



## MOBILE PHONE USAGE AND ITS ASSOCIATION WITH SLEEP PATTERN AMONG MEDICAL STUDENTS

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### ABSTRACT

**Introduction:** Mobile Phone usage in India is increasing ridiculously, especially among youth. Its usage has all sort of positive and negative effects

**Objective:** To find the mobile phone usage among medical students and its association with their sleep pattern

**Methods:** A cross-sectional study was conducted among 415 medical students in Chennai medical college hospital & Research Centre, Irungalur, Trichy by using self-administered questionnaire. Assessment of sleep pattern of medical students was done by using the standardised Pittsburgh sleep quality index questionnaire. Data were entered in Microsoft Excel 2010 and analysed by using SPSS software v20. Chi-square test was used

**Results:** Almost all the students (96.4%) were using smart phone, Reason for the usage of mobile phone as necessity (65%) and entertainment (31%). Overall 78% of the medical students were getting adequate sleep (Score<5) and 22% were getting poor sleep usually (Score ≥5). Poor sleep was present among 40% of the female students, whereas among male students only 10% and this was statistically significant  $p < 0.001$ . Increase in the duration of Social Media usage was significantly associated with sleeping status of the medical students ( $p=0.002$ ). Similarly those who were actively playing mobile phone games had significantly poor sleep ( $p < 0.001$ ). Number of calls/day and Number of SMS/day did not show any statistically significant association with sleeping status of medical students.

**Conclusion:** Spending time in Social media and Games significantly changing the sleeping status among medical students. Self-control and Guidance from the parents is needed to control the over usage of mobile phone usage.

**KEYWORDS :** Mobile Phone, Sleep Pattern, Pittsburgh sleep quality index (PSQI)

### INTRODUCTION:

Mobile phones were introduced in few markets in the 1980s, and their use spread only in the mid 1990s. Mobile phone usage increased from 12.4 million in 1990 to 500 million in 2000 to 3.3 billion in 2008 and 5.3 billion at the end of 2010.<sup>1</sup> India is one of the largest markets for mobile phones in the world. Mobile phone growth in India has been fast and it has reached all segments of society, especially the young.<sup>2</sup> The first generation of the mobile phone was manufactured with basic features such as voice call. Today, mobile phones are equipped with other features that allow further communications and entertainments such as the Short Message Service (SMS), MP3 player, Games, Internet, Whatsapp, Face book, Twitter and Videos.<sup>3</sup> These additional features has attracted people across all walks of life including the younger generations, and consequently led to the increase in the number of mobile phone users in India.

Although these devices have proved to be lifesaving in certain circumstances (e.g., after accidents) and helped to improve the quality of life in some sectors, concerns continue to be raised about potential adverse health impacts associated with their use.<sup>4</sup> Besides providing various advantages these new technologies can lead to much type of social problems like social isolation, economic/financial problems like larger debts incurred to buy or use smart phones. It can also cause both physical and psychological pathologies like damages related to electromagnetic field radiation, vehicular accidents, distress linked to the fear of not being able to use new technological devices.<sup>5</sup> The increasing utilization of new technological devices and virtual communication involving personal computers, tablets and mobile phones (smart phones) are causing changes in individuals' behaviour and daily habits.

Constant usage and addiction to cell phones has affected the people physically, psychologically, and socially. Excessive mobile phone use has been found to be associated with health problems such as impaired concentration, headache, dizziness, fatigue, thermal sensations in and around ear, facial dermatitis, and stress, sleep disturbances owing to night time use, and frustration.<sup>6</sup> Inappropriate use of mobile phone by students present many deleterious effects, for example, usage of phones during lectures causes disturbances in classrooms affecting students' academic performances,<sup>7</sup> and accidents while driving,<sup>8</sup> damaged relationships owing to preference to phone calls by ignoring other members,<sup>9</sup> and increased freedom from parents along with decreased social freedom.<sup>10</sup> Psychologically, people get addicted to

mobile phones that have led to emotional stress. Students may also show cognitive/ behavioural salience in which they constantly think about their phones when they are not using it or keep on checking their mobile phones for missed calls or messages.<sup>7</sup> For many the smart phone has become an extension of their ear, from the moment they wake up until the second they fall asleep.<sup>11</sup>

New addition to the stress list is "Nomophobia",<sup>11</sup> the fear of being out of mobile phone contact and "Ringxiety"<sup>12</sup> has been reported. According to psychiatrist<sup>13</sup> cell phone dependence can be considered as a new diagnostic entity as it has properties of excessive use, withdrawal, tolerance and negative repercussions. There were no much studies of mobile phone usage and sleeping pattern among medical students.

### OBJECTIVE:

This study was designed to find the mobile phone usage among medical students and its association with their sleep pattern

### METHODOLOGY:

The present study was a cross-sectional study conducted among the medical students of Chennai Medical College Hospital and Research Centre (CMCH&RC), Irungalur, Trichy, Tamilnadu during June 2015. CMCH&RC is a rural based private medical college with students coming from all over Tamil Nadu located at a distance of about 22 Kms from Trichy. The college enrolls a batch of 150 students each year for MBBS.

All the medical students (second, Third and Fourth Year) were included in this study. The data was collected by using a pre tested, structured questionnaire. The students were approached in their lecture halls and they were invited to participate in the study. After taking informed consents from them, the questionnaire was distributed. The ones who refused to participate were instructed to return the questionnaires unfilled. A total of 415 students returned the filled questionnaires. 30 students were absent on the particular day and the rest 5 students have not filled the questionnaire.

The questionnaire for this study was made keeping in mind the various pros and cons for mobile phone usage today by the general population and how it is particularly used by a medical student in their day to day activities. Assessment of sleep pattern of medical students was done by using the standardised Pittsburgh sleep quality index questionnaire.

The PSQI is a reliable and standardized measure of sleep quality and pattern. It assesses the quality and pattern of sleep in 7 domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the last month. It is a self-rated scale and is scored on a 0 to 3 point Likert scale (with 3 reflecting the “negative” extreme of the domain). The sum of the domain scores produces a global score that reflects the overall quality of sleep. Total scores range from 0 to 21, with a score of  $\geq 5$  reflecting a “poor sleeper.” With high internal consistency and a high reliability coefficient (Cronbach  $\alpha=0.83$ ), this scale has been used to assess sleep quality in many studies.

**Data Analysis:** The data was entered in MS Excel and analysed using SPSS, version 20.0. Pattern of mobile phone usage were reported as proportions. Domains of sleep quality and pattern were reported as proportions. Association between mobile phone usage and sleeping status were analysed by using Chi-square test. p value of  $<.05$  was taken as statistically significant.

**Results:**

**Mobile phone usage by medical Students**

Most of the medical students participated in this study were using a single mobile phone (94.5%) and very few were using more than one mobile phone (5.5%). Almost all the students (96.4%) were using smart phone whereas the rest 3.6% were using non smart phone type of mobile phones. Most of the students (65.1%) started the reason for the usage of mobile phone as necessity, 31.3% for entertainment. Around 27% of the medical students were using mobile phone in each category of duration 2-4 hours, 4-8 hours and  $>8$  hours. Most of the medical students (41.2%) were making 4-6 calls, 27.2% were making  $<3$  calls and the rest 31.6% were making more than 6 calls per day. Around 34% of medical students sent 11-50 SMS per day, 32.5% of them sent 51-100 SMS per day, 14% of them sent  $>100$  SMS per day and the rest sent  $<10$  SMS per day. Majority of the students (27%) spent around 4-6 hours in using mobile phone for calls alone.

About 37.8% of the total medical students actively involved in the social media using their mobile phone like Whatsapp, Facebook, Twitter, Internet around 2-4 hours followed by 21.7% students actively involved around 4-8 hours and 11% actively involved around more than 8 hours. Most of the medical students (52.5%) were playing mobile games less than one hour. Around 30% of students were playing around 1-4 hours and 7% were playing more than 4 hours (Table 1).

**Table 1: Mobile phone usage among Medical Students**

Variables	N (%)
<b>Number of mobile phones used by a medical student</b>	
1	392(94.5)
2	22(5.3)
3	1(0.2)
<b>Type of mobile phone used</b>	
Smart phones	400(96.4)
Not	15(3.6)
<b>Average number of calls/ day</b>	
$\leq 3$	113(27.2)
4-6	171(41.2)
7-9	34(8.2)
$\geq 10$	97(23.4)
<b>Average number of SMS/day</b>	
$\leq 10$	82(19.8)
11-50	140(33.7)
51-100	135(32.5)
$>100$	58(14)
<b>Time spend by the medical students for phone calls per day</b>	
1-2	79(19)
2-4	110(26.5)
4-8	112(27)
8-12	78(18.8)
$>12$	36(8.7)
<b>Reasons for which mobile phones are used by medical students</b>	
Necessity	270(65.1)
Status symbol	8(1.9)
Entertainment	130(31.3)
Others	7(1.7)

<b>Average duration of mobile phone usage /day (in hours)</b>	
$<2$	79 (100)
2-4	110 (100)
4-8	112 (100)
$>8$	114 (100)
<b>Average duration of time(in hours) spent for the usage of social medias / day</b>	
$<2$	122(29.4)
2-4	157(37.8)
4-8	90(21.7)
$>8$	46(11.1)
<b>Average duration of time spent for games/day (in hours)</b>	
0	42 (100)
$<1$	218 (100)
1-4	125 (100)
$>4$	30 (100)
<b>Total</b>	<b>415 (100)</b>

**Sleep Status:**

Component 1: Subjective sleep quality; More than 50% of the medical students felt that they had good sleep and 42% had fairly good sleep. Around 4% had fairly bad sleep. Component 2: Sleep latency; More than 50% of the medical students felt no latency of sleep. Mild, Moderate and severe latency were felt by 37%, 7% and 1% of the medical students respectively. Component 3: Sleep duration; around 20% of the medical students were sleeping more than 7hrs, nearly three-fourth (74.5%) of the medical students were sleeping 6- 7hrs / day, and the rest (6.2%) were sleeping less than 6hrs / day

Component 4: Habitual sleep efficiency; around 90% of the medical students were having more than 85% habitual sleep latency. Component 5: Sleep disturbance; 32% of the medical students felt no disturbance in the sleep, around 65% of the students felt mild disturbance and the rest 2.2% felt moderate disturbance in sleep.

Component 6: Use of sleep medication; four students used medication for sleep almost daily, medication was needed by eight students once a week and 28 students used it sometimes for normal sleep. More than 90% of the students needed no medication for sleep. Component 7: Day time dysfunction; one-fourth (25.5%) of the students had mild dysfunction in daytime, 6% had moderate dysfunction. Most of the students (68.4%) didn't have any dysfunction during daytime (Table 2). Overall 78% of the medical students were getting adequate sleep (Score $<5$ ) and 22% were getting poor sleep usually (Score  $\geq 5$ ) based on the global score.

**Table 2: Sleep Pattern among Medical Students**

Variables	Frequency (%)
<b>Component 1: Subjective sleep quality</b>	
Very Good Sleep	224(54.0)
Fairly Good Sleep	176(42.4)
Fairly Bad sleep	15(3.6)
<b>Component 2: Sleep latency</b>	
No latency	226(54.5)
Mild Latency	155(37.3)
Moderate Latency	30(7.2)
Severe latency	4(1.0)
<b>Component 3: Hours of sleep</b>	
$>7$ hrs	80(19.3)
6-7hrs	309(74.5)
5-6hrs	23(5.5)
$<5$ hrs	3(.7)
<b>Component 4: Habitual sleep latency</b>	
$>85\%$	372(89.6)
75-84%	35(8.4)
65-74%	7(1.7)
$<65\%$	1(.2)
<b>Component 5: Sleep disturbance</b>	
No disturbance	136(32.8)
mild disturbance	270(65.1)
moderate disturbance	9(2.2)
<b>Component 6: Sleep medication taken</b>	
Not needed	375(90.4)
sometimes needed	28(6.7)
weekly once	8(1.9)

Almost daily	4(1.0)
<b>Component 7: Daytime dysfunction</b>	
No dysfunction	284 (68.4)
Mild dysfunction	106 (25.5)
Moderate dysfunction	24 (5.8)
Severe dysfunction	1 (0.2)
<b>Overall Sleeping Status</b>	
Adequate Sleep (Score <5)	322 (77.6)
Poor Sleep (Score ≥5)	93 (22.4)
Total	435 (100)

**Association between Mobile phone usage and sleep pattern**

Poor sleep was present among 40% of the female students. Whereas among male students only 10% had poor sleep and this difference was statistically significant  $p < 0.001$  (Table 3). Duration of Social Media usage was significantly associated with sleeping status of the medical students. Those who actively involved in the activities of social media were significantly having poor sleep usually compare to those who

**Table 4: Association between cell phone usage and sleeping status**

Variables	Adequate Sleeper N (%)	Poor Sleeper N (%)	Total	X <sup>2</sup> for Trend Somers'd	P value
<b>Duration of Cell Phone Usage / day (in hours)</b>					
<2	52 (65.8)	27 (34.2)	79 (100)	-0.67	0.126
2-4	91 (82.7)	19 (17.3)	110 (100)		
4-8	88 (78.6)	24 (21.4)	112 (100)		
>8	91 (79.8)	23 (20.2)	114 (100)		
<b>Social Media Usage / day (in hours)</b>					
<2	105 (86.1)	17(13.9)	122 (100)	0.132	<b>0.002</b>
2-4	121 (77.1)	36 (22.9)	157 (100)		
4-8	66 (73.3)	24 (26.7)	90 (100)		
>8	30 (65.2)	16 (34.8)	46 (100)		
<b>Number of Calls/ Day</b>					
≤ 3	84 (74.3)	29 (25.7)	113 (100)	-0.05	0.231
4-6	136 (79.5)	35 (20.5)	171 (100)		
7-9	18 (52.9)	16 (47.1)	34 (100)		
≥ 10	84 (86.6)	13 (13.4)	97 (100)		
<b>Number of SMS/ Day</b>					
≤10	59 (72)	23 (28)	82 (100)	-0.055	0.188
11-50	112 (80)	28 (20)	140 (100)		
51-100	100 (74.1)	35 (25.9)	135 (100)		
>100	51 (87.9)	7 (12.1)	58 (100)		
<b>Playing Games/ Day (in hours)</b>					
0	33 (78.6)	9 (21.4)	42 (100)	0.163	<b>&lt;0.001</b>
<1	185 (84.9)	33 (15.1)	218 (100)		
1-4	85 (68)	40 (32)	125 (100)		
>4	19 (63.3)	11 (36.7)	30 (100)		
Total	322 (77.6)	93 (22.4)	415 (100)		

X<sup>2</sup>- Chi-Square Test

**Discussion:**

Mobile phones utilize low intensity micro waves in a range of 900-1800 MHz for its function. Micro waves in this frequency have shown to affect physiological functions and has raised concerns related to health problems like head ache, dizziness, sleep disturbances, cognition and cancer.<sup>14,15</sup> The present study focussed on evaluating the effect of mobile phone use on sleep pattern. In the present study, Almost 96% were using smart phone which was more compared to a study done in Maharashtra and Punjab where 83% and 76% respectively used smart phones.<sup>16,17</sup> Around 65% were using for necessity and 32% were using for entertainment. Almost 5% of the students participated in the present study owned more than one mobile phone. This proportion was very much less compared to a study done in Mangalore where 21% of the medical students used more than one mobile phone.<sup>13</sup>

With overall sleep pattern score majority (78%) of the participants had normal sleep pattern. This result was concordant with many other studies.<sup>18,19,20</sup> In the present study mild and moderate sleep disturbance was perceived by 67% of the students. Sleep disturbance among the participants was also detected by Abdel-Rassoul et al done in Egypt.<sup>21</sup>

In the present study female students had poor sleep pattern

were not actively involved ( $p=0.002$ ). Similarly those who were actively playing mobile phone games had significantly poor sleep usually compared to those who were not actively played games using mobile phones ( $p<0.001$ ). Duration of mobile phone usage, Number of calls/day and Number of SMS/day did not show any statistically significant association with sleeping status of medical students (Table 4).

**Table 3: Association between gender and sleeping status of Medical students**

Gender	Adequate Sleeper N (%)	Poor Sleeper N (%)	Total	X <sup>2</sup> Value (df)	P value
Male	221 (90.6)	23 (9.4)	244 (100)	57.4 (1)	<b>&lt;0.001</b>
Female	101 (59.1)	70 (40.9)	171 (100)		
Total	322 (77.6)	93 (22.4)	415 (100)		

X<sup>2</sup>- Chi-sqaure Test, df- Degree of Freedom

significantly compared to male medical students which was similar to another report from a cohort study which found an association between mobile phone overuse, stress and sleep pattern among women.<sup>22</sup> Except for 31% of the students who used mobile phones for entertainment others used it for social interaction. Similar findings were explored by another research conducted on mobile phone adoption in young generation.<sup>23</sup> In this study 96% of the respondents had good sleep quality which was contradictory to the result observed by White AG and his colleagues where sleep quality was affected due to mobile phone use pattern.<sup>24</sup>

In the present study duration of mobile phone use, number of SMS sent per day and number of calls did not have any significant effect on overall sleep pattern among medical students. Besides that, using social media and playing games were significantly associated with sleeping status among the medical students. Similarly interaction between mobile phone playing and short sleep duration was described by Jiang X et al at China.<sup>25</sup>

Though mobile phone use has not affected the overall sleep pattern among the medical students (over all sleep pattern score), it had an effect on habitual sleep latency and sleep disturbance. Use of social media and playing games had a negative influence of the sleep pattern among the students. Using mobile phone is not a problem when it is used for necessity. Over usage affects sleep which would reflect in the

academic performance of the students.<sup>17</sup> Therefore, all the young medical college students should be encouraged to utilize mobile phones only for necessity.

### Conclusion:

Spending time in Social media and Games significantly changing the sleeping status among medical students. Thus medical students should understand usage of mobile phones is affecting their health and sleeping status, taking necessary steps for self-control in over usage of mobile phone usage. Their parents also should guide and watch the youngster in regard of mobile phone usage especially social media usage and games. Government also should take necessary programmes regarding mobile phone usage.

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