e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2024; 16(8); 1331-1335

Original Research Article

Effect of Smart Phone Use on Sleep Quality of Young Adults

Hemali Jha[1], Shiteez Jopher[2], Pradnya Gurude[3], Vinay Kumar Singh[4]

[1]Associate Professor, Department of Internal Medicine, Integral Institute of Medical Sciences and Research Lucknow, Uttar Pradesh, India.

[2]Associate Professor, Department of Physiology, Shri Shankaracharya Institute of Medical Sciences, Bhilai, Chhattisgarh, India

[3]Associate Professor, Department of Anatomy, GMC, Parbhani, Maharashtra, India

[4]Assistant Professor, Department of General Medicine, Laxmi Chandravansi Medical College Hospital, Bishrampur, Palamu, Jharkhand, India

Received: 05-08-2024 / Revised: 23-08-2024 / Accepted: 30-08-2024

Corresponding Author: Dr. Vinay Kumar Singh

Conflict of interest: Nil

Abstract:

Smartphone use has been related to health problems. Studies have indicated that the use of smartphones is associated with Sleep disturbances. However, little is known about the association between Smartphone addiction and sleep quality in adolescents and young adults. This Smart phone addiction is affecting their lifestyle in such a manner that they find it ok to compromise with their sleep which is not good at all for their mental as well as physical health. The current study examined the relationship between problematic mobile phone use and sleep quality. A cross-sectional study was conducted among the 50 Young male and female adolescents and young adults aged 16 to 24 years. . The participants completed a self-administered questionnaire. Objectives of the study was to compare the effects of mobile phone on quality of sleep in smart phone users using Pittsburgh Sleep Quality Index (PSQI) and Smartphone Addiction Scale – Short Version (SAS-SV). Two scales were adopted in our study. 44% subjects used phones for 3-5 hours daily, 30 % used for 2-3 hours, 16 % used for more than 5 hours. 10% used for 1-2 hours. A high SAS-SV score was found to be a significant indicator of poorer sleep quality. 64% subjects were low users and 36 % were high users according to Short Version (SAS-SV) scores of smartphone addiction scale. 60% subjects had poor sleep quality and 40% had good sleep quality as per Pittsburgh Sleep Quality Index (PSQI). Our study showed a high prevalence of smartphone addiction and poor sleep quality for the participants. Younger age, being single, and heavy usage hours of smartphones seem to be indicators for poorer sleep quality.

Keywords: Smartphone Use, Sleep Quality.

Introduction

A smartphone is a popular device that works like a portable computer providing easy access to information, social connectivity, workplace applications, convenience, mobility, size, and so forth, making it an essential part of our daily lives.[1] Like every other important invention of the technological revolution, smartphones have brought with themselves both comforts and problems.[2] Nowadays, smartphone users are particular about owning the latest versions, apps, and upgrade for which they are ready to spend large sums of money. Users have become so dependent on this device that they feel inadequate and useless without it, and this preoccupancy with the smartphone makes them ignore other important work.[3,4]Mobile phones have become a part of day-to-day life. International studies conducted in 2007 showed that mobile phones are the most essential means of communication for adolescents.[5] Now a days mobile phone use has increased dramatically with falling costs of mobile phones. If any adverse effect is established from mobile phone use it will be a global concern because developing countries are establishing this technology in preference to fixed line systems.[6] The term “smart phone” is basically used for those phones that provide integrated services of communication, computing, messaging, management of applications and wireless communication competency. Smart phone was invented for the ease and welfare of people but its excess use affected people’s mental and social health resulting in a new kind of health disorder among adolescents named as “smart phone's addiction”. It involves abuse, misuse, or compulsive use of a smart phone by users.[7] Smart phones lead to problems like being addicted to it. Smart phone overuse leads to frequently checking of dynamic content on mobile devices resulting in weakening of self-regulation. Indian adolescents are affected by high smart phone addiction.[8] Sleep is one of the

fundamental requirements to meet the biological, psychological, social, and cultural needs of a person. Sleep is an important part of healthy life, and it is directly related with health and quality of life [9]. Regular sleep duration and sleep quality enhance the physical and emotional well-being of the individual. Studies have revealed that insufficient and poor quality sleep affects cognitive functions, general health condition and well-being negatively [10]. In adolescence, daily sleep requirement is between 8.5 and 9.3 hours, while it is higher in adults. During adolescence, when physical growth accelerates, sleep is the fundamental factor in improving physical and academic performance [11]. Despite the increasing need for sleep, daily sleep duration decreases due to the factors specific to this period, which brings problems with it. Sleeping late at night and getting up late are sleep characteristics of this period. It has been noted in many recent studies that widespread use of cell phones has played an important role in the emergence of sleep related problems in young adults . Cell phones, which are the product of developing technology, have become a part of our everyday lives. The use of cell phones has gradually increased among students as they facilitate communication; they are portable, and they offer the opportunity to use the Internet and take photos [12]. This study was therefore, conducted to assess the effect of mobile phone usage on the quality and composition of sleep in a representative sample of the Young Indian adults .

Material and Methods

A cross-sectional study was conducted among the 50 Young male and female adolescents and young adults aged 16 to 24 years. The participants completed a self administered questionnaire, which includes questions that were taken from the Pittsburgh Sleep Quality Index (PSQI) and Smartphone Addiction Scale – Short Version (SAS-SV). Two scales were adopted in our study, PSQI and SAS-SV. PSQI is a ten-item scale that aims to measure seven components that affect sleep quality. It was developed by Buysse et al. (1988) [13]. and was validated with high internal consistency and a Cronbach's alpha of 0.83[14,15]. Each of the seven components will have a grade between 0 (which indicates no sleep difficulties) and 3 (which indicates severe difficulty within the component). The higher the overall score for all seven components, the higher the sleep issues for the participants, with an overall score ranging between 0 to 21. A cut-off number of 5 was selected where an overall mean response for a participant of 5 or more will indicate that he most likely has a sleep difficulty . The SAS-SV is a ten-item score that was developed to measure the addiction of smartphone usage. It was developed by Kwon et al. in 2013 [16]. The SAS-SV has a Cronbach's alpha correlation coefficient of 0.91, which is considered within the desired range [17]. For each item or phrase, the respondent will choose among six answers of a Likert scale ranging from strongly disagree to strongly agree, with an overall score ranging from 10 to 60, where higher scores indicate higher smartphone addiction. PSQI scores above 5 were taken as abnormal.[13] Data were analyzed using Statistical Package for the Social Sciences version 20. Categorical data were summarized as a percentage and numerical data as a mean and standard deviation.

Results

Table 1: Age and Gender of Subjects

Age	**Number of Subjects (n=50)**	**Percentage (%)**
16-18	18	36%
19-21	21	42%
22-24	11	22%
Gender	**Number of Subjects (n=50)**	**Percentage (%)**
Male	26	52 %
Female	24	48 5

Table 2: Duration of Smart phone use

Duration of Smart phone use	**Number of Subjects (n=50)**	**Percentage (%)**
6 months	04	8%
6months -1 year	08	16%
1-2 years	12	24%
>2 years	26	52%

52 % Adults used Smart phone for more then 2 years

Table 3: Various apps used by subjects

Various apps	Number of Subjects (n=50)	Percentage (%)
Social Networking and Photos	48	98%
Games	18	36%
Shopping	30	60%
Academics	22	44%
Youtube Videos	36	72%
Others	12	24%

Smart Phones were most commonly used for social networking by young adults (98%), followed by youtube videos (72%), shopping apps (60%) gaming 936%), academic use (44%).

Table 4: Daily time spent on Smart phone use

Daily time spent	Number of Subjects (n=50)	Percentage (%)
1-2 hours	05	10 %
2-3 hours	15	30 %
3-5 hours	22	44 %
>5 hours	08	16 %

44% subjects used phones for 3-5 hours daily, 30 % used for 2-3 hours, 16 % used for more than 5 hours. 10 % used for 1-2 hours.

Table 5: Pittsburgh Sleep Quality Index (PSQI) and Smartphone Addiction Scale – Short Version (SAS-SV) scores in subjects

Gender	SAS-SV(60) Mean± SD	PSQI Mean± SD
Males	33.4±9,2	6.2±3.1
Females	34.2±8.6	6.8±3.6

A high SAS-SV score was found to be a significant indicator of poorer sleep quality.

Table 6: Smartphone use characteristics and sleep quality among subjects

Smartphone Addiction and Sleep Quality		Number of Subjects (n=50)	Percentage (%)
Short Version (SAS-SV) scores	Low Users	32	64 %
	High Users	18	36 %
Pittsburgh Sleep Quality Index (PSQI)	Poor	30	60 %
	Good	20	40 %

Table 6 shows 64% subjects were low users and 36% were high users according to Short Version (SAS-SV) scores of smartphone addiction scale. 60% subjects had poor sleep quality and 40% had good sleep quality as per Pittsburgh Sleep Quality Index (PSQI).

Discussion

A cross-sectional study was conducted among the 50 Young male and female adolescents and young adults aged 16 to 24 years. 52% Adults used Smart phone for more then 2 years. Smart Phones were most commonly used for social networking by young adults (98%), followed by youtube videos (72%), shopping apps (60%) gaming (36%), academic use (44%). 44% subjects used phones for 3-5 hours daily, 30% used for 2-3 hours, 16% used for more than 5 hours. 10% used for 1-2 hours. 64 % subjects were low users and 36% were high users according to Short Version (SAS-SV) scores of smartphone addiction scale. 60% subjects had poor sleep quality and 40% had good sleep quality as per Pittsburgh Sleep Quality Index (PSQI). Excessive smartphone use among adolescents and young adults has been consistently linked to poor sleep, which in turn is associated with adverse physical and psychological health outcomes. Therefore, studying the effects of smartphone usage on sleep quality among individuals aged 16-25 years is crucial. The main objective of this study was to assess the sleep quality among smartphone users. According to the National Sleep Foundation guidelines, young adults aged 16-24 years require 7-9 hours of sleep each night [22]. The study revealed that individuals who use their smartphones more at night are at a higher risk of poor sleep quality, particularly if use exceeds 60 minutes. These findings align with international studies on adults and adolescents [18,19]. Long-term sleep quality impacts health, potentially leading to depression among adolescent students [20]. A survey by Philips Healthcare in 2019 found that 62% of surveyed adults only somewhat slept

well [21]. The use of smart phones has increased rapidly in recent years. This may result in Smartphone addiction, which represents the convergence of existing mobile phone and Internet addiction problems into smartphone addiction (Hwang et al). Overuse of a Smartphone may cause various physical and psychological health problems. Some studies have evaluated the relationship between smart phones and sleep disturbances.[22] Canan et al found an association between Internet addiction and impaired sleep. Moreover, Loughran et al reported the adverse effect of electromagnetic fields emitted by mobile phones on sleep electroencephalograms. Similarly, Huber et al reported that electromagnetic field exposure (mobile phone usage) in the evening influences physiological factors such as sleep quality and the melatonin rhythm, probably by influencing the brain activity - particularly that of the pineal gland; it may also result in altered cerebral blood flow and brain electrical activity.[23,24] Young adults tend to be unaware of just how much time they really spent on Smartphone, and the effect this might have on their academic performance and social interaction (Meena, Mittal and Solanki). Because sleep is a significant biological mechanism related to mood regulation (Thomée et al) students whose sleep is disrupted because of technology use may be more likely to experience markers of depression such as loss of energy, concentration problems, and daytime sleepiness (Adams and Kisler, 2013;NSF,2011). The extensive use of smart phones in recent years had led to exposure of humans to radio frequency electromagnetic field (RF-EMF) of 30 KHz-300 GHz both during receiving and transmitting the signals. Studies on human beings have reported the adverse effects of EMF emitted by mobile phones on sleep electroencephalograms and reduced melatonin production.[25-27] A biological explanation for an association between exposure to RF-EMF and impaired sleep quality has been hypothesized which relates to the suppressed nightly melatonin secretion by electromagnetic field exposure. Smart phone usage is a very activating behaviour engaging our brain and fingers.[28] Smart phones are capable of processing more information than other phones as they include many features like games, access to the internet and social networking, messaging, videos, multimedia, and navigation, in addition to their use for communication. Thus the usage of smart phones can have more adverse effects on sleep as compared to the nonusers of smart phones. 'If you're typing, that's not part of a normal sleep preparation routine', said Doctor Jeffrey Bluhm with the providence sleep disorder center. 'Cell phones are so convenient that they're an inconvenience.' -Haruki Murakami. Hence this study was done to find out whether smart phones have more hazardous effects on sleep. Overall, our findings will likely be helpful for initiating a clinical trial to compare sleep quality and its relationship with multiple aspects of smartphone usage. We encourage further studies, given that the number of smartphone users continues to increase

Conclusion

In this growing competitive world smartphone addiction is one of the main issues among the young college students so it cannot be ignored. It is seen in the study that excessive mobile phone use is related with the poor sleep quality among the college students. As, college students are the future of the country so it must be taken into account and something should be done to enhance their lifestyle rather than letting them carry their same unhealthy lifestyle. This proves the importance of counselling cell in a college as this can help the students already addicted to bring back to the right path and make them realize the importance of a quality sleep. Our study showed a high prevalence of smartphone addiction and poor sleep quality for the participants. Younger age, being single, and heavy usage hours of smartphones seem to be indicators for poorer sleep quality. A high SAS-SV score was also found to be a significant indicator of poorer sleep quality.

References

1. Alosaimi FD, Alyahya H, Alshahwan H, Mahyijari NA, Shaik SA. Smartphone addiction among university students in Riyadh, Saudi Arabia. Saudi Med J. 2016; 37:675-83.
2. Ahmed I, Ramzan M, Qazi TF, Jabeen S. An investigation of mobile phone consumption patterns among students and professionals; is there any difference? Eur J Econ Finance Adm Sci. 2011; 39:136-43.
3. Walsh SP, White KM. Me, my mobile and I: The role of self and prototypical identity influences in the prediction of mobile phone behavior. J Appl Soc Psychol. 2007; 37:2405-34.
4. Nowreen N, Ahad F. Effect of smartphone usage on quality of sleep-in medical students. Natl J Physiol Pharm Pharmacol 2018;8(10): 1366-1370.
5. Kenichi Ishii. Examining the Adverse Effects of Mobile Phone Use among Japanese Adolescents. Keio Communication Review No. 33, 20 11:1-15.
6. Repacholi MH. Health risks from the use of mobile phones. Toxicology Letters 120, 2001: 323–331.
7. Deoshree Akhouri, Kehksha. A comparative study of addiction of simple phone and smart phone and its effect on mental health: the dark side of technology. International Journal of Multidisciplinary Research and Development. June 2016; 3(6): 140-143.
8. Davey S, Davey A. Assessment of Smartphone Addiction in Indian Adolescents: A Mixed Method Study by Systematic review and Meta-

analysis Approach. International Journal of Preventive Medicine. 2014; 5 (12) :1500-1511.
9. Owens, J. Adolescent sleep working group, and committee on adolescence. insufficient sleep-in adolescents and young adults: an update on causes and consequences. Pediatrics, 2014; 134(3):921- 932.
10. Munezawa, T, Kaneita, Y, Osaki, Y, Kanda H, Minowa M, Suzuki K, Higuchi S, Mori J, Yamamoto R, Ohida T. The association between use of mobile phones after lights out and sleep disturbances among Japanese adolescent: A Nationwide cross-sectional survey. Sleep, 2011;34(8): 1013-1020.
11. Ergun, S, Duran, S, Gultekin, M, Yanar, S. Evaluation of the factors which affect the sleep habit and quality of health college students. TJFMPC, 2017;11(3):186-193.
12. Kuyucu, M. Use of smart phone and problematic of smart phone addiction ın young people: "smart phone (colic)" university youth. Global Media Journal TR Edition, 2017; 7(14): 328-359.
13. 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; 28(2): 193-213.
14. Salahuddin M, Maru TT, Kumalo A, PandiPerumal SR, Bahammam AS, Manzar MD. Validation of the Pittsburgh sleep quality index in community dwelling Ethiopian adults. Health and quality of life outcomes. 2017;15(1):1-7.
15. Aloba OO, Adewuya AO, Ola BA, Mapayi BM. Validity of the Pittsburgh sleep quality index (PSQI) among Nigerian university students. Sleep medicine. 2007;8(3):266-270.
16. He J-w, Tu Z-h, Xiao L, Su T, Tang Y-x. Effect of restricting bedtime mobile phone use on sleep, arousal, mood, and working memory: a randomized pilot trial. PloS one. 2020;15(2): e0228756.
17. Sfendla A, Laita M, Nejjar B, Souirti Z, Touhami AAO, Senhaji M. Reliability of the Arabic smartphone addiction scale and smartphone addiction scale-short version in two different Moroccan samples. Cyberpsychology, Behavior, and Social Networking. 2018;21(5):325-33 2.
18. Exelmans L, Van den Bulck J. Bedtime mobile phone use and sleep in adults. Soc Sci Med. 2016; 148:93-101.
19. Abbey G, White WB, Igou F. Mobile phone use and sleep quality and length in college students. Int J Humanit Soc Sci. 2011; 1:51-58.
20. Gautam P, Dahal M, Baral K, Acharya R, Khanal S, Kasaju A, et al. Sleep quality and its correlates among adolescents of Western Nepal: A population-based study. Sleep Disord. 2021; 2021:5590715.
21. Philips [Internet]. [cited 2023 Aug 2]. Philips global sleep survey shows we want better sleep, but only if it comes easily. Available from: https://www.philips.com/a-w/about/new s/archive/standard/news/press/2019/20190307-philips-globalsleep-survey-shows-we-want-better-sleep-but-only-if-it-comes-easily.html.
22. Hutter HP, Moshammer H, Wallner P, Kundi M. Subjective symptoms, sleeping problems and cognitive performance in subjects living near mobile phone base stations. Occup Environ Med. 2006;63(5):307-13.
23. Rathore B, Singh N, Chouhan Y, Rathore I, Sethia S. A community based comparative cross- sectional study to assess the effects of mobile phone on quality of sleep-in smart phone users and non- users in Central India. Int J Community Med Public Health 2016; 3:2078-82
24. Michael M, Colin B, Mika K. The health hazards of mobile phones. Br Med J. 2000;320: 1288-9.
25. Burch JB, Reif JS, Noonan CW, Ichinose T, Bachand AM, Koleber TL, et al. Melatonin metabolite excretion among cellular telephone users. Intern J Radiation Biol. 2002:78.
26. Jarupat S, Kawabata A, Tokura H, Borkiewicz A. Effects of the 1900 MHz electromagnetic field emitted from cellular phone on nocturnal melatonin secretion. J Physiol Anthropol. 2003; 22:61-3.
27. Buysse, DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. (PSQI): Psychiat Res. 1989; 28:193-213.
28. Demirci K, Akgönül M, Akpinar A. Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. J Behav Addict. 2015;4(2):85-92
29. Sanjay D, Harish S, Bhagwat AK, Arpita B, Abhilasha G, Alia KZ, and Akansha S. A study to evaluate mobile phone dependence among students of a medical college and associated hospital of central India. Ind J Comm Med. 20 10:35.