



A comprehensive evaluation of smartphone addiction and its impact on sleep quality among school-aged children: An observational study

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Abstract

This observational study aimed to evaluate the correlation between smartphone addiction and sleep quality among school children aged 6–12 years in urban Belagavi. A total of 30 students were selected using simple random sampling. Tools used included the Smartphone Addiction Scale - Short Version (SAS-SV) and the Pittsburgh Sleep Quality Index (PSQI). Data analysis was conducted using SPSS and Pearson Correlation Coefficient.

Keywords: Bharatesh Homoeopathic Medical College & Hospital Belagavi, observational study, smartphone addiction, sleep quality, school children, aged 6–12 years, urban belagavi, simple random sampling

Introduction

Smartphone addiction is defined as a behavioral disorder characterized by the compulsive use of smartphones, typically measured by the frequency of access. It includes four main components: obsessive usage, behavioral repetition (such as constant checking of messages), tolerance (increased usage over time), and withdrawal symptoms (such as agitation or discomfort without the device). According to the World Health Organization (WHO, 1964), addiction involves a persistent usage of a substance or device for relief, comfort, or stimulation, often leading to craving in its absence.

Smartphones today are no longer mere communication devices. With their Internet-based features, they function as portable, real-time information hubs and mini-computers, allowing users to play games, chat, access social networks, browse the web, and more. Excessive use of these devices has been linked to reduced sleep quality, including disturbances in REM sleep, slow-wave sleep, and melatonin secretion—especially due to screen light exposure at night. The mechanisms by which smartphones affect sleep quality include:

1. **Sleep displacement:** usage replaces regular sleeping time.
2. **Cognitive and emotional stimulation** – overuse increases mental activity and stress.
3. **Light emission** – screen light disrupts melatonin production.
4. **Electromagnetic exposure** – potentially disrupts brain activity during sleep.

Studies have shown an inverse relationship between smartphone use and sleep duration and a direct correlation between smartphone use and sleep disturbances. Furthermore, long-term usage can cause physical ailments

such as headaches and musculoskeletal pain, which also impact sleep.

Findings: A significant negative correlation was found—higher smartphone addiction scores were associated with poorer sleep quality.

Aim & objectives of study

Aim

To study the relationship between smartphone addiction and quality of sleep in children aged 6–12 years.

Objectives

- To assess the effect of smartphone addiction on sleep duration.
- To evaluate the severity of smartphone, use and its correlation with sleep disturbances.

Methodology

Study Design: Observational survey

Sampling Method: Simple Random Sampling

Sample Size: 30

Tool: Pittsburgh Sleep Quality Index (PSQI)

Scoring Good: 0–7

Moderate: 8–14

Poor: 15–21

Categories	Score
Good	0-7
Moderate	8-14
Bad	15-21

Inclusion criteria

1. Subjects of age group 6-12 years.
2. both the sexes and without any regard to economic status

3. Disturbed sleep which is based on average bedtime and average wake up time.
4. Those who are physically in position to understand and cooperate with the investigator in filling up the questionnaire.

Exclusion criteria

1. Cases with gross pathological changes and complications.
2. Patients on immune suppressants and on any other active treatment.
3. Age group above 12 years.
4. Mental retarded subjects.
5. Subjects with organic psychosis.
6. Those who are not willing.

Review of Literature

Bedtime Use of Technology and Associated Sleep Problems in Children

Research article First published online October 27, 2017

Bedtime Use of Technology and Associated Sleep Problems in Children.

The survey results highlight some associations between increased technology use and difficulty with sleep quantity in children and adolescents. The data suggest that increased technology use at bedtime, namely, television, cell phones, video games, and computers, is associated with a decrease in the amount of sleep children are getting. These children were more likely to be tired in the morning and less likely to eat breakfast, which are risk factors for elevated BMI. The data also suggest that overweight and obese children and adolescents were more likely to have trouble falling asleep and trouble staying asleep than their normal BMI counterparts. When children were reported by their parents to use one form of technology at bedtime, they more than likely used another form of technology as well. For example, children watching television before bed were also more likely to be texting in the middle of the night than children who did not watch television before bedtime. In addition, children who watched more television were more likely to exhibit inattentive behaviours.

It is important to be aware of how this new age of technology may influence the coming generations so that we may be prepared to offer recommendations as to prevent the harmful effects of overexposure^[11].

Smartphone addiction ruins sleep, study says, but you can fight back

By Sandee LaMotte, CNN

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CNN — Addiction to smartphones will result in poor sleep, according to a new study.

The study, published in *Frontiers in Psychiatry*, looked at smartphone use among 1,043 students at King's College London. Researchers asked the students to complete two questionnaires on their sleep quality and smartphone usage, in person and online.

Using a 10-question validated scale that was developed to assess smartphone addiction in children, nearly 40% of the university students qualified as "addicted" to smartphones, the study found.

Estimated prevalence is consistent with other reported studies in young adult populations globally, which are in th

range of 30–45%," lead author and King's College medical student Sei Yon Sohn and her co-authors wrote in the study. "Later time of use was also significantly associated with smartphone addiction, with use after 1 a.m. conferring a 3-fold increased risk," the authors wrote.

Students who reported high use of cell phones also reported poor sleep quality, the study found. That falls in line with prior studies that have found overuse of smartphones at night to be associated with trouble falling asleep, reduced sleep duration and daytime tiredness. That's likely because use of smartphones close to bedtime has been shown to delay circadian rhythm, the body's normal sleep-and-wake clock^[12].

Smartphone Addiction, Sleep Quality and Mechanism

This study considered novel and noteworthy phenomena: Internet and smartphone addictions. Little research has cast light on these issues, despite the increasing negative influence of these addictions on our lives. Reliability problems of self-reporting formats, and culturally limited studies, make some researchers still cast doubt on diagnosis of internet addiction, the disorder is now considered as one of the behaviour addictions. Indeed, internet addiction rooted smartphone addiction but generally smartphone addiction can be happened because it is an information and communication electronic device. As development of internet-based smart-mobile devices increases, the significance of this research is likely to increase. It is suggested, rather, that smartphone usage is the social expectations and rewards of connecting with other people and seeking to learn from others that induce and sustain addictive relationships with smartphones. Smartphone addiction is as the same as drug addiction and can be diagnosed by four properties: compulsion, functional impairment, tolerance, and withdrawal. Smartphone addiction is defined as the lack of control to use the smartphone despite adverse effects including financial, psychological and physical, social harmful consequences on users. About psychological effects of cell Phone Addiction, in this review we mentioned the correlation of smartphone addiction and sleep disturbance which can be as a consequence of increase in sleep disorders and fatigue in users, also, it can be affected by bright light which may decrease sleep quality. Sleep deprivation can act through arcuate nucleus and reward centers such as ventro-tegmental area and nucleus accumbens. The orexin system activity modulates the decrease in energy consumption and increase in food intake which leads to obesity^[13].

Smartphone overuse can cause not only mobility problems in the wrists, fingers and neck but also interference with sleep habits. However, research on smartphone addiction and sleep disturbances is scarce. Therefore, we aimed to investigate daytime sleepiness in association with smartphone.

The quality of sleep in adolescence affects growth, emotional stability and learning skills. Therefore, the management of smartphone addiction seems to be essential for proper sleeping habits. There is a critical need to develop a means of preventing smartphone addiction on a social level^[14].

As mobile phones have become more advanced, offering users increasing capabilities and becoming more computer-like than Cell phone-like, the new term “Smartphone” was adopted ^[1]. Smartphones allow access to a nearly limitless amount of education, knowledge, and every connected person in the world ^[2]. Smartphones are becoming increasingly like miniature laptops as they offer web browsing, Wi Fi, and a variety of educational and entertainment applications, and smartphones are popular and widely available ^[3]. Additionally, many modern smartphones have sleek and attractive designs, and their features are constantly evolving to be more convenient for users, especially for children and adolescents.

In this study, we investigated smartphone addiction as it affects sleep duration by means of its sub-factors, which include disturbance of adaptive functions, virtual life orientation, withdrawal, and tolerance in relation to gender and age ^[15].

Cell phone addiction consists of four main components: obsessive phone use, behaviours such as repetitive checking for messages or updates; tolerance or longer and more intense of use; withdrawal or feelings of agitation or suffering without the phone; and functional impairment or interference with other life activities and face to face social relationships ^[15]. All these are very similar to the characteristics of internet addiction.

It has been reported that problematic Internet use may affect sleep quality, due to reducing rapid eye movement (REM) sleep, slow-wave sleep, and sleep efficiency ^[23], or suppressing onset time of melatonin secretion and delay in the beginning of sleep due to the bright light of a computer screen at midnights ^[47]. The relationship between poor sleep and problematic new medias and technologies such as smartphones are suggested as follows.

- 1) Displace of smartphones and internet-based technologies instead of regular sleep;
- 2) Noxious cognitive, emotional or physiological effects of using smartphones and internet-based technologies;
- 3) Light emission from the screen of mentioned devices may affect sleep quality;
- 4) Using mobile and generally, internet-based technologies in the bedroom may disturb sleep quality by means of microwaves and also, receiving messages may awake users at night ^[48]. In this regard, it is reported that the adverse effect of electromagnetic fields released by smartphones on sleep quality through electroencephalograms ^[49]. Information and communication electronic devices interfere with chronotype or circadian clock by emitting bright light by delay this endogenous clock and causes sleep disturbance. There was an inverse relation between Smartphone ownership and sleep duration and also positive correlation with sleep difficulties ^[16].

Repertory Rubrics

1. **Sleep disturbed:** thoughts by activity of - Bryonia, Calcarea
2. **Sleeplessness:** fear, fright from - Aconite
3. **Sleep disturbed:** sliding in bed, by - mur-ac
4. **Sleep dreaming:** midnight; after - rohus tox
5. **Sleep disturbed:** heat, by - bar c, graph
6. **Sleeplessness mental exertion:** hyos, ars

7. **Sleeplessness:** pain from; sulph, lac
8. **Sleeplessness:** restlessness, from; merc-c
9. **Sleeplessness:** respiration, with difficult; children in – kali-bar
10. **Sleeplessness:** sleepy all day, sleepless all night; staph, arg-n
11. **Sleeplessness:** twitching of the limbs, with; ars, plus, kali c
12. **Sleeplessness:** late, if going to bed; am-c,
13. **Sleeplessness:** fear, fright from: acon, bry, cham, rhus-t
14. **Sleeplessness:** dream, from: ambar, camph
15. **Sleeplessness:** coldness: from; acon, verat
16. **Sleep:** snoring (Respiration); brom, lac-c,

Homoeopathic Remedies and Indications

1. **Calc:** He cannot go to sleep because his thoughts trouble him, and he sees all sorts of things. There is no congruity in his mind. We know that strong intelligence puts aside such follies, but these are just the things that Calcarea patients’ dwell (KENT) upon ^[19]
2. **Rhus Tox:** falling asleep late; lying on the back during sleep. Strong disposition to sleep during day, and also in morning in bed. Somnolence, full of distressing and broken dreams. Sleeplessness, esp. before midnight, generally caused by a sensation of heat, ebullition of blood, and uneasiness which does not permit patient to remain lying down. Disturbed sleep, with anxious and frightful dreams ^[20]. (CLARKE)
3. **Bar-C:** Sleep. -Talking in sleep; awakens frequently; feels too hot. Twitching during sleep ^[21]. (BOERICKE)
4. **ARS:** sleep. Disturbed, anxious, restless ^[22]. Must have head raised by pillows. Suffocative fits during sleep. Sleeps with hands over head. Dreams are full of care and fear. Drowsy, sleeping sickness (BOERICKE)
5. **HYOS:** The sleep is a great tribulation ^[23] to this nervous patient. There are times of sleeplessness. Again, profound sleep. Sleepless, or constant sleep. Either awake or sleep, there may be muttering, long continued sleeplessness (J T KENT)
6. **Sulph:** Pains, uneasiness, and tingling ^[24] in limbs, anxiety and heat, colic at night; gastralgia, vertigo, headache, visions and illusions of senses, palpitation of heart, asthmatic sufferings, hunger and thirst. Inability to sleep otherwise than on back, with head high. Retarded sleep at night, or sleeplessness, sometimes caused by a great flow of ideas or from over-excitement. —Sleep too light; or agitated with frequent waking, often with starts, and in a fright. Waking too early with inability to go to sleep again (JH CLARKE)
7. **Lach:** sleeps into aggravation. Sudden ^[25] starting when falling asleep. Sleepiness, yet cannot sleep Wide-awake in evening (WILLIAM BOERICKE)
8. **APIS:** Much yawning. Great desire to sleep ^[26]. extreme sleepiness. Sleep disturbed by many dreams. Sleep, late

- in the morning. Awakens from sleep with a shrill shriek (child suffering from hydrocephalus) (CLARKE)
9. **KALI BR:** Drowsiness [27]; often broken by start. Sleeplessness, due to worry, grief, Somnambulism in children. (S.R PHATAK)
 10. **STAPH:** limbs, when sleeping. Disturbed sleep, with unquiet dreams, and frequent waking with a start. Child wakes, pushes everything away and wants everybody to go away; restless at night²⁸ as from frightful dream Sleepy all day; awake all night; body aches all over. (J H CLARKE)
 11. **AMC-C:** Sleepiness in the daytime. Sleeplessness, and sleep delayed, esp. after going late to bed [29]. Disturbed and unrefreshing sleep. (CLARKE)
 12. **Cham:** Yawning and stretching. Sleepiness, during the day, without being able to sleep, on lying down. Nocturnal sleeplessness, with attacks of anguish, visions, and illusions of the sight and hearing [30]. On sleeping, starts with fright, cries, tossing, tears, talking, raving, groans, snoring, and constant separating of the thighs. Nocturnal delirium (JH CLARK)

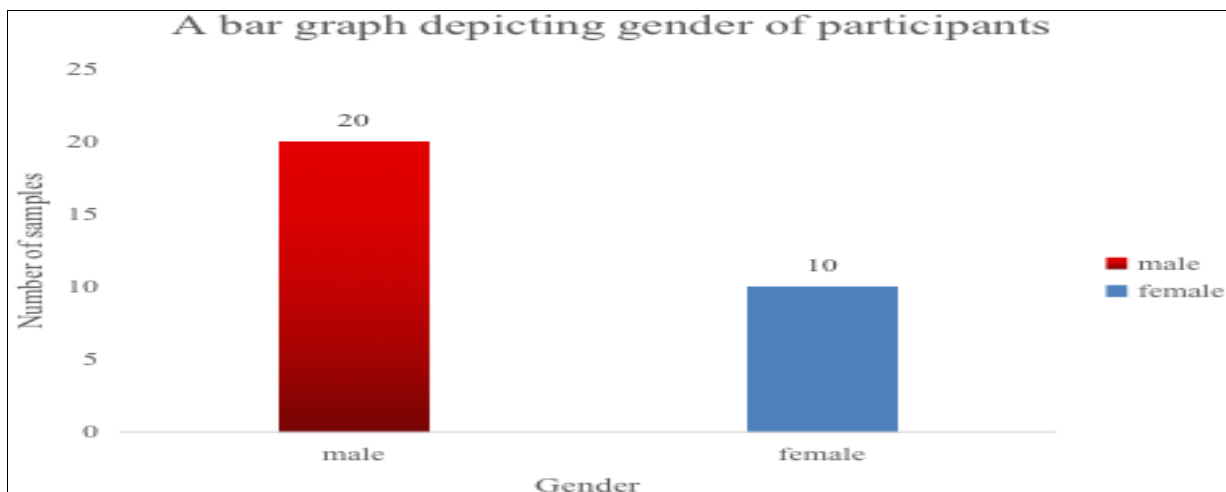
13. **BRYONIA:** Starts, with fright, ongoing to sleep and during sleep. Unquiet sleep, with confused dreams³¹, and great flow of ideas. Ongoing to sleep, cries and delirium, as soon as the eyes are closed. Delirium as soon as he awakes. Disagreeable, vexatious dreams. Vivid dreams of the transactions of the day. Nocturnal delirium, and visions with the eyes open. Groans, esp. towards midnight.
14. **Verat:** "Hands icy cold." "Face and legs icy cold." This coldness is another of the keynote of Ver. It is one aspect of the fever-producing power of the drug [32]: "Coldness of the whole body." "Coldness running over whole body soon after taking it." "Feeling of internal chill ran through him from head to toes of both feet at once."(JH CLARKE)

Observation and results

Distribution of study according to gender

Table 1: Showing Sex wise distribution of cases

Gender	No of samples	Percentage
Male	20	66.6%
Female	10	33.3%
Total	30	100%

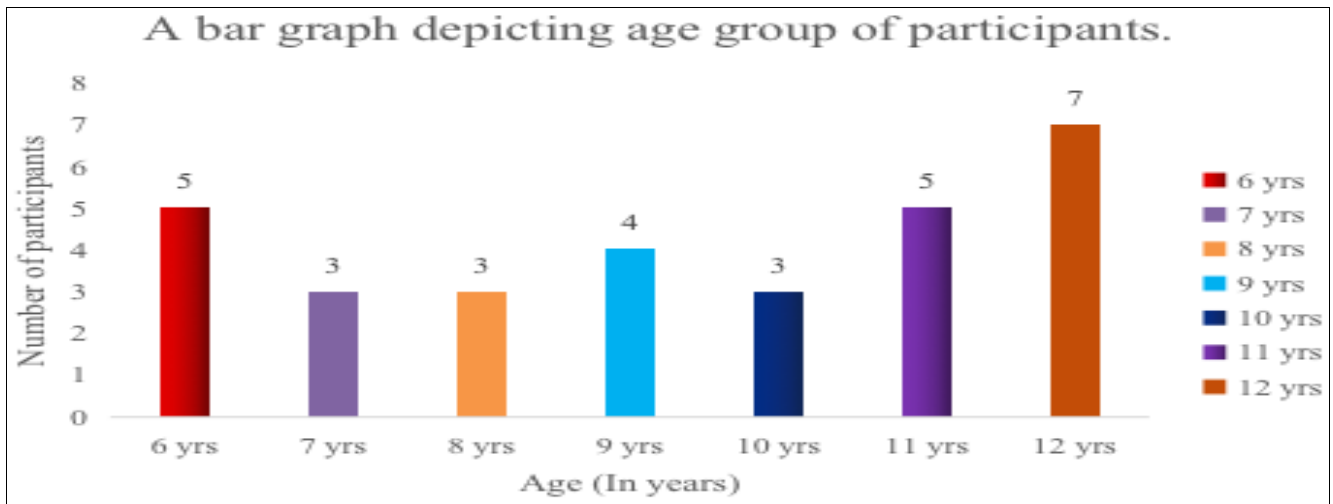


Study shows that smart phone addiction is more common in males i.e. 20 (66.6)

Distribution of Cases According to Age

Table 2: Showing Age wise distribution of cases

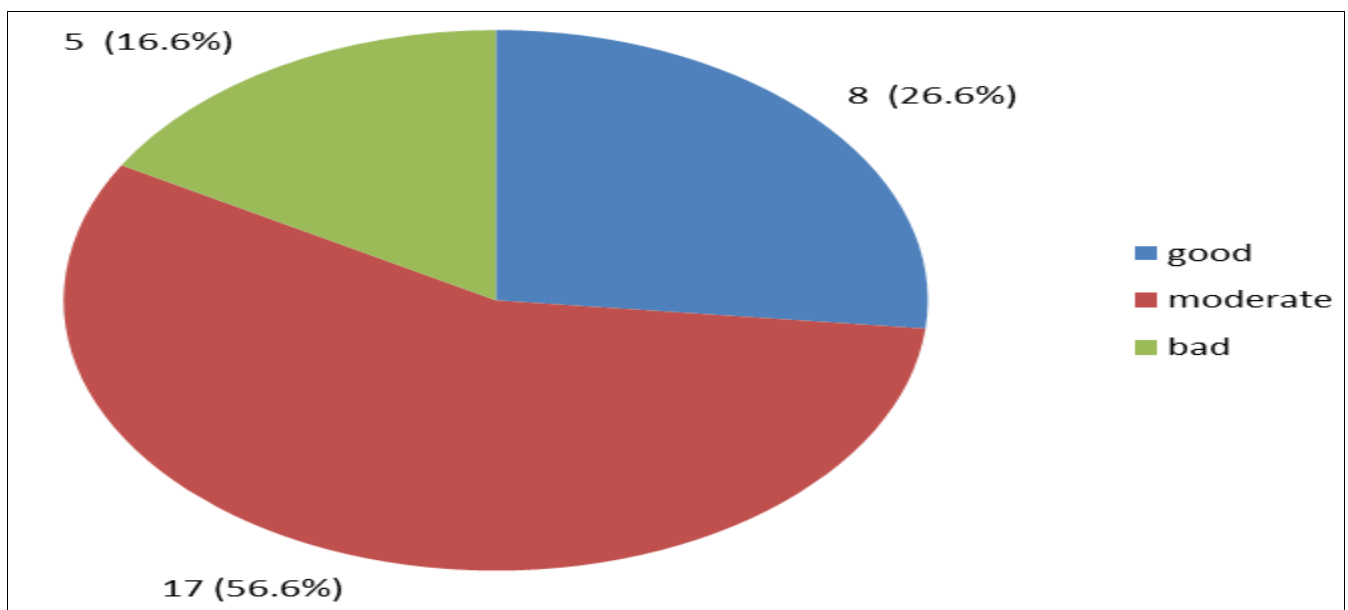
Age group	No. Of samples	Percentage
6yrs	5	10%
7yrs	3	10%
8yrs	3	10%
9yrs	4	13.3%
10yrs	3	16.6%
11yrs	5	16.6%
12yrs	7	23.3%
Grand Total	30	100%



The study shows that smart phone addiction is more in 12 years age group i.e. 7(23.3%) subjects

A pie chart depicting evaluation of smartphone addiction and quality of sleep among school going children.

Score	No. of Students
Good	08
Moderate	17
Bad	05



Discussion

The study was carried over a period of 6 months at Urban School among age group 6-12years , selected on basis on simple random method wherein 5 subjects belong to 6years, 3 subjects belong to 7 years of age, 3subjects belong to 8 years,4 subjects belong to 9 years, 5 subjects belong to 10 years,5 subjects belong to 11 years and 7 subjects belong to 12 years of age group .Both the sexes were taken for study irrespective of their economic status.

The study shows 20 were male students and 10 were female students, PSQI scale was used to access the quality of sleep in students which contain different components and 10 individual questions about their quality and pattern of sleep, usage of smartphone and other difficulties during sleep. The study shows that differentiating the subjects into different

categories of scale that contains score of (0-21) 0-7 good 8-14 moderate 15-21 bad Smartphone addiction is rampant among school-going children, and it is an area of concern for parents and educators. The effects of Smartphone addiction on sleep can have harmful repercussions on the child’s physical and mental well-being, academic, performance and the overall quality of life. It is important for parents and educators to set boundaries and establish healthy habits around Smartphone use to mitigate these effects. Finally, school-going children should also be taught about the importance of balanced Smartphone use and healthy sleep habits to promote overall well-being. The study found that smartphone addiction is more prevalent among boys and most common in 12-year-olds. The Pittsburgh Sleep Quality Index (PSQI) effectively

assessed various aspects of sleep patterns and smartphone use. The study revealed that increased smartphone use negatively impacts sleep quality, with most students falling into the "moderate" disturbance category.

Educators and parents must collaborate to promote balanced smartphone usage and instill good sleep hygiene practices among school-going children.

Conclusion: Smartphone addiction moderately affects the quality of sleep in school-going children aged 6–12 years.

Summary

This observational study aimed to investigate the relationship between smartphone addiction and sleep quality in children. Conducted at an urban school in Belagavi using standardized tools (SAS-SV and PSQI), the results indicated that higher smartphone usage correlates with lower sleep quality. Emphasizing education on responsible smartphone use and healthy sleep routines is essential.

Conclusion

The study conducted among 30 subjects shows that 26.6% are good, 58.6% are moderate and 16.6% are bad. Hence the conclusion is that This observational study aimed to investigate the relationship between smartphone addiction and sleep quality in children. Conducted at an urban school in Belagavi using standardized tools (SAS-SV and PSQI), the results indicated that higher smartphone usage correlates with lower sleep quality. Emphasizing education on responsible smartphone use and healthy sleep routines is essential.

Summary

AN OBSERVATIONAL STUDY” in the age group of 6-12 years the research was conducted through paper survey in the form of questioner based. This study was conducted to evaluate the relationship between Smartphone addiction and the quality of sleep and to know the effects of smart phone addiction on duration duration in schools’ children. The study was conducted on 30 subjects of age group (6-12years) in urban School, Belgaum, A Simple Random Sampling method was used (SRS), the Smartphone Addiction Scale Short Version (SAS-SV), and the Pittsburgh Sleep Quality Index (PSQI) and SPSS were used as a tool for inferential analysis. Followed by, Pearson Correlation (PC) was used to test the hypothesis of the study. The study indicates that the greater the Smartphone addiction, the lower the quality of sleep was seen in subjects.

The study shows that 26.6% subjects are good, 58.6% subjects are moderate and 16.6% are bad.

Therefore, the addiction of smartphone is affecting the quality of sleep in children at the moderate level.

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