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# A Review on Mobile Phone Usage and its Effects on Sleep and Psychological Health

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**ABSTRACT:Introduction:** In current scenario mobile phones become important gadgets for humans throughout the worldwide. It is because the mobile phone plays various functions in day to day lifestyle. However, duration of mobile phones uses causes several effects on sleep and psychological health which results in addiction to it. The study aimed to review the mobile phone usage and its effects on sleep and psychological health.

**Evidence Acquisition:** This paper intends to review the effects on sleeps and psychological health due to the impact of mobile phone usage and its relation with mood deficits, and sleep loss led to anger, confusion, anxiety, and depression were examined. For this paper more than 10 different studies have been reviewed using electronic data base, i.e., Google Scholar, PubMed, Medline and Science Direct.

**Result:** Detailed review of several studies reveal that there was a significant relationship between using mobile phones late at night and insomnia, low energy, tiredness, and headache.

**Conclusion:** Extensive usage of mobile phones not only effects the psychological health. However, it also includes beyond quality sleeping, includes psychological effects, day time fatigue, quality of learning, and academic performance.

**KEYWORDS:** Mobile Phone, Sleep, Psychological Health, Melatonin, Sleep Cycle, REM, NREM.

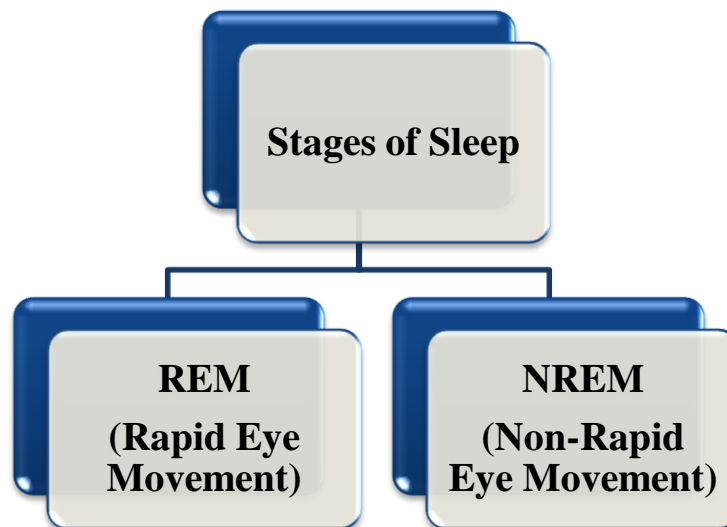
## I. INTRODUCTION

The advancement of mobile phone communication has moved quickly. During ongoing years, the utilization of mobile phones has expanded significantly and has been resembled by gawning a concern about the consequences for sleep and sluggishness ascribed to exposure to the blue light delivered by mobile phones during late night use. Showing that the late-night cell phone causes adverse effect on sleep would flag a far and widespread public health problem [1]. Mobile phone use has become a typical piece of day by day life and new insights show that the Global System for Mobile Communications (GSM) network currently has more than five billion users worldwide [GSM World, 2010]. This boundless use, and the way that the radiofrequency (RF) electromagnetic fields (EMF) produced by mobile phones are incompletely consumed by the human cerebrum, has made new open doors for logical examinations into the related conceivable wellbeing impacts. Sleep interruptions and sleepiness are among the most broadly detailed mobile phone-related medical issues [2]. The use of mobile phones has become (a need for many individuals all through the world since the present actually progressed cell phones are equipped for accepting calls as well as to store information, sending and getting records and so on) important, particularly among the young. This has led to psychological dependence on mobile phones, which results in addiction to it. Excessive use of mobile phones is considered to be associated with headaches, earache, warmth sensations, and even perceived difficulties in concentrating on anything. Various studies have also shown that most smartphone users suffer from sleep deprivation and intensified stress impacting their cognitive and learning skills [3]. Presently mobile phone use is a typical practice for some youthful grown-ups before sleep time or even after lights-outs. This undesirable propensity can prompt deferred sleep time, absence of rest, unpredictable sleep wake cycles, helpless sleep quality, and expanded exhaustion during the day. Also, social media or games may initiate hyperarousal pre-sleep. According to several studies sleep disorders were associated with mood deficits, and sleep loss led to anger, confusion, anxiety, and depression [4]. Sleep is an essential need that constitutes almost one-third of the hours in a human's lifetime. It is a condition of reversible obviousness, where the body and brain are re-established, fixed, and created [5]. It is all around recorded that sleeping is the principle segment

of strong intellectual and physical capacities. Sleep has a critical function in various parts of life. Legitimate sleep is particularly significant for kids and teenagers. It is recommended that sleep disturbance influences may increment the danger of physical and mental issues, particularly during immaturity. Sleep deprivation among adolescents is not a new phenomenon however, in recent years, its adverse health effects have drawn more clinical and academic attention [6]. In spite of the fact that the media has started to shape a significant aspect of the everyday life of youngsters, the expanding recurrence of utilization of media, for example, (TV), PC games, the Internet, mobile phone usage compromises healthy sleep. Utilizing the media can change the sleeping time and shorten the sleeping period.[7] The incidence of mental health challenges has risen globally. These findings have raised questions about the negative effects of excessive mobile phone use on college students' physical and mental health [8]. Anxiety, depression, dependence, and addiction are some of the negative effects of the social media. It can also disrupt the sleep quality due to the adverse effects of electromagnetic fields produced by mobile phones and decreased the amount of melatonin release [9]. In spite of some knowledge on troublesome wellbeing impacts, mobile phones are picking up prevalence, particularly in youthful age.[10]

### WHAT IS SLEEP?

Sometime in the past individuals imagined that sleep was simply a time when the body and mind "shut off" for a couple of hours every night to rest in preparation for the next day. Be that as it may, presently researchers comprehend that neither the body nor the mind "shut down" when we rest truth be told, they are frequently working considerably harder than they do during the day, going through cycles to re-establish cells, process information, and improve wellbeing [11].



**REM SLEEP** - REM sleep happens about every 90 minutes during the night. Adults usually spend about one-fifth of the night in REM sleep and the remaining 4 fifths in non-REM sleep. Infants spend at least half of the time they are asleep in REM sleep. [SOURCE: Stages of Sleep (Sleep.org)]

**NREM SLEEP** - In non-REM sleep you go through 4 stages. During stage 1 you are in transition between being awake and asleep and wake easily. During stages 2, 3 and 4, your eye movement's stops your body temperature falls and you are deeply asleep. [SOURCE: Stages of Sleep (Sleep.org)]

# How exposure to **blue light** affects your brain and body

BY DISRUPTING MELATONIN, **SMARTPHONE LIGHT** RUINS SLEEP SCHEDULES. THIS LEADS TO ALL KINDS OF **HEALTH PROBLEMS**:

The disruption to your sleep schedule might leave you distracted and impair your **MEMORY** the next day.



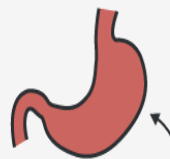
A poor night's sleep caused by smartphone light can make it **HARDER TO LEARN**.



Over the long term, not getting enough sleep can lead to **NEUROTOXIN** buildup that makes it even harder for you to get good sleep.

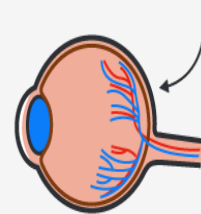


People whose melatonin levels are suppressed and whose body clocks are thrown off by light exposure are more prone to **DEPRESSION**.



By disrupting melatonin and sleep, smartphone light can also mess with the hormones that control hunger, potentially increasing **OBESITY RISK**.

There's some evidence that blue light could damage our vision by harming the **RETINA** over time – though more research is needed.



Researchers are investigating whether or not blue light could lead to **CATARACTS**.



There's a connection between light exposure at night and the disturbed sleep that come with it and an increased risk of breast and prostate **CANCERS**.



SOURCES: Nature Neuroscience; Harvard Health Publications; ACS, Sleep Med Rev, American Macular Degeneration Foundation; macular.org; European Society of Cataract and Refractive Surgeons; JAMA Neurology

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*Source: Nature of Neuroscience; Harvard Health Publications; ACS, Sleep Med Rev, American Molecular Degeneration Foundation; macular.org; European Society of Cataract and Refractive Surgeons; JAMA Neurology.*



## II. EVIDENCE ACQUISITION

This paper intends to review the usage of mobile phone and its effects on sleep and psychological health and how mobile phones are actually disturbing the melatonin (Sleep Hormone) and due to which sleep cycles are being disturbed and leading to some psychological problem such as lack of sleep, distracted and impair memory, harder to learn, more prone to depression, increasing obesity risk and damaging our vision by harming the retina. Information used in this review was mainly obtained from scientific electronic academic journal database. For this review more than 15 studies have been reviewed using electronic data base, i.e., Google Scholar, PubMed, Elsevier.

## III. RESULT

Jennifer H et al. was conducted an observational study from September to November 2016 among 203 undergraduate medical students in KIMS, Tamil Nadu. Every participant had smartphones that were used for communication and social media. The long periods of use of mobile phones extended from 5 minutes to 10 hours out of each day. The majority of them (61%) utilized during night hours, 72.4% of the examination members had poor sleep quality, 66.5% had moderate pressure, 14.8% had extreme pressure. There was a huge relationship between poor sleep quality and scholarly execution with mobile phone utilization ( $p < 0.01$ ). [3]. Study conducted by He J-Wet al. on 38 members were randomized to either an intercession gathering ( $n = 19$ ), where individuals were told to abstain from utilizing their mobile phone 30 minutes before sleep time or control group ( $n = 19$ ), where the members were given no such directions. Limiting mobile phone use before sleep time for about a month was effective in reducing sleep latency, expanding sleep span, improving sleep quality, lessening pre-rest excitement, and improving beneficial outcomes and working memory. [4]. A cross-sectional study was conducted by Tao S et al. in 4747 college students. Hazardous mobile phone use and helpless sleep quality were seen in 28.2% and 9.8% of participants, individually. Poor sleep quality plays a more significant role in increasing the risk of mental health problems in students with PMPU (Problematic mobile phone use) than in those without PMPU (Problematic mobile phone use) [12]. Mohammadbeigi A et al. was led a cross-sectional investigation was conducted on 380 undergraduate students selected by proportional stratified sampling in Qom, Iran in 2015. The commonness of over-utilization of mobile phones was 10.7% (CI 0.95; 8.8%, 12.6%) and the pervasiveness of helpless sleep quality was 61.7% (CI 0.95; 57.1%, 66.3%). The mean, everything being equal, and absolute score of sleep quality demonstrated a direct huge relationship by phone dependence score aside from sleep length score that was conversely. [8]. Fobian AD et al. was conducted a study to assessed relationships between adolescent media use and sleep efficiency. Three notable findings are produced. To begin with, young adult media use was related with a few parts of sleep wellbeing. Second, mobile phone utilize was affirmed to be related to adolescent rest. Third, our results update adolescent media multitasking behaviors [13]. Whipps Jet al. was conducted a study in September 2016, first-semester college students ( $N = 114$ ) completed surveys evaluating night-time media usage (NMU) and sleep behaviors. Students revealed a mean sleep duration of  $7.26 \pm 0.93$  hours. Just 33% ( $N = 38$ ) reported better sleep quality (8 Hours) on average. Hence night-time media usage (NMU) was positively correlated with weight and weight status [14]. Amra Bet al. was conducted a study on a population consisted of 2400 adolescents, aged 12-18 years, living in Isfahan, Iran. The study reveal that 56.1% of girls and 38.9% of boys reported poor quality sleep. Late-night mobile phone use by adolescents' people was related with less fortunate sleep quality. Members who were genuinely physically active would do well to sleep quality and quantity. As a component of sound way of life suggestions, avoidance of late-night mobile phone use ought to be supported in adolescent's people. [15]. Gupta N et al. was conducted a descriptive study was conducted on a total of 1,000 medical students aged between 17 and 24 years who were using mobile phone for at least 1 year. In which among the absolute 1,000 students, every one of them had their mobile phone, with about 76.4% of students having mobile phones. The major purpose of using the phone was for communication, coordination of activities, and in emergencies, while others were also using it for downloading games, music, videos, and for style. late-night usage of mobile phones was exceptionally huge ( $p < 0.0001$ ) related to trouble in awakening, waking time sleepiness, the decrease in study propensities, trouble in focus, increment in missed classes, and going late for classes. Subsequently, Besides the positive function of mobile phones in our everyday carries on with, its overuse has a negative effect on mental wellbeing, rest, and scholastic execution of students. Hence, it is important to guide the students regarding efficient, safe, purposeful usage, and negative effects of mobile phones on health and the environment [16]. R. Preety et al. was conducted a survey of 90 students about their sleep pattern and maximum cell phone usage. The study uncovers that numerous youngsters are utilizing technology inside the prior hour attempting to fall asleep or utilizing mobile phone in bed, which meddles with the capacity to fall asleep and stay asleep for the duration of the night. Functionally, cellular phone use shortly before bed has been linked to several negative outcomes to such daytime fatigue, restlessness, and lethargy which also directly affect the academics and mental health of the students. With the help of inculcating good habits and a strict sense of willpower, ways can be mended to have a good sleep cycle and reduction in cell phone usage [17]. R. Haripriya et al. was

conducted a survey among 100 people. Her survey reveal that people who use their mobile phones right before going to sleep do not get quality sleep and their sleep duration is also affected [18]. Dowdell EB et al. was conducted a study on 372 college students at two mid-size universities in 2013. A quarter of the respondents (25.6%) detailed sleep messaging habits alongside helpless sleep quality and the mobile phone impacting their sleep ( $p < .05$ ). students that sleep text were bound to report sleep interference ( $p < .000$ ), to put their mobile phone in bed with them ( $p < .000$ ), have no memory of messaging (72%), or what they messaged (25%). Subsequently Sleep messaging and its effect on helpless sleep propensities is a developing pattern in an undergrad populace [19]. Jafari H et al. led a descriptive-analytical study on 439 students. As per the rating of mobile phone habit, 17.8% of the students were in the scope of moderate dependency and 10.9% of them were in the scope of extraordinary dependency. Additionally, 71.3% of the students were distinguished as mobile phone addicts. The normal score of feeling of depression in young men and young ladies was  $43.22 \pm 5.16$  and  $42.82 \pm 5.30$ , out of 105, individually. There was no huge distinction between them. There was a noteworthy and negative relationship between's scores of mobile phone dependence and a feeling of depression. [20]. Eyvazlou M et al. was conducted a descriptive statistical methods study to investigate the relationship between the excessive use of mobile phones and general health and quality of sleep on 450 Occupational Health and Safety (OH&S) students in five universities of medical sciences in the North East of Iran in 2014. The outcomes uncovered that half of the understudies had a helpless degree of sleep quality and a large portion of them were viewed as undesirable. [21]. Alfawareh H Met al. conducted a survey study using questionnaires that were randomly distributed to 66 academic staff who own a smartphone at the Northern Border University. His study reveals that having a smartphone diverted academic staffs' focus at work, created "check habits", and an artificial relationship; more than 90% of the respondents admitted that they put their mobile phone next to their bed before sleep, and 61.41% of them asserted that they had the sentiments of inadequacy at whatever point mobile phones were not with them. [22]. Zarghami M et al. was led a study of over 358 students from different schools of the university who participated in a cross-sectional study. His study reveals that 60% of the students used their cell phones after lights were out. There was a critical connection between utilizing mobile phones late around night time and sleep deprivation, low vitality, sluggishness, and cerebral pain. When the effect of upsetting occasions was disposed of, the relationship stayed huge just for a sleeping disorder. No critical relationship was seen between utilizing phones and distractibility. [23]. Akcay Det al. conducted a descriptive study that took place from January 13- 15, 2016 with 9th, 10th, and 11th-grade students enrolled at Konya High School ( $n=380$ , 51.6% female, age  $16.05 \pm 0.87$ ). It was resolved that 20.5% of the students with great sleep quality and 79.5% of the students with helpless sleep quality postponed their sleep time for proceeded with use of their mobile phone ( $p < 0.05$ ). Mobile phones ought to be taken out from the rooms of teenagers. [24].

#### IV. CONCLUSION

Mobile phone usage in population poses challenges to sleep and psychological health significantly. In various studies concluded, it reveals that the majority of the population is using mobile phones in their daily life for various purposes which varies from for communication, Social Media uses, watching movies, and so on. The population who uses mobile phones varies in the duration of time they use from short minutes to extensive hours to nearly half of the day. The usage of phones is effectively managed at least by a share of the population to specified usage. However, use among the larger share of the population appears considerably high, especially in young and teens. Among the users, extensive use is largely visible in late-night or night hours. Those who spent broader time on mobile phones, a significant association is visible in the quality of sleep and insomnia. The impacts are far beyond quality sleeping, includes psychological effects, day time fatigue, quality of learning, and academic performance so on.

Accurately regulated purposeful use of the mobile phone can improve the quality of sleep and can reduce other psychological effects also. Proper use can vitally improve positive thinking, working memory, life performance especially for students in academic learning. The usage of all technologies including devices like mobile phones needs to be precisely calibrated for the advancement of human life without significant adverse effects on the health of individuals in all dimensions.

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