



Original Article

## A Cross Sectional Study on the Effects of Mobile Phone Usage on Subjective Sleep Quality

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### ABSTRACT

**INTRODUCTION** In the modern age mobile phones have become an important part of daily life offering unparalleled connectivity and access to information. However the increased usage of phones has raised concern about their impact on health and particularly on sleep quality. The aim of this study is to find out the association between mobile use and sleep quality and to find out prevalence of mobile related sleep risk factors (MRSRF) and their effect on sleep in mobile users. **METHODOLOGY** A cross-sectional study was conducted on the Undergraduate medical students of Government Medical College, Vizianagaram from December 2025 to March 2026. Students between 18 to 24 years old participated in the study. Semi-structured questionnaire for socio-demographic data, Mobile related sleep risk factors (MRSRF) questionnaire, Pittsburgh Sleep Quality Index (PSQI) were filled by the students through Google forms. Convenient sampling technique was used and 366 students completed the questionnaire. Data analysis is performed using IBM-SPSS version 21.0. **RESULTS** Average screen usage time is 4.713 hours (SD =2.33). Average time spent on watching videos on you tube is 1.437hours (SD=1.25). 40.4% of the students have poor sleep quality. Using mobile before going to sleep when lights have been turned off and Screen usage time is positively correlated with day time dysfunction. Watching videos on you tube is positively correlated with sleep latency, use of sleeping pills, day time dysfunction and sleep disturbances. Using mobile before going to sleep when lights have been turned off is positively correlated with sleep latency, day time dysfunction and sleep disturbances. Keeping the mobile near the pillow is negatively correlated with subjective sleep quality. Keeping the mobile in Airplane mode is positively correlated with subjective sleep quality. **CONCLUSION** Students with increased screen time had poor sleep quality. Understanding mobile related sleep risk factors is crucial for developing effective interventions aimed at improving sleep quality.

**Keywords:** Mobile use, sleep quality, MRSRF.

### INTRODUCTION

In the modern age, mobile phones have become an important part of daily life, offering unparalleled connectivity and access to information. As the result of technological development mobile phone usage has significantly increased over the past decade globally.[1] Mobile phones are commonly used to communicate with friends, family members, attend online classes, transfer mobile data, play back music, record videos, take pictures, keep a calendar, pay bills etc. Many people use mobile phones to socialize, to connect technologically sometimes as a means of fashion and social status indication. However, the increased usage of phones has raised concern about their impact on health and particularly on sleep quality [2]. Sleep is one of the most significant of human behaviours, occupying one third of human life. It is a universal behavior that has been demonstrated in every animal species studied from insects to mammals. Sleep is the process the brain requires for proper functioning. Sleep may appear to be a passive process but in fact can be associated

with a high degree of brain activation [3]. Studies have revealed that insufficient and poor quality sleep affects cognitive functions, general health condition and well-being negatively [4][20]. Research has increasingly highlighted a correlation between problematic mobile phone use and disturbances in sleep patterns indicating excessive use of phones may contribute to Sleep problems [22]. The interaction between mobile phone usage and sleep is multifaceted. Mobile phone screens emit blue light which interferes with body's natural sleep wake cycle. Also, the constant notifications from the mobile phone and the tendency to engage in stimulating activities before bed time may increase the difficulty to fall asleep and maintain restful sleep.

The mobile phones emit radiofrequency energy, a form of non-ionizing Electromagnetic radiation. It can influence Melatonin. Melatonin is a hormone produced by the Pineal gland which can control many physiological processes occurring in daily or seasonal rhythms, such as sleep, metabolism, and reproduction. Under normal circumstances Melatonin levels begin to rise at dusk and remain elevated until dawn. Bright light suppresses the release of Melatonin. Melatonin in a sense is the signal of darkness in the brain [3]. Melatonin can influence the circadian timing system in humans [5]. Under physiological conditions, the regulatory mechanisms ensure that this rhythm is properly entrained in the light-dark cycle. Therefore, the elevated night-time Melatonin secretion can serve for all cells of the body as a clock and a calendar. Studies on humans have reported the adverse effects of Electromagnetic field emitted by mobile phones reduce Melatonin production [6] [25] This study explores the problematic use of mobile phones and its specific effects on sleep quality. Understanding these relationships is crucial for developing strategies to mitigate the negative effects of mobile phone use on sleep, ultimately contributing to improved public health and awareness.

### AIMS AND OBJECTIVES

- To find out the association between mobile use and sleep quality.
- To find out prevalence of mobile related sleep risk factors (MRSRF) and their effect on sleep in mobile users

### MATERIALS AND METHODS

A cross-sectional study was conducted in Undergraduate medical students of Government Medical College, Vizianagaram. Institutional ethics committee of Government Medical College, Vizianagaram approved the study. Sample size was calculated for this cross-sectional study by using the formula given below.

Formula  $n = Z^2 * P * (1-P) / e^2$ , where n = the required sample size, Z = the Z – score corresponding to desired confidence level. For 95% confidence level, Z=1.96, P = estimated prevalence of the condition in the population, e = the desired margin of error (precision). This is value like 0.04 for 4% precision. In this study I have taken p=0.5 to get the maximum sample size. Sample size calculated by this formula is 384. Only three batches of MBBS students were present in this college as medical college was started in 2023. Average strength of the class is 150 students. Students between 18 to 24 years old who gave the valid consent participated in the study. Class representatives of the 3 batches were contacted over phone and purpose of the study explained to them. The consent form and questionnaire regarding the study was prepared in Google forms and sent to each class through the WhatsApp groups. Participants were assured that their personal information would be kept confidential. Convenient sampling technique was used in this study. 393 students volunteered the study. Out of 393, 11 students were excluded due to medical illness, 1 student was excluded due to psychiatric illness, and 15 students did not complete the questionnaire.

### STUDY TOOLS

1. Socio demographic Proforma was used to collect demographic data.

2. The Pittsburgh Sleep Quality Index (PSQI) is designed to assess individual sleep quality. This scale has been translated into multiple languages and is used globally. PSQI has been found to be most effective in terms of reliability and validity. It has got internal consistency coefficient (Cronbachs alpha) of 0.83. It includes 19 self-rated items, which focus on seven main areas including: subjective sleep quality, sleep latency (time taken to fall asleep), sleep duration, habitual sleep efficiency (the ratio of total sleep time to time in bed), sleep disturbances, the use of sleep-inducing medicines and daytime dysfunction. The PSQI includes a scoring key for calculating a patient's seven sub scores, each of which ranges from 0 to 3. A score of 0 indicates no difficulty. A score of 3 indicates severe difficulty.

The 7 component scores are then added to make a global score with a range of 0–21.

A score of 0 means no difficulty. A score of 5 or more indicates poor sleep quality. A score of 6-10 indicates mild sleep disturbances, 11-15 indicates moderate sleep disturbances and 16-21 means severe sleep disturbances [7][9].

3. Mobile-related sleep risk factors questionnaire (MRSRF) consists of seven primary items designed to know the duration of use, usage in bed, phone placement and settings, blue light exposure, notifications and disturbances. The face validity of the questionnaire was confirmed by professors of physiology and respiratory therapy at IAU, whereas test retest technique was used to verify the reliability (interval of three weeks) with a group of 30 students (P = 0.002; r = 0.84).[10]

## Statistical Analysis

The data were analyzed using Statistical Package for Social Sciences (SPSS) for Windows, Version 21.0. Descriptive statistics were used to determine the demographic data. Comparison of sleep quality and sleep parameters in the participants with various “Mobile-related sleep risk factors” (MRSRF) was done by using Cross tab Chi square test for nominal variables, and independent t test for qualitative data. Relative risk assessment was done for sleep quality and MRSRF. Correlation of poor sleep quality and various sleep parameters with MRSRF was done by using Pearson and Spearman tests. P value of < 0.05 was considered statistically significant.

## RESULTS

**TABLE 1: Distribution of demographic variables**

	Frequency	Percentage	Total
Age			
18 Years	57	15.57	15.57
19 Years	82	22.40	37.97
20 Years	110	30.05	68.02
21 Years	77	21.03	89.05
22 Years	20	5.46	94.51
23 Years	16	4.37	98.88
24 Years	4	1.09	100
Male	122	33.3	33.3
Female	244	66.7	100.0
Hindus	305	83.3	83.3
Christians	23	6.3	89.6
Muslims	32	8.7	98.4
Others	6	1.6	100.0
2025 Batch	141	38.5	38.5
2024 Batch	116	31.7	70.2
2023 Batch	109	29.8	100.0
Staying in hostel	284	77.6	77.6
Not staying in hostel	82	22.4	100.0
Do you use mobile just before going to sleep [ while in the bed, when the lights have been turned off- Yes	292	79.8	79.8
Do you use mobile just before going to sleep while in the bed, when the lights have been turned off- No	74	20.2	100.0
Do you keep your mobile on your bed (near your pillow) while sleeping? Yes	232	63.4	63.4
Do you keep your mobile on your bed (near your pillow) while sleeping? No	134	36.6	100.0
Do you keep your mobile away from your bed (at least 2 meters away) while sleeping? Yes	122	33.3	33.3
Do you keep your mobile away from your bed (at least 2 meters away) while sleeping? No	244	66.7	100.0
Do you put your mobile in airplane mode while sleeping? Yes	61	16.7	16.7
Do you put your mobile in airplane mode while sleeping? No	305	83.3	100.0
Do you use blue light filters (night mode) on your mobile? Yes	234	63.9	63.9
Do you use blue light filters (night mode) on your mobile? No	132	36.1	100.0
Sleep quality – good	218	59.6	59.6
Sleep quality- poor	148	40.4	100

**TABLE 2: Descriptive statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
1. Age	366	18	24	19.96	1.359
2. For how many total hours/24 hours do you use a mobile screen?	366	.5	16.0	4.713	2.3399
3. How many hours do you spend on watching videos on You- tube	366	.00	10.00	1.4372	1.25152

**TABLE 3: Comparison of various parameters with PSQI**

AGE	PSQI < 5	PSQI > 5	TOTAL
18 Years	29	28	57
19 Years	57	25	82
20 Years	64	46	110
21 Years	43	34	77
22 Years	9	11	20
23 Years	13	3	16
24 Years	3	1	4
Total	218	148	366
<b>SEX</b>			
Male	67	55	122
Female	151	93	244
<b>MBBS BATCH</b>			
2025 Batch	80	61	141
2024 Batch	73	43	116
2023 Batch	65	44	109
<b>STAYING IN HOSTEL</b>			
Yes	161	123	284
No	57	25	82

**TABLE 4: Comparison of MRSRF with PSQI**

Do you use mobile just before going to sleep (while in the bed, when the lights have been turned off)	Good sleep quality	Poor sleep quality	Total
Yes	162	130	292
No	56	18	74
Do you keep your mobile on your bed (near your pillow) while sleeping?			
Yes	121	111	232
No	97	37	134
Do you keep your mobile away from your bed (at least 2 meters away) while sleeping?			
Yes	86	36	122
No	132	112	244
Do you put your mobile in airplane mode while sleeping?			
Yes	47	14	61
No	171	134	305
Do you use blue light filters (night mode) on your mobile?			
Yes	142	92	234
No	76	56	132

**TABLE 5: Relative risk estimation for MRSRF and poor PSQI**

Relative risk estimation for MRSRF and poor PSQI	Value	95% Confidence Interval	
		Lower	Upper
1. Do you use mobile just before going to sleep (while in the bed), when the lights have been turned off.	1.830	1.200	2.791
2. Do you keep your mobile on your bed (near your pillow) while sleeping?	1.733	1.277	2.351
3. Do you keep your mobile away from your bed (at least 2 meters away) while sleeping?	0.43	0.473	0.873
4. Do you put your mobile in airplane mode while sleeping?	0.522	0.324	0.842
5. Do you use blue light filters (night mode) on your mobile?	0.927	0.718	1.195

**TABLE 6: Correlation of MRSRF with various components of PSQI**

		Sleep latency	Subjective sleep quality	Sleep duration	Use of sleeping medications	Day time dysfunction	Sleep disturbance
1.Screen usage time	Correlation coefficient P value					<b>0.125</b> 0.017	
2.Watching videos on U-tube	Correlation coefficient P value	<b>0.167</b> <b>0.001</b>			<b>0.115</b> <b>0.027</b>	<b>0.104</b> <b>0.046</b>	<b>0.136</b> <b>0.009</b>
3.Do you use mobile just before going to sleep	Correlation coefficient P value	<b>.229</b> <b>.000</b>				<b>0.240</b> <b>0.000</b>	<b>0.171</b> <b>0.006</b>
4.Keeping the mobile on bed near the pillow while sleeping	Correlation coefficient P value		<b>-.150</b> <b>.004</b>				
5.Do you keep the mobile on bed( at least 2 m away) while sleeping	Correlation coefficient P value						
6.Do you keep your mobile in Airplane mode while sleeping	Correlation coefficient P value		<b>.141</b> <b>.007</b>				

**RESULTS**

Mean age of the students is 19.96 years (SD 1.359 years). In our study 66.7% (n=244) were females, 83.3% were Hindus. 38.5% of students were first year students, 31.7% were second year students and 29.8% were third year students. Most of the students belong to the state of Andhra Pradesh. Only 0.5% of students reported history of alcohol intake, and 0.3% reported history of smoking. 77.6% of the students were staying in hostel.

Average screen usage time is 4.713 hours (SD =2.33). Male students are using the mobile on an average of 4.85 hours and female students 4.64 hours. 41% of the students who have more than 4 hours screen time has poor sleep quality. Third year students are using the mobile for about 5.40 hours .Average time spent on watching videos on you tube is 1.437hrs(SD=1.25). 60.78% of the students who watch you tube for more than 2 hours have poor sleep quality .79.8% of the students use mobile just before going to sleep. 63.4% of the students keep their mobile on bed near pillow while sleeping. 66.7% do not keep their mobile away from bed (2m) while sleeping.

Only 16.7% of the students keep their mobiles in Airplane mode while sleeping. 63.9% students use blue light filters on their mobile. 40.4% of the students have poor sleep quality. Using mobile before going to sleep when lights have been turned off and keeping the mobile near the pillow will increase the risk of having poor sleep quality of sleep. Keeping the mobile 2m away from bed while sleeping, keeping the mobile in Airplane mode, using blue light filters decrease the risk of having poor sleep quality.

Screen usage time is positively correlated with day time dysfunction. Watching videos on you tube is positively correlated with sleep latency, use of sleeping pills, day time dysfunction and sleep disturbances. Using mobile before going to sleep when lights have been turned off is positively correlated with sleep latency, day time dysfunction and sleep disturbances. Keeping the mobile near the pillow is negatively correlated with subjective sleep quality. Keeping the mobile in Airplane mode is positively correlated with subjective sleep quality.

**DISCUSSION**

In our study mean screen time is 4.713 hours whereas study done by Yeluri etal[11] has 5.13hrs screen time and Baby etal [12]has 5.25hrs average screen time. One of significant finding of our study is that 79.8% of the students were using mobile phone after the lights have been turned off. Similar findings were seen in the study done by Tejas V Patel etal[27]

and Rafique et al (84.5%)[10]. In our study 40.4% of the students have PSQI score more than 5 which indicates poor sleep quality whereas study done by Akcay et al [2] and Harshil et al [27] reported 66.6% and 64.2% participants had poor sleep quality of life.

Relative risk assessment revealed that using mobile before going to sleep when the lights have been turned off and keeping the mobile near pillow increases the risk of developing poor quality of sleep. A systematic review done by Multazem et al [13] also revealed that night time mobile use was associated with reduced sleep quality. Many students use the mobile before going to sleep to check whatsapp messages, to send good night messages to friends and family members. Munezawa et al [21] reported that in their survey of Japanese adolescents sleep disturbances (short sleep duration, subjective sleep quality, day time extreme sleepiness and insomnia) were found in people who use their mobile phones to talk and send messages after the lights are turned off.

Mobile usage causes sleep quality to deteriorate as a result of delayed bed time. Students who keep their mobile near the pillow will have increased phone usage because any message alerts make them check their mobiles, after that they may start seeing reels, they may watch videos, play games and get preoccupied with their mobiles this inevitably leads to delay in sleeping and waking and sleep quality is affected.[1][14][18]

Keeping the mobile 2m away from bed, keeping the mobile in Airplane mode, using blue light filters decrease the risk of developing poor quality of sleep. According to our study 70.49% of the students who keep their mobile 2m away from bed have good sleep quality. Keeping the mobile 2m away from bed drastically reduces EMF exposure, eliminating the fire hazard of charging on bed and removing the temptation to scroll at night. This separation prevents night time stimulation and improves sleep quality. In our study 77% of students who turn on Airplane mode, 60% of the students who use blue light filters have good sleep quality. Airplane mode is a setting that disables all wireless transmissions on a portable device, including cellular wifi, bluetooth and GPS. Blue light filters adjust screen colours to warmer, amber tones to reduce short wave length light emissions. They prevent blue light from suppressing natural melatonin production before bed time [8].

41% of the students with poor sleep quality were using mobile for more than 4 hours. 60.78% of the students who have poor quality of sleep were watching u tube for more than 2 hours. In our study Screen usage time is positively correlated with day time dysfunction and watching videos is positively correlated with sleep latency, use of sleeping pills, day time dysfunction and sleep disturbances. Almost similar results were seen with studies done by Sathe HS et al, Foerster M et al, Alshobaili FA et al [16][15][17]. Most of the mobile phones emit blue light. Blue light in the wave length 460 -480 nm cause decrease in the production of Melatonin. Melatonin is the hormone which is involved in circadian rhythm. Decreased Melatonin production leads to phase shifting in human circadian clock there by causing prolonged sleep latency, sleep disturbances which ultimately leads to day time disturbances and when this problem lasts long patient may end up in using sleep inducing medications. [13][18]

Using mobile before going to sleep when lights have been turned off is positively correlated with sleep latency, day time dysfunction and sleep disturbances. Similar findings were seen in a study done by Rafique et al [10]. day time dysfunction ( $P=0.003$ ), sleep disturbances ( $P=0.004$ ), Sleep latency ( $P=0.001$ ). almost similar findings were seen in a study by Yeluri et al [11] where bed time screen usage has significant adverse relationships with sleep quality quantity and sleep latency. [24][23]

Keeping the mobile near the pillow showed negative correlation with subjective sleep quality and this correlation is statistically significant. Study done by Harshil et al [27] reported worsening of subjective sleep quality. Study done by Demiri et al [19] revealed similar results where smart phone severity was negatively correlated with sleep quality which is statistically significant.

Keeping the mobile in airplane mode is positively correlated with subjective sleep quality. Activating airplane mode on mobile improves sleep primarily through behavioral changes rather than radiation reduction. Disabling connectivity prevents night time notifications from waking you and stops the temptation to scroll, which are the major culprits of poor sleep quality. It also reduces low power radio waves and Electromagnetic fields prevents blue light exposure and cortisol spikes allowing quicker transitions into deep sleep.

### Limitations

1. A small sample size was taken in this study which restricts the extent to which the study can be generalized.
2. Study focused on mobile phone usage only, other electronic devices such as laptop, desktop, television were not taken into consideration which could significantly influence the sleep quality in students.
3. Consumption of caffeinated drinks (coffee, tea, energy drinks, soft drinks), as well as doing exercises which could influence sleep quality were not considered in this study.

4. PSQI is a self reported questionnaire where participants may give biased answers because of their perceptions, beliefs and expectations.

It is recommended that further research need to be initiated by addressing these limitations

## CONCLUSION

It is seen in the study that as the screen usage time increased the sleep quality worsened. Awareness sessions should be conducted to the students regarding the problems associated with mobile phone usage. Students should be educated about sleep hygiene, proper usage of mobile phone, and hazardous effects of mobile phone usage on sleep. They should also be encouraged to seek professional help when they have sleep issues.

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## CONFLICTS OF INTEREST

All authors declare that there is no conflict of interest

## REFERENCES

1. Hue Thi Pham ,Hsiao-Ling Chuang, Electronic device use before bed time and sleep quality among university students *Healthcare* 2021,9,1091.
2. Duyug Akcay,Bulent Devrim Akcay ,The effect of mobile phone usage on sleep quality in adolescents ,*JNBS* 2018, volume 5, issue 1
3. Benjamin James Sadock ,Virginia Alcott Sadock,Pedro Ruiz Synopsis of Psychiatry eleventh edition ISBN- 13: 978-93-5129-273-9 , Page 533-542.
4. Samaha M, Hawi NS. Relationships among smartphone addiction, stress,academic performance, and satisfaction with life. *Computers in human behavior*.2016 Apr 1;57:321-5.
5. Sathe HS, Saraf AS, Talapalliwar M, Patil V, Kumar V, Karia S. Excessive Daytime sleepiness and sleep quality in medical students and their association with smartphone and internet addiction: A cross-sectional study. *Annals of Indian Psychiatry*. 2021 Jul 1;5(2):139-43.
6. Liu H, Chen G, Pan Y, Chen Z, Jin W, Sun C, et al. Occupational electromagnetic field exposures associated with sleep quality: A cross-sectional study. *PLoS One* 2014; 9 : e110825
7. Tsai P-S ,Wang S-Y et al. Psychometric evaluation of the Chinese version of the Pittsburgh sleep quality index in primary insomnia and control subjects. *Qual Life Res*. (2005) 14:1943-52
8. Algorta,GP;Van Meter,A .;Dubika,B.;Jones,S.;Youngstrom,E;Lobban,F. Blue blocking glasses worn at night in the first year higher education students with sleep complaints: A feasibility study. *Pilot Feasibility Stud*.2018,4,1-7.
9. Buysse DJ, Reynolds III CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry research*. 1989 May 1;28(2):193-213.
10. Rafique N, Al-Asoom LI, Alsunni AA, Saudagar FN, Almulhim L, Alkaltham G. Effects of Mobile Use on Subjective Sleep Quality. *Nat Sci Sleep*. 2020 Jun 23;12:357-364. doi:10.2147/NSS.S253375. PMID: 32607035; PMCID: PMC7320888.
11. Yeluri K, Hs K, H BG, Bj SC. Electronic Gadget Screen-time, Perceived Sleep Quality & Quantity and Academic Performance in Medical Students. *J Assoc Physicians India*. 2021 Nov;69(11):11-12. PMID: 34781611.
12. Baby RS, Issac A, Vasudev A, Sabu DK, Gopika TS, Pal M, Sahu R. Impact of screen time on sleep quality. *Indian Journal of Psychiatric Nursing*. 2021 Jan 1;18(1):29-32.
13. Multtazem Fahreza Chandra ,Amalia Karthika ,Widya May Hendra ,zakia Ifana Putri Emilia Sasqia Puteri,Dwi Khai Kani Arma Zura Yelvi Mila, Desmawati ,The effect of mobile phone usage with sleep quality in adolescents : a systematic review , *International journal of Research and Review* vol 6,issue 12 December 2019
14. Sinha S, Dhooria S, Sasi A, Tomer A, Thejeswar N, Kumar S, Gupta G, Pandey RM, Behera D, Mohan A, Sharma SK. A study on the effect of mobile phone use on sleep. *Indian J Med Res*. 2022 Mar;155(3&4):380-386. doi: 10.4103/ijmr.ijmr\_2221\_21. PMID: 35946229; PMCID: PMC9707689.
15. Elsheikh, A.A., Elsharkawy, S.A. & Ahmed, D.S. Impact of smartphone use at bedtime on sleep quality and academic activities among medical students at Al -Azhar University at Cairo. *J Public Health (Berl.)* (2023).
16. Sathe HS, Saraf AS, Talapalliwar M, Patil V, Kumar V, Karia S. Excessive Daytime sleepiness and sleep quality in medical students and their association with smartphone and internet addiction: A cross-sectional study. *Annals of Indian Psychiatry*. 2021 Jul 1;5(2):139-43.
17. Foerster M, Henneke A, Chetty-Mhlanga S, Rössli M. Impact of adolescents' screen time and nocturnal mobile phone-related awakenings on sleep and general health symptoms: a prospective cohort study. *International journal of environmental research and public health*. 2019 Feb;16(3):518. doi:10.3390/ijerph16030518.

18. Alshobaili FA, AlYousefi NA. The effect of smartphone usage at bedtime on sleep quality among Saudi non medical staff at King Saud University Medical City. *Journal of family medicine and primary care*. 2019 Jun 1;8(6):1953-7.doi:10.4103/jfmpe.jfmpe\_269\_19.
19. Demirci K, Akgönül M, Akpınar A. Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *Journal of behavioral addictions*. 2015 Jun;4(2):85-92. doi:10.1556/2006.4.2015.010
20. Twenge JM, Campbell WK. Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population based study. *Preventive medicine reports*. 2018 Dec 1;12:271-83.
21. Munezawa T, Kaneita Y, Osaki Y, Kanda H, Minowa M, Suzuki K, et al. The association between use of mobile phones after lights out and sleep disturbances among Japanese adolescents: A nationwide cross-sectional survey. *Sleep* 2011; 34 : 1013-20.
22. Sahin S, Ozdemir K, Unsal A, Temiz N. Evaluation of mobile phone addiction level and sleep quality in university students. *Pak J Med Sci* 2013; 29 : 913-8.
23. Gladius Jennifer H, Sowmiya K, Vidya DC, Archana Lakshmi PA, William RF. A study of mobile phone usage on sleep disturbance, stress and academic performance among medical students in Tamil Nadu. *Int J Community Med Public Health* 2017; 5 : 365-8.
24. Kurugodiyavar MD, Sushma HR, Godbole M, Nekar MS. Impact of smartphone use on quality of sleep among medical students. *Int J Community Med Public Health* 2017; 5 : 101-9.
25. Pockett S. Public health and the radio frequency radiation emitted by cellphone technology, smart meters and WiFi. *N Z Med J* 2018; 131 : 97-107.
26. Kaneko M, Ahara Y, Liu Y, Motohashi S, Higuchi: Effects of VDT tasks with a bright display at night on melatonin, core temperature, heart rate, and sleepiness. *J Appl Physiol* 2003; 94 : 1773-6.
27. Harshil J Shah, Hemang M Shah, Minakshi N Parikh, Tejas V Patel, Relationship between cellphone screen time and its effects on sleep quality in medical UG students ; *Indian journal of public health research and development* , volume 16 no 2, April –June 2025.