1 hour	45	28.0
	Total		161	100.0
3	Wake-up Time	4:00 a.m. – 6:00 a.m.	47	29.2
		6:00 a.m. – 7:00 a.m.	37	23.0
		7:00 a.m. – 8:00 a.m.	77	47.8
	Total		161	100.0
4	Total Sleep per Night (Hours)	4 – 6 hours	37	23.0
		6 – 7 hours	45	28.0
		7 – 8 hours	59	36.6
		More than 8 hours	20	12.4
	Total		161	100.0

Table 4 (a): A predominant 66.5% of participants retired for the night between 10:00 p.m. and 12:00 a.m., while the majority awoke between 7:00 a.m. and 8:00 a.m. (47.8%). Approximately 36.6% reported obtaining 7–8 hours of sleep every night, whereas 31.1% fell asleep within 10 minutes of retiring to bed.

Table 4 PSQI (b)

Sleep Issue	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
Unable to sleep within 30 minutes	N=73 (45.34%)	N=51 (31.68%)	N=29 (18.01%)	N=8 (4.97%)
Waking at night or early morning	N=68 (42.24%)	N=46 (28.57%)	N=33 (20.50%)	N=14 (8.70%)
Getting up to use the bathroom	N=64 (39.75%)	N=55 (34.16%)	N=33 (20.50%)	N=9 (5.59%)
Trouble breathing comfortably	N=126 (78.26%)	N=18 (11.18%)	N=16 (9.94%)	N=1 (0.62%)
Coughing or snoring loudly	N=132 (82.00%)	N=11 (6.83%)	N=17 (10.56%)	N=1 (0.62%)
Feeling too cold	N=102 (63.35%)	N=37 (22.98%)	N=21 (13.04%)	N=1 (0.62%)
Feeling too hot	N=101 (62.73%)	N=35 (21.74%)	N=23 (14.29%)	N=2 (1.24%)
Having bad dreams	N=82 (50.93%)	N=50 (31.06%)	N=22 (13.66%)	N=7 (4.35%)
Having pain	N=105 (65.22%)	N=32 (19.88%)	N=17 (10.56%)	N=7 (4.35%)
Taking sleep medicine	N=145 (90.06%)	N=7 (4.35%)	N=6 (3.73%)	N=3 (1.86%)
Feeling sleepy during the day	N=40 (24.84%)	N=63 (39.13%)	N=38 (23.60%)	N=20 (12.42%)
Trouble staying enthusiastic about tasks	N=66 (40.99%)	N=50 (31.06%)	N=33 (20.50%)	N=12 (7.45%)
Overall sleep quality	N=10 (6.21%)	N=89 (55.28%)	N=1 (0.62%)	N=61 (37.89%)

Table 4 (b): The majority of participants indicated little sleep problems, with more than 75% not encountering concerns such as respiratory difficulties, coughing, or reliance on sleep medicine. Daytime tiredness (39.1% less than once weekly) and difficulties maintaining enthusiasm (31.1% less than once weekly) were notably prevalent issues.

Table 5: SRQ-A

Statement	Always	Most of the time	Sometimes	Never
I do coursework because I want to learn new things	N=10 (6.21%)	N=32 (19.88%)	N=68 (42.24%)	N=51 (31.68%)
I study because I enjoy learning	N=10 (6.21%)	N=29 (18.01%)	N=72 (44.72%)	N=50 (31.06%)
I do homework because it's important for my future	N=19 (11.80%)	N=35 (21.74%)	N=67 (41.61%)	N=40 (24.84%)
I often procrastinate on assignments	N=19 (11.80%)	N=43 (26.71%)	N=64 (39.75%)	N=35 (21.74%)
I try to do well so others will be proud of me	N=34 (21.12%)	N=38 (23.60%)	N=59 (36.65%)	N=30 (18.63%)
I study because I feel guilty if I don't	N=27 (16.77%)	N=27 (16.77%)	N=63 (39.13%)	N=44 (27.33%)
I work hard to avoid feeling ashamed	N=26 (16.15%)	N=37 (22.98%)	N=52 (32.30%)	N=46 (28.57%)
I study only to get good grades	N=59 (36.65%)	N=60 (37.27%)	N=29 (18.01%)	N=13 (8.07%)
I find studying personally meaningful	N=8 (4.97%)	N=30 (18.63%)	N=49 (30.43%)	N=72 (44.72%)
I feel responsible for my learning	N=2 (1.24%)	N=24 (14.91%)	N=45 (27.95%)	N=90 (55.90%)

Table 5: The majority of individuals engaged in their studies mostly for extrinsic motivations, with 73.9% affirming their pursuit of excellent marks and 44.7% acknowledging tendencies toward procrastination. In contrast, intrinsic motivation was diminished, with 55.9% never feeling personally accountable for their learning and 44.7% never seeing studying as significant.

Table 6: Association of Smartphone addiction among 3rd-year MBBS students

		Duration of smartphone use(In years):				Total	Chi Square (p value)
		Less than 2 years	3 to 5 years	6 to 8 years	More than 8 years		
Age	20	2	6	4	1	13	11.100 (0.745)
	21	2	33	10	3	48	
	22	2	45	17	5	69	
	23	1	16	3	2	22	
	24	0	5	1	0	6	
	25	0	2	0	1	3	
Gender	Male	3	59	16	9	87	3.504 (0.320)
	Female	4	48	19	3	74	
Residential Status	Day scholar	3	55	21	8	87	1.923 (0.589)
	Hosteller	4	52	14	4	74	
Family Type	Nuclear	7	85	27	10	129	2.041 (0.564)
	Joint	0	22	8	2	32	
Socioeconomic status	Class I (≥ ₹10,250)	6	77	26	10	119	7.956 (0.789)
	Class II (₹5,125 – ₹10,249)	1	20	3	1	25	
	Class III (₹3,075 – ₹5,124)	0	5	3	1	9	
	Class IV (₹1,537 – ₹3,074)	0	3	3	0	6	

	Class V (< ₹1,537)	0	2	0	0	2	
Total		**7**	107	35	12	161	

Table 6: No statistically significant correlation was found between Smartphone addiction and socio-demographic characteristics, including age, gender, residential status, family type, or socioeconomic position ($p>0.05$). Approximately 66.5% of students have used cellphones for duration of 3 to 5 years, irrespective of demographic variations.

Table 7: Reliability (Internal Consistency)

Scale	Cronbach's α	Interpretation
Smartphone Addiction Scale – Short Version (SAS-SV)	0.889	Excellent
Academic Self-Regulation Questionnaire (SRQ-A)	0.758	Acceptable

Table 7: The reliability study demonstrated exceptional internal consistency for the Smartphone Addiction Scale–Short Version (Cronbach's α = 0.889) and satisfactory reliability for the Academic Self-Regulation Questionnaire (Cronbach's α = 0.758), indicating that both measures were reliable for evaluation.

Table 8: Regression Analysis (Dependent Variable: Smartphone Addiction Total Score)

Predictor	Coefficient (B)	Standard Error (SE)	t-value	p-value	Significance
Academic Self-Regulation (SRQ-A)	-0.10	0.17	-0.62	0.53	Not significant
Sleep Quality (PSQI)*	0.45	0.14	3.17	0.0018	Significant
R^2	0.06	—	—	—	—

Sleep quality (PSQI): PSQI-derived sleep disturbance score calculated from items 5–16.

Table 8: Regression analysis indicated that academic self-regulation (SRQ-A) was not a significant predictor of smartphone addiction (B = -0.10, p = 0.53), whereas poor sleep quality (PSQI) strongly predicted increased smartphone addiction scores (B = 0.45, p = 0.0018). The model accounted for 6% of the variation in smartphone addiction ($R^2 = 0.06$).

Table 9: SAS-SV Scale (Smartphone Addiction Scale - Short Version)

Item #	Question Description	N	Mean	SD	SE	Cronbach's α
1	I miss planned work due to smartphone use	161	3.49	1.82	0.14	0.88
2	I have a hard time concentrating in class because of smartphone use	161	3.23	1.92	0.15	0.88
3	I feel pain in the wrists or neck due to smartphone use	161	2.98	1.89	0.15	0.88
4	I spend more time on my smartphone than I intend	161	4.12	1.65	0.13	0.87
5	People around me complain about my smartphone use	161	2.89	1.92	0.15	0.88
6	I lose sleep due to smartphone use at night	161	3.45	1.88	0.15	0.88
7	I feel restless or irritated when not using a smartphone	161	2.78	1.79	0.14	0.88
8	I have difficulty controlling the urge to use my smartphone	161	3.01	1.94	0.15	0.88
9	I feel impatient when I'm not holding my smartphone	161	2.67	1.80	0.14	0.88
10	I check my smartphone continuously so I don't miss anything	161	3.02	1.87	0.15	0.88

Full Scale: 10 items (1-10), Total Mean = 27.63, SD = 11.27, SE = 0.89, Cronbach's α = 0.89 (Good).

Table 9: The SAS-SV findings reveal a moderate level of smartphone addiction among participants, with an average score of 27.63 ± 11.27. The scale exhibited outstanding internal consistency, with Cronbach's α = 0.89.

Table 10: SRQ-A (Study Regulation Questionnaire - Academic Motivation)

Item #	Question Description	N	Mean	SD	SE	Cronbach's α
1	I do coursework because I want to learn new things	161	3.45	1.72	0.14	0.75
2	I study because I enjoy learning	161	3.12	1.68	0.13	0.75
3	I do homework because it's important for my future	161	4.01	1.45	0.11	0.74
4	I often procrastinate on assignments	161	3.23	1.89	0.15	0.75
5	I try to do well so others will be proud of me	161	3.56	1.78	0.14	0.75
6	I study because I feel guilty if I don't	161	2.98	1.65	0.13	0.74
7	I work hard to avoid feeling ashamed	161	3.34	1.72	0.14	0.75
8	I study only to get good grades	161	3.45	1.82	0.14	0.75
9	I find studying personally meaningful	161	3.67	1.55	0.12	0.74
10	I feel responsible for my learning	161	3.21	1.68	0.13	0.75

Full Scale: 10 items (1-10), Total Mean = 28.02, SD = 5.24, SE = 0.41, Cronbach's α = 0.76 (Acceptable)

Table 10: The SRQ-A scale, including 10 questions, had a mean score of 28.02 ± 5.24 (SE = 0.41) and demonstrated satisfactory internal consistency (Cronbach's α = 0.76). The individual item scores ranged from 2.98 to 4.01, indicating moderate to high academic desire among individuals.

Table 11: PSQI Index (Pittsburgh Sleep Quality Index) (a)

Item #	Question/Component Description	N	Mean	SD	SE
1	Bedtime (hours past midnight)	161	15.626	8.717	0.691
2	Time to fall asleep (minutes)	161	16.423	10.695	0.848
3	Wake-up time (hours past midnight)	161	7.253	5.007	0.398
4	Total sleep per night (hours)	161	7.149	1.474	0.116

Table 11 (a): The PSQI evaluation (four components) revealed an average bedtime of 15.63 ± 8.72 hours, a sleep onset latency of 16.42 ± 10.70 minutes, a wake-up time of 7.25 ± 5.01 hours, and a total sleep duration of 7.15 ± 1.47 hours each night. The findings indicate typically sufficient sleep duration with modest diversity in sleep schedule among subjects.

Table 11: PSQI Index (Pittsburgh Sleep Quality Index) (b)

Item #	Question/Component Description	N	Mean	SD	SE	Cronbach's α
5	Unable to sleep within 30 minutes	161	0.826	0.898	0.071	0.822
6	Waking at night or early morning	161	0.957	0.990	0.078	0.822
7	Getting up to use the bathroom	161	0.919	0.908	0.072	0.822
8	Trouble breathing comfortably	161	0.329	0.678	0.053	0.822
9	Coughing or snoring loudly	161	0.298	0.679	0.053	0.822
10	Feeling too cold	161	0.509	0.743	0.059	0.822
11	Feeling too hot	161	0.540	0.783	0.062	0.822
12	Having bad dreams	161	0.714	0.862	0.068	0.822
13	Having pain	161	0.540	0.851	0.067	0.822
14	Taking sleep medicine	161	0.174	0.576	0.045	0.822
15	Feeling sleepy during the day	161	1.236	0.965	0.076	0.822
16	Trouble staying enthusiastic about tasks	161	0.944	0.957	0.075	0.822

Table 11 (b): PSQI components 5–16 had low to moderate mean scores (0.17–1.24), indicating occasional sleep disruptions, with daytime drowsiness being the most often stated concern (1.24 ± 0.97). The scale exhibited remarkable internal consistency (Cronbach's $\alpha = 0.82$).

Table 12: Overall sleep quality

Quality	Frequency	Percentage (%)
Very good	61	37.89
Fairly good	89	55.28
Fairly bad	10	6.21
Very bad	1	0.62
Total	161	100.00

Table 12: A majority of participants (93.17%) reported acceptable subjective sleep quality, while 6.83% reported poor subjective sleep quality.

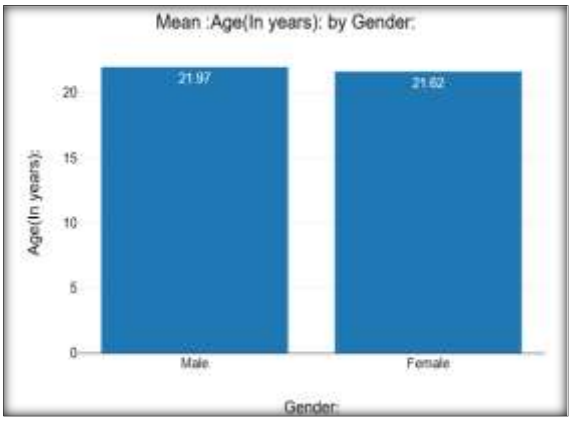

Figure 1: Shows the mean age of male and female gender

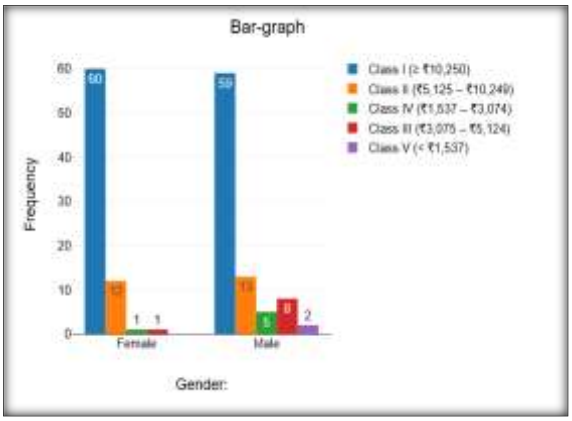

Figure 2: Shows the gender and frequency distribution for the socio-economic status of the participants

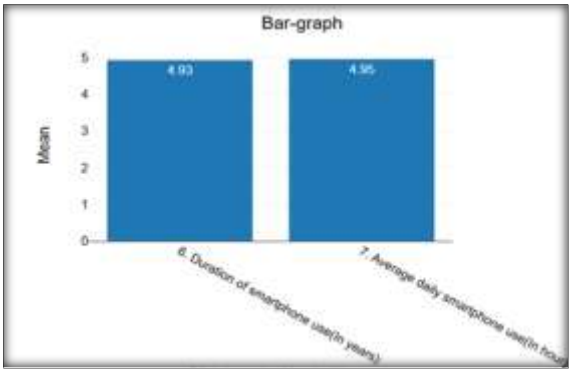

Figure 3: Shows the bar-graph of the mean of the duration of smartphone and average daily smartphone use in hours

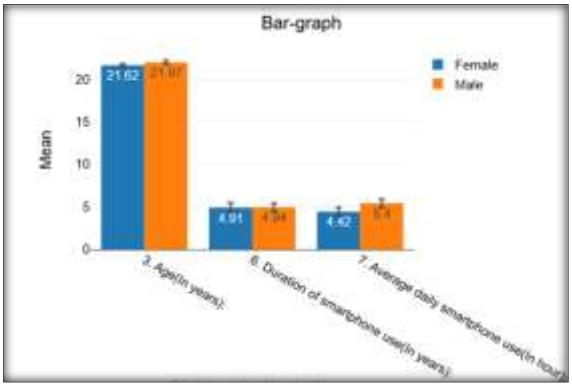

Figure 4: Shows the mean and standard deviation for age, duration of smartphone use and average daily smartphone use (in hours)

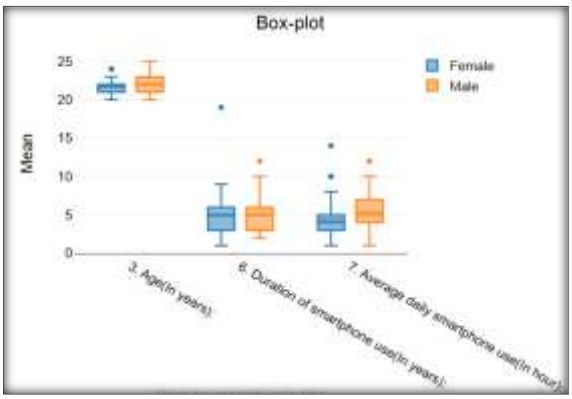

Figure 5: Shows the box-plot for mean of the gender with age, duration of smartphone use and average daily smartphone use (in hour)

DISCUSSION

This study identified a smartphone addiction prevalence of 37.3% among medical students at a private medical college in South India. Regression analysis demonstrated that higher PSQI-derived sleep disturbance scores (items 5–16) were significantly associated with increased smartphone addiction. This finding suggests that smartphone addiction is linked to cumulative sleep disturbances rather than widespread self-perceived poor sleep. These findings significantly contribute to the accumulating evidence that correlates excessive smartphone use with sleep disturbances in medical school environments. The identified incidence of smartphone addiction of 37.3% roughly aligns with previous aggregated data indicating typical rates of 40%-50% among medical students globally [16,17]. This incidence exceeds the 29.1% seen among French medical students, aligning with recent Indian research indicating a 40% prevalence[18]. The discrepancies in rates across research are likely attributable to diverse cultures, measurement instruments used, and characteristics of the groups studied. Although most students subjectively reported acceptable overall sleep quality, analysis of multiple components of the Pittsburgh Sleep Quality Index revealed delayed sleep onset, nocturnal awakenings, reduced sleep duration, and daytime dysfunction.[14] These cumulative sleep disturbances, reflected by higher PSQI-derived sleep disturbance scores (items 5–16), were significantly associated with increased smartphone addiction.[9,16,18] Similar associations between excessive smartphone or mobile phone use and impaired sleep parameters among medical and university students have been reported in previous studies[10,13,21] suggesting an association between smartphone addiction and qualitative sleep disturbances even when subjective sleep perception A descriptive examination of PSQI items provides insight into sleep domains commonly reported by students with higher smartphone addiction scores. remains acceptable. An item-wise descriptive examination of PSQI responses suggests that daytime dysfunction and somatic discomfort were more prominent sleep-related concerns among students, supporting the overall finding that cumulative sleep disturbances (items 5–16) were associated with higher These findings indicate a strong association between cumulative sleep disturbances and higher smartphone addiction scores, rather than widespread poor subjective sleep quality or medication use.smartphone addiction. Consistent trends seen across all academic years indicate that smartphone-related sleep disturbances are not only transient adjustment concerns but persistent obstacles throughout medical training. This underscores the need of long-term solutions above temporary cures. The elevated prevalence of smartphone addiction and poor sleep quality among medical students significantly impacts medical training and student well-being. Poor sleep quality is consistently associated with worse academic performance, impaired cognitive abilities in clinical settings, and an increased likelihood of errors in medical practice. The significant correlation between smartphone addiction and poor sleep quality indicates that reducing excessive smartphone use might substantially enhance student health and academic performance. Educational institutions should consider implementing comprehensive digital health programs that include assessments for smartphone addiction, instruction on sleep hygiene, and strategies for habit modification. The elevated incidence among

Third-year students indicates that targeting interventions at this critical transitional phase may be most effective [16,24]

The prevalence of smartphone addiction among MBBS students at Assam Medical College was 44%. This rate exceeded that reported in previous studies by Ammati et al. in South India and Soni et al. in Rajasthan[25,26]. Our rate exceeded those reported in research conducted in China, South Korea, and Southern Europe using the same SAS-SV method [27-29]. However, our rate was inferior to that reported in a comparable research by Sethuraman et al. conducted in Andaman [30]. The discrepancies may arise from the diverse tools and grouping methodologies used, as well as variations among the participants in the different research. The elevated prevalence seen in our present research indicates a potential public health concern stemming from smartphone use among students at our medical institutions. In our research, the prevalence of smartphone addiction was somewhat greater among males (44.9%) compared to girls (43.15%), although the difference was not statistically significant. Gender disparities and smartphone addiction have captivated several researchers; yet, there is no definitive consensus about which demographic is at more risk of addiction[31]. The research conducted by Jenaro et al. including 337 Spanish university students revealed a correlation between excessive mobile phone use, female gender, elevated anxiety, and insomnia. Kawasaki et al. in Thailand, as well as Hakoama and Hakoyama, observed similar high addiction levels in females [32,33]. Nonetheless, other research conducted by Takao et al. and Perry and Lee revealed no significant correlation between gender and the prevalence of smartphone addiction[34,35]. Our research demonstrated a strong correlation between daily average use duration and the incidence of smartphone addiction. This aligns with the results of Haug et al. in Switzerland and Cha in Korea [36,37]. Comparable findings were seen by Suliman et al. in Saudi Arabia, where excessive smartphone use and increased daily hours of use were substantially correlated with smartphone addiction. This indicates that students were dedicating substantial time to their cellphones and depended on the many technological advantages they provide. Students have become to depend on smartphones for even the most basic everyday activities. Excessive dependence on smartphones may adversely affect physical health, mental well-being, social interactions, familial relationships, and academic performance, as shown by several researches on smartphone addiction[37-39]. The research by Walsh et al. indicated a significant increase in smartphone users, heightened expenditure on the latest devices and applications, an inability to function without smartphones, extended use hours, and persistent preoccupation with smartphones. This indicates that smartphone addiction is poised to increase in prevalence and emerge as one of the most prevalent forms of addiction[40].

CONCLUSION

Smartphone addiction ratings were moderate (SAS-SV mean = 27.63 ± 11.27) and were strongly affected by daily use and inadequate sleep quality, although socio-demographic variables had a negligible impact. Although most students reported acceptable subjective sleep quality, higher PSQI-derived sleep disturbance scores were significantly associated with increased smartphone addiction. There was no significant association between Smartphone addiction and academic self-regulation.

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