

A Descriptive Study to Assess the Effect of Habitual Usage of Mobile Phone on the Sleep Quality among Adolescents in Selected Colleges, Chennai

Sandhya R¹, Sujitha Jebarose T¹

¹Assistant Professor, Faculty of Nursing, Dr.M.G.R. Educational and Research Institute, Chennai

Abstract

Background: Smartphone has become an indispensable part of our day to day living due to its countless advantages. This habituated the people to become more dependent on mobile phones especially the adolescent age group. They become addicted to mobile technology which in turn declines their cognitive function, academic performance and a poor sleep pattern.

Objective: The purpose/ intention of the study is to assess the sleep disturbances due to the use of mobile phones especially in the night among adolescents.

Materials & Method: A descriptive study conducted on students from selected arts and science colleges in Chennai. The sample size was 100 adolescents selected through simple random sampling technique. Mobile phone use questionnaire, Modified Pittsburgh sleep quality index (PSQI) were used to Assess the Effect of Habitual Usage of Mobile Phone on the Sleep Quality

Results : The results revealed that most of them (38%) received text messages every night, majority of them (43%) sent text messages every night. Majority of them (55%) have experienced sleep latency and sleep disturbances (atleast once a week), most of them (53%) had varied sleep duration. This study analyzed that use of mobile phone every night is significantly associated with quality of sleep at $P < 0.001$ (highly significant)

Conclusion: This study findings shows that habitual usage of mobile phones during night especially after lights are out invariably affects the sleep quality among adolescents

KeyWords: mobile Phones, sleep quality, adolescents.

Introduction

Background: Mobile devices have become widely prevalent over the past decade, the declining cost and increasing computational power of mobile devices, such as smart phones and tablet computers, has created a revolution in personal communications⁽¹⁾⁽¹⁰⁾. Mobile devices have a remarkable ease of access due to instant-

on technology. Adolescents are at an age where good quality sleep, mental and physical wellbeing is of utmost importance. Sadly, to keep up with today's fast paced, technologically oriented society, they engage in habitual mobile phone use which affects their cognitive function and general wellbeing. "It is believed that sleep is a restorative process and a basic biologic need," said Dr. Neil Kline, "When humans are deprived of sleep, there are many body systems that fail. Not only do our performance, memory and attention span suffer, our immune system and endocrine system is also impaired." Deep sleep is essential as it is the time when the body rejuvenates cells and repairs damage suffered during the day. Melatonin, a hormone which regulates the sleep is suppressed due to the exposure of blue light from the

Corresponding Author

Ms. Sandhya . R

M.Sc(Nursing).,Assistant Professor, Faculty of Nursing, Dr.M.G.R. Educational and Research Institute, Chennai, Tamilnadu, India. Contact No. 7358219035. e-mail id – sandhiramachandran@gmail.com.

mobile screen. This causes intrusion in the initiation and regulation of sleep cycle.

Habitual use of cell phones late at night after lights are out is particularly popular among younger generations for talking or mailing messages. Moreover, it is a mere entertainment object and serves to keep them in constant contact with their peers. Due to uncontrolled use of mobile devices they become dependent to it termed as Nomo phobia. Difficulty in “shutting off” leads to various sleep disturbances leading to insomnia, tiredness, headache, dizziness, irritability. This lack of sleep can result in attention disorders and poor academic performance in adolescents.

A cross sectional study was done by Munezawa et al., 2011² in order to find out the association between the use of mobile phones after lights out and sleep disturbances among Japanese adolescents. The study findings revealed that mobile phone use after lights out has significant association with all forms of sleep disturbance.

The recent studies reported that the habitual mobile phone usage causes marked decline in academic performance³. Li et al. (2015) reported that under graduate students (n = 516) participated in the study by competing the validated surveys assessing their cell phone use, locus of control, sleep quality, academic performance, and reduced subjective well-being. This study concluded that use of the cell phone in the class, and at bedtime has a negative effect on sleep quality and academic performance.

Fossum et al., 2014; Li et al., 2015; Exelmans & Van den Bulk, (2016)⁴ examined the association between the use of a television, computer, gaming console, tablet,

mobile phone, or audio player in bed before going to sleep with insomnia, daytime sleepiness among 532 students aged 18 - 39. The results showed that mobile phone usage for playing/surfing/texting was positively associated with insomnia

Hence, it is important to have an accurate understanding of the impact of mobile phone on health to develop strategies to overcome the adverse effects and enhance the quality of life.

Objective

To assess the Impact of Mobile Phone Usage on the Sleep Quality among adolescents.

Materials and Method

The present study was a descriptive study conducted on students from selected arts and science colleges in Chennai. The sample size was 100 adolescents selected through simple random sampling technique. Data was collected using a demographic questionnaire, mobile phone use questionnaire, Modified Pittsburgh sleep quality index. Ethical committee clearance was obtained from Institutional Review Board (IRB). The aim and the purpose of this study was explained to the study participants and the confidentiality was assured to them. Data was collected by the above said questionnaire.

Results

Overall, 100 students participated in this study, of which, 62% were females and 38% were males, 48% were aged 18 – 20 years, 52% were aged between 20 – 22 years, 95% were single, 5% got married. Out of 100 students, 50% are studying literature, 50% are studying computer science. Majority of the students 83% did not have any other occupation, while 17% are working besides studying.

Table 1: Frequency and Percentage Distribution of Mobile Phone Usage among Adolescents

Type of Use	Every Night	More Than Once in a Week	Once in a week	1 - 3 Times in a Month	Never
Receiving text messages	38 (38 %)	30(30%)	20 (20%)	7 (7%)	5(5%)
Sending text messages	43 (43%)	37 (37%)	8 (8%)	8(8%)	4(4%)
Receiving phone calls	26 (26%)	30 (30%)	25 (25%)	10 (10%)	9(9%)
Calling	18 (18%)	15 (15%)	30 (30%)	20 (20%)	15 (15%)

The above table depicts that, Most of them (38%) receive text messages every night, majority of them (43%) send text messages every night , while 4% of the study participants never send text messages in the night.26% of the study participants receive phone calls every night while 30% receive phone calls in the night more than once a week and 9 % of the study participants never receive phone calls in the night. Approximately 30% of them make phone calls once in a week during night time, while 18% make phone calls every night and 15% never make calls in the night.

Table 2: Frequency and Percentage Distribution of the Sleep Quality among Adolescents

Components of Pittsburgh Sleep Quality Index	Frequency and percentage	Mean and standard deviation
Sleep latency	55 (55%)	M- 2.12,SD - 0.81
Sleep duration	53 (53%)	M-2.17 , SD – 0.80
Sleep disturbance (at least once a week)	55 (55%)	M- 2.29 , SD – 0.73
Habitual sleep efficiency	30 (30%)	M- 2.56 , SD – 0.50
Subjective sleep quality	17 (17%)	M- 2.7, SD – 0.56
Use of sleep medications (at least once a week)	0	0
Daytime dysfunction (at least once a week)	30 (30%)	M- 2.7 ,SD -0.47
		M- 14.14 SD- 3.92

The above table depicts that majority of them (55%) have experienced sleep latency and sleep disturbances (atleast once a week) ,most of them (53%) had varied sleep duration , 30 % of them had day time dysfunction and habitual sleep efficiency is reduced but none were using sleep medications

Table 3: Association Between Mobile phone usage and the sleep quality

Mobile phone usage	Sleep quality	
	Chi square	P value
Every Night	11.45*	0.001* (Significant)
More Than Once a Week	7.65	0.01
Once a Week	6.75	0.01
1 - 3 Times a Month	2.04	0.10

It is inferred from the above table that use of mobile phone every night is significantly associated with disturbances in the quality of sleep at P < 0.001 (highly significant).

Discussion

Overall, 100 students participated in this study, of which, 62% were females and 38% were males, 48% were aged 18 – 20 years, 52% were aged between 20 – 22 years,85% were single, 15% got married. Out of 100 students, 50% are studying literature, 50% are studying computer science. Majority of the students 83% did not have any other occupation, while 17% are working besides studying.

Frequency and Percentage Distribution of Mobile Phone Usage among Adolescents

Most of them (38%) receive text messages every night, majority of them (43%) send text messages every night, while 4% of the study participants never send text messages in the night.26% of the study participants receive phone calls every night while 30% receive phone calls in the night more than once a week and 9 % of the study participants never receive phone calls in the night. Approximately 30% of them make phone calls once in a week during night time, while 18% make phone calls every night and 15% never make calls in the night.

Davey S, Davey A. (2014)⁵.conducted a mixed method study to assess the smart phone addiction among adolescents and its consequent impact on their health. Systematic review was done using websites of

EMBASE, MEDLINE, PubMed, Global Health, PsycINFO, Biomed-Central, and Web of Science, Cochrane Library, and world library - World-Cat, Indian libraries such as National Medical Library of India from 1 January, 1995 to March 31, 2014. Finally, meta-analysis on only Indian studies was done using Med-Calc online software. A total of 45 articles were considered in systematic-review globally; later on 6 studies out of these 45 related to Smartphone's addiction in India were extracted to perform meta-analysis, in which total 1304 participants (range: 165-335) were enrolled. The smart phone addiction magnitude in India ranged from 39% to 44% as per fixed effects calculated ($P < 0.0001$). Smartphone addiction damages the interpersonal skills and can lead to significant negative health risks and harmful psychological effects among Indian adolescents.

The Present study conducted is also among adolescents who are at an urge of smart phone addiction.

Frequency and Percentage Distribution of the Sleep Quality among Adolescents

Majority of them (55%) have experienced sleep latency and sleep disturbances (at least once a week), most of them (53%) had varied sleep duration, 30% of them had day time dysfunction and habitual sleep efficiency is reduced but none were using sleep medications.

The results are consistent with a study conducted by Orzech K, Grandner M, et.al (2016)⁶. Aimed at investigating the association between the self-reported sleep patterns and digital media use in a first-year University student (N = 254, 48% male) population. Students tracked their sleep through daily online diaries and provided digital media use data in 15-min blocks for 2 h prior to bedtime on nine occasions. A longer duration of digital media use was associated with reduced total sleep time and later bedtime, while greater diversity of digital media use was associated with increased total sleep time and earlier bedtime. Analysis of activities in the last hour before bedtime indicated that activity type plays a role in digital media's effect on sleep, with computer work, surfing the Internet, and listening to music showing the strongest relationship to multiple sleep variables. These findings have implications for physical and mental health of University students and can inform design of devices to minimize negative effects of digital media on sleep.

Amra B, AliShahsavari, (2017)⁷ associated sleep and late-night cell phone use among 2400 adolescents aged 12-18 yrs in Iran. Age, body mass index, sleep duration, cell phone use after 9 p.m., and physical activity were documented. The Pittsburgh Sleep Quality Index questionnaire was used to assess the quality of sleep. 1270 participants reported to use cell phone after 9 p.m. Overall, 56.1% of girls and 38.9% of boys reported poor quality sleep, respectively. Wake-up time was 8:17 a.m. (2.33), among late-night cell phone users and 8:03 a.m. (2.11) among non-users. Most (52%) late-night cell phone users had poor sleep quality. Sedentary participants had higher sleep latency than their peers. Adjusted binary and multinomial logistic regression models showed that late-night cell users were 1.39 times more likely to have a poor sleep quality than non-users (p -value < 0.001).

Association Between Mobile phone usage and the sleep quality

This study analysed that use of mobile phone every night is significantly associated with disturbances in the quality of sleep at $P < 0.001$ (highly significant).

The above findings are consistent with a cross sectional study conducted by Sahin S, Ozdemir K, (2013)⁸ conducted to assess the mobile phone addiction level in university students between 01 November 2012 and 01 February 2013, to examine several associated factors and to evaluate the relation between the addiction level and sleep quality. The study group included 576 students. The Problematic Mobile Phone Use Scale was used for evaluating the mobile phone addiction level and the Pittsburgh Sleep Quality Index for assessing the sleep quality. The study group consisted of 296 (51.4%) females and 208 (48.6%) males. The mean age was 20.83 ± 1.90 years (min:17, max:28). The addiction level was determined to be higher in the second-year students, those with poor family income, those with type A personality, those whose age for first mobile phone is 13 and below and those whose duration of daily mobile phone use is above 5 hours ($p < 0.05$ for each). The sleep quality worsens with increasing mobile phone addiction level ($p < 0.05$).

Exelmans L, Van den Bulck J (2015)⁹ assessed the bedtime mobile use and the sleep quality among 844 Flemish adults (18-94 years old). Self-reported sleep quality, daytime fatigue and insomnia were measured using the Pittsburgh Sleep Quality Index

(PSQI), the Fatigue Assessment Scale (FAS) and the Bergen Insomnia Scale (BIS), respectively. Data were analyzed using hierarchical and multinomial regression analyses. Half of the respondents owned a smart phone, and six out of ten took their mobile phone with them to the bedroom. Sending/receiving text messages and/or phone calls after lights out significantly predicted respondents' scores on the PSQI; particularly longer sleep latency, worse sleep efficiency, more sleep disturbance and more daytime dysfunction. Bedtime mobile phone use predicted respondents' later self-reported rise time, higher insomnia score and increased fatigue. Age significantly moderated the relationship between bedtime mobile phone use and fatigue, rise time, and sleep duration. An increase in bedtime mobile phone use was associated with more fatigue and later rise times among younger respondents (≤ 41.5 years old and ≤ 40.8 years old respectively); but it was related to an earlier rise time and shorter sleep duration among older respondents (≥ 60.15 years old and ≥ 66.4 years old respectively).

Conclusion

The habitual usage of mobile phones at late-night has a significant effect with poorer sleep quality among adolescents. Findings reveals that mobile phone use at bedtime is negatively related to sleep outcomes. Longer average screen-time was associated with shorter sleep duration and worse sleep-efficiency. The sleep quality worsens with increasing smart phone addiction level. Young people suffer more than the older adults. Adolescents have to be motivated to have an adequate sleep for a better physical and mental wellbeing.

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