Section: Miscellaneous

Original Research Article

CROSS-SECTIONAL STUDY TO SEE THE ASSOCIATION BETWEEN SCREEN TIME AND SLEEP QUALITY AMONG CHILDREN OF 13 TO 19 YEARS OF JAMMU PROVINCE

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ABSTRACT

Background: To study the association between screen time and sleep quality among teenagers of Jammu province.

Materials and Methods: An analytical cross-sectional study was carried out using a questionnaire targeting all accessible adolescents. The study questionnaire covered personal data, medical history, screen use including the type of used devices, duration of use per day and at bedtime, effect of using devices, and family and friends' influence on using devices. Sleep quality was assessed using Pittsburgh Sleep Quality Index.

Results: A total of 220 teenagers fulfilling the inclusion criteria completed the study questionnaire. Teenagers ages ranged from 13 to 19 years with a mean age of 15.5 ± 1.1 years old. Exact of 93 (42.2%), the study adolescents used screens for 6–8 hours daily, 47 (21.3%) use screens for more than 8 hours daily. Most of them are addicted to their smartphones 172 (78%) followed by tablets and computers.55% feel that using devices at bedtime affect your productivity on the next day.63% feel fatigue and drowsiness 54%, which affects their concentration at work 29.4%. A total of 94 (42.7%) of the study adolescents were good sleepers while 126 (57.2%) were poor sleepers.9.5% even require sleeping pills because of poor sleep.

Conclusion: The study revealed that teenagers had a high frequency rate and duration of screen use which may exceed 6 hours daily with more than half of them with poor sleep quality, feeling fatigue, daytime sleepiness, and lack of concentration.

Keywords: Teenagers, devices addiction, effect, relation, screen use, sleep.

INTRODUCTION

Sleep is essential for our bodies to feel mentally alert and focused. Lack of sleep over an extended period can lead to a range of health issues, including increased stress and depression. Ensuring that we prioritize getting enough quality sleep is crucial for maintaining good health and improving overall quality of life. As technology has advanced, teenagers have become increasingly reliant on devices such as mobile phones, laptops, tablets, and gaming consoles. While these devices provide a myriad of benefits, they can also have a significant impact on sleep patterns, especially in adolescents.[1,2]

As a primary care physician, it is important to have knowledge about the impact of screen use on sleep because it can have a significant effect on the health and well- being of our patients. Sleep deprivation can exacerbate existing health problems, impair cognitive function, and increase the risk of accidents and injuries. Furthermore, excessive screen time can lead to addiction, social isolation, and mental health issues such as anxiety and depression.[2,3]

Physicians should educate their patients about the importance of good sleep hygiene, why it matters and how it can affect their overall health. Also, encouraging patients to discuss their sleep habits, including how long they sleep, their sleeping

environment, and in what situations they experience sleep problems. Promote avoidance of excessive use of electronics and limiting screen time before bed or avoiding electronics in the bedroom can help improve sleep hygiene. By advising our patients to limit their screen time before bed and promoting healthy sleep habits, we can help them improve their overall health and quality of life.[4]

The availability of media devices is nearly common among teenagers. These devices are theorized to harmfully disturb sleep through numerous pathways. First, they might inversely affect sleep by directly moving, delaying, or disturbing sleep time. Second, the content may be psychologically motivating, and, third, the light released from devices affects circadian rhythm, biological sleep, and attentiveness. Though, the connection between media device use and poor sleep has been inadequately assessed due to the rapid development of these devices which has outdid research abilities. The aim of this study is to determine the impact of screen time on sleep in teenagers. Also, to measure the estimated time of screen use and its effects on sleep and to define the factors affecting sleep on them.[5,6]

MATERIAL AND METHODS

An analytical cross-sectional study was carried out using a questionnaire targeting teenagers aging 13 to 19 years during the period from January 2024 to March 2024. The study questionnaire covered adolescent's personal data, medical history, screen use including type of used devices, duration of use per day and at bedtime, effect of using devices, and family and friends influence on using devices. Sleep quality was assessed using Pittsburgh Sleep Quality Index (PSQI) and other questions related to sleep quality. Randomly villages were selected and house to house survey was done. Sleep quality was measured by the Pittsburgh Sleep Quality Index. Socio demographic information collected. A sample size of 220 teenagers was taken.

Inclusion Criteria

All those who are willing to participate.

Teenagers [13 to 19 years]

Exclusion Criteria

1. All those who refuse to participate
2. All locked houses

The global score for PSQI was obtained by summing up all items discrete scores of its seven "component" scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The sum of scores for these seven components yields one global score. In scoring the PSQI, seven component scores are derived, each scored 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0–21). Total score was categorized at cut-off point 7 as those who had a global score of 7 points or less were considered to have good sleep quality (good sleepers) while others with a global score of more than 7 points were considered to have moderate to poor sleep quality (poor sleepers).

RESULTS

A total of 220 teenagers fulfilling the inclusion criteria completed the study questionnaire. Teenagers ages ranged from 13 to 19 years with a mean age of 15.5 ± 1.1 years old. Exact of 100 (45.5%) participants were females and 120 (54.5%) were males. A total of 20 (9.3%) participants had a chronic health problem. Exact of 93 (42.2%), the study adolescents used screens for 6–8 hours daily, 47 (21.3%) use screens for more than 8 hours daily. A total of 94 (42.7%) of the study adolescents were good sleepers while 126 (57.2%) were poor sleepers. Most of them are addicted to their smartphones 172 (78%) followed by tablets and computers.55% feel that using devices at bedtime affect your productivity on the next day.63% feel fatigue and drowsiness 54%, which affects their concentration at work 29.4%. 9.5% even require sleeping pills because of poor sleep.

Statistical Analysis: After data were extracted, it was revised, coded, and fed to statistical software IBM SPSS version 22. All statistical analysis was done using two-tailed tests. P value less than 0.05 was statistically significant. Descriptive analysis based on frequency and percent distribution was done for all variables including adolescent's personal data, medical health condition, and screen utilization pattern covering devices used, duration of use, bedtime use and effect. Tool reliability was assessed using alpha Cronbach's coefficient which reflects the tool's internal consistency. Internal consistency reliability of 0.7 or more is judged good. Cross-tabulation was used to assess the distribution of adolescents' sleep quality by their personal data and screen use. Significance of relations in cross-tabulation was tested using Pearson Chi-square test and exact probability test for small frequency distributions.

Table 1

Personal data	No [total 220]	%
Age in years		
13-15	72	32.7%
15-17	73	33.18%
17-19	75	34%
Gender		
Male	120	54.5%

Female	100	45.5%
Have chronic health problem		
Yes	20	9.3%
No	200	90.7%

Table 2: Screen use pattern and effect among adolescents

Screen use	No	%
Which devices do you use daily?		
Phone	172	78.0%
Tablet	18	8.6%
Laptop	6	1.9%
Computer	17	8.2%
TV	2	0.6%
Video games	5	2.8%
How much screen time do you use daily?		
<1 hour	5	2.27%
1–2 hours	11	5%
3–5 hours	64	29%
6–8 hours	93	42.2%
>8 hours	47	21.3%
Do you believe that your family/friends have influenced you with the amount of screen time you use?		
Yes	68	30.9%
May be	89	40.7%
No	63	28.4%
How much time do you spend using devices before sleep while lying in bed?		
15 minutes or less	35	16%
16–30 minutes	43	19.5%
31–45 minutes	51	23.17%
46–60 minutes	55	24.0%
>60 minutes	36	17.6%
Using devices at bedtime affect your productivity on the next day?		
Yes	119	55%
No	58	26.4%
I do not know	43	19.6%
If yes, what is the effect?		
Fatigue	76	63.9%
Sleepiness	65	54.6%
Headache	63	52.9%
Low mood	41	34.5%
Low concentration at work	35	29.4%
Drowsiness	29	24.4%

Table 3: Pittsburgh sleep quality index components among adolescents

Sleep quality components	No	%
1 Subjective sleep quality		
Very good	58	26.5
Fairly good	84	38%
Fairly bad	70	31.8%
Very bad	8	3.7%
2 Sleep duration		
>7 hours	54	24.5%
6–7 hours	120	54.5%
5–6 hours	22	10%
<5 hours	24	10.9%
3 Use of sleeping medication		
no	131	59.5%
once or twice	68	30.9%
Three or more times	21	9.5%

DISCUSSION

Several studies have shown that the use of electronic devices, can significantly affect the quality and duration of sleep-in teenagers. A study published in the journal Sleep Medicine found that teenagers who reported high levels of screen time had shorter sleep duration and more difficulty falling asleep than those with lower screen use. Another study published in the Journal of Clinical Sleep Medicine found that night-time use of electronic devices was associated with higher levels of daytime sleepiness and poorer academic performance. Furthermore, a review of various studies on this topic concluded that electronic device use at bedtime was consistently linked with poorer sleep outcomes in adolescents. Therefore, it is recommended that teenagers limit screen time before bed and establish a regular bedtime routine to promote healthy sleep habits.[6]

In 2014, the National Sleep Foundation in the Modern Family reported that about 96% of teenagers between the ages of 15 and 17 have used devices before their sleep time. According to The American Academy of Child and Adolescent Psychiatry that adolescent spends up to nine hours of screen time per day. The rising use of screens for school, entertainment, and social media may be beneficial but experts are becoming progressively worried about the effects of blue light from the used electronic devices on the sleep-wake cycle. Nearly, two in three teenagers frequently sleep less than the proper duration, and screen time may be a main cause for sleep deprivation and other associated problems. Insufficient sleep associated with daytime sleepiness is predominant among the pediatric population and upsurge during adolescence. In the United States, 75% of adolescents aged 17 to 18 years old experience inadequate sleep, with similar findings in further developed countries. The American Academy of Pediatrics has mentioned many issues including media device use that considerably lead to this trend of inadequate and deteriorating sleep in the adolescent population.[7,8]

Silva SS et al did a systematic review on use of digital screens by adolescents and association on sleep quality. This study aimed to analyze the influence of digital screen use on adolescents' quality of sleep. Excessive use of digital screens was associated with worse and shorter sleep, showing, as its main consequences, night awakenings, long sleep latency, and daytime sleepiness. The use of mobile phones before bedtime was associated with poor quality of sleep among adolescents. Our evaluation of the methodological quality of the chosen studies found seven to be poor and 16, moderate.[9]

Mak YW et al did study on association between screen viewing duration and sleep duration, sleep quality, and excessive daytime sleepiness among adolescents in Hong Kong. Screen viewing is considered to have adverse impacts on the sleep of adolescents. The present study investigated the duration with which currently prevalent screen viewing devices (including televisions, personal computers, mobile phones, and portable video devices) are viewed in relation to sleep duration, sleep quality, and daytime sleepiness. Television and computer viewing remain prevalent, but were not correlated with sleep variables. Mobile phone viewing was correlated with all sleep variables, while portable video device viewing was shown to be correlated only with daytime sleepiness. The results demonstrated a trend of increase in the prevalence and types of screen viewing and their effects on the sleep patterns of adolescents.[10]

Hale L et al systematically examined and updated the scientific literature on the association between screen time (e.g., television, computers, video games, and mobile devices) and sleep outcomes among school-aged children and adolescents and found that screen time is adversely associated with sleep outcomes (primarily shortened duration and delayed timing) in 90% of studies. Some of the results varied by type of screen exposure, age of participant, gender, and day of the week. Youth should be advised to limit or reduce screen time exposure, especially before or during bedtime hours to minimize any harmful effects of screen time on sleep and well-being.[11]

Baiden P et al examined the association between excessive screen-time behaviors and insufficient sleep among adolescents. The objective of this study was to examine the association between excessive screen-time behaviors and insufficient sleep among adolescents. School-based behavior interventions that focus on reduction in excessive screen-time and sedentary behaviors might be beneficial in reducing excessive screen-time behaviors and consequently improve sleep quality among adolescents.[12]

Wu X et al studied that low physical activity and high screen time can increase the risks of mental health problems and poor sleep quality among Chinese college students.16.3%, 15.9% and 17.3% of the students had psychological problems, such as anxiety, depression and psychopathological symptoms, respectively. The prevalence of poor sleep quality was 9.8%. High ST was significantly positively associated with anxiety, depression, psychopathological symptoms, and poor sleep quality. High PA was insignificantly negatively associated with anxiety, depression, psychopathological symptoms, and poor sleep. Low PA and high ST were independently and interactively associated with increased risks of mental health problems and poor sleep quality ($p<0.05$ for all). I nterventions are needed to reduce ST and increase PA in the lifestyles of young people.[13]

Dos Santos Ab et al in a Brazilian cross-sectional school-based study saw that screen time is negatively associated with sleep quality and duration only in insufficiently active adolescents. Sleep quality and sleep duration, and PA were assessed by Mini Sleep and Baecke questionnaires, respectively. Participants in the highest quartile were classified as physically active. Screen time was analyzed by the self-reported number of hours spent on different screen devices (i.e., television, computer, videogame, and cellphone/tablet). Participants in the highest tertile were classified as having high screen time. High screen time was associated with poor sleep quality and insufficient sleep duration only in insufficiently active adolescents. These results suggest that high PA levels may contribute to improving sleep patterns in pediatric population.[14]

Santiago FL et al studied the association between screen time exposure, anxiety, and sleep quality in adolescents. The increase in sedentary screen time can negatively affect the quality of sleep, impacting the performance of daily activities. There was a positive, statistically significant ($p < .001$) correlation between sleep quality and symptoms of anxiety. Increased interaction with the screen and

higher levels of anxiety can be more harmful to sleep in adolescents. Exposure to screen time, specifically those which have a greater interaction such as video games and computers, can have a negative impact on sleep quality, but only in adolescents with a higher risk of anxiety.[15]

CONCLUSION

In conclusion, the study revealed that teenagers in Jammu have high frequency rate and duration of screen use which may exceed 6 hours daily with nearly half of them with poor sleep quality, feeling fatigue, daytime sleepiness, and lack of concentration. Initiation of educational programs covering the hazards of increased screen use is mandatory for adolescents and all other community members to reduce screen use and dependency.

What we learnt from this study: Screen use particularly before bed can have a negative impact on sleep quality. To promote better sleep, it is recommended to limit screen time at least one hour before bedtime. Additionally, establishing a relaxing bedtime routine such as reading a book, taking a warm bath, and practicing relaxation techniques can also improve sleep quality. More studies are needed to be done on other physical and mental effects of screen use.

Declarations

Funding: None **Conflicts of interest/Competing interests**: None **Availability of data and material**: Department of Community medicine Acharya Shri Chander College of Medical sciences and Hospital **Code availability**: Not applicable **Consent to participate**: Consent taken **Ethical Consideration**: There are no ethical conflicts related to this study. **Consent for publication**: Consent taken.

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