Influence Of Screen Time On Quality Of Sleep Among General Population – A Cross Sectional Study

Abstract

Sleep is a physiological state of reversible unconsciousness in which brain is less responsive to external stimuli. Among the causes for sleep disturbances, screen time and light emitting devices used during late hours plays a major role. With the pervasive use of screens in daily life, understanding how screen time affects the sleep patterns is critical. As screen exposure increases, particularly before bedtime, it is hypothesized to disrupt sleep quality and duration, potentially affecting physical and mental health.

Objectives

To assess and evaluate the sleep quality and screen time among general population.
To find out the association between screen time and the sleep duration.

Methods

A cross sectional study was conducted among community using respondent-driven sampling, total of 310 participants were assessed using a semi-structured questionnaire consisting of demographic background, screen time usage. Data of sleep quality, quantity was collected using Pittsburgh Sleep Quality Index.

Results

50.3% were female and 49.7% were male with mean age 27 ± (9.33) among 310 participants. 74% had poor sleep quality and 73.2% had screen time usage >2 hours per day. Social media (82 %) and communication (71%) were the two areas where screen usage was found to be highly used. There is a significant association (p-0.001) between no of hours slept and screen time usage using chi square test (21.1). Independent t-test resulted that there is a significant (p-0.001) difference between screen time usage and sleep quality.

Conclusion

There is a significant finding for the association observed between duration of screen time and sleep quality, majority of respondents developed poor sleep quality.

Individual's well-being and sleep quality can be improved by implementing awareness campaigns and technological improvements into practice.

Keywords

Pittsburgh Sleep Quality Index, Screen time, Sleep quality.

Introduction

In the digital age, screen time has become an integral part of daily life for individuals of all ages, including early adolescents.(1)The rapid proliferation of digital devices has led to an increase in the time spent in front of screens for entertainment, education, and social interaction. While these technological advances offer numerous benefits, there is growing concern about their potential negative effects on health.(2) Sleep is a vital, often neglected component of every person's overall health and well-being. Sufficient nap is a biological and psychological requirement and prerequisite to sound cognition, good psychological status, and overall performance. Exposure to luminous light from the electronic devices would hinder sound sleep by altering communication pattern between sleep–wake cycle and the internal clock.(3) Getting exposed to screen light during the night time could elevate alertness, diminish melatonin production, and bring on phase lag in the circadian clock such as lag in sleep time.(4) Inadequate sleep duration and poor sleep quality have been associated with several adverse cardiometabolic health outcomes including hypertension,(5) obesity, type two diabetes mellitus(6,7) and cardiovascular disease.(8) It is recommended adults aged 18 to 60 obtain at least seven hours of sleep per night to promote optimal health, although some young adults may need more than nine hours of sleep per night.(9) Screen time (ST) is the amount of time spent using a device with a screen such as a smartphone, computer, television, or video game console.(10) Sleep and screen time have an impact on each other which will affect the physical and mental wellbeing of an individual.

Screen usage may directly affect sleep by replacing it due to its time consuming nature, or it may interfere with sleep through increased psychophysiological arousal caused by the stimulating content of the material, or through bright light exposure.(11) Bright light may impact sleep in two ways: by delaying the circadian rhythm when exposure takes place in the evening and also by causing an immediate

activation in itself.(12) India has over 820 million active internet users across all age groups, reflecting the widespread digital engagement of its population.(13,14) However, despite this extensive internet usage, there is a lack of comprehensive studies exploring the connection between screen time and sleep quality in the general population. This study aims to evaluate the association between screen time, sleep quality and sleep duration among the general population.

Methods

A cross sectional study was conducted among community from May-June 2024 through respondent driven sampling technique. Participants who were able to access the google forms were included in the study.

The participants were assessed using a questionnaire which consists of demographic background, screen time usage details and the Pittsburgh Sleep Quality Index (PSQI). There are seven components in the PSQI which are subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction.

Statistical analysis

A total of 310 respondents participated in the study. The data were recorded in excel sheet and analysed using SPSS 23.0 software. Chi-Square test and Independent t test was used to determine the association between screen time and sleep quality.

Results

Responses were obtained from 310 participants. Table 1 shows the demographic factors of the participants. 50.3% were female and 49.7% were male with a mean age of 27 ± (9.33). In which 52.3% were employed, (2.6%) unemployed, (33.5%) student and (11.6%) homemaker. Among employed 69.8% worked general shift and 30.2% worked night shifts.

Type of screen majority of study participant used was mobile (95.8%) followed by Tv (55.6%), Laptop (49.2%) and others (Figure1). As per PSQI score individual having high score of >5 was considered to have poor sleep quality. Majority (74%) had poor sleep quality. About 73.2% had >2 hours and 26.8% had <2 hours screen time usage per day (Table 2)

Purpose of screen used by majority of participant was for social media (82.3%), communication (71.1%), work (39.5%), academic (33.8%) and games (19%). The chi-square analysis ($\chi^2 = 72.927$, p=0.000) resulted a significant association between age and sleep quality (Table 3). Notably, 48.3% of individuals aged 26–35 years reported poor sleep quality among different age groups. Sleep duration and screen time usage were also significantly associated (p-0.001) using chi square test (21.1) (table 4) Independent t-test resulted that there is a significant (p-0.001) mean difference between screen time usage and sleep quality. Error bar plot indicates that individuals who engage in more than 2 hours of screen time per day experience poor sleep quality. (Figure 2)

Discussion

Sleep is crucial for maintaining an adequate and healthy lifestyle. It can be considered as a maintenance and repair period of the body during which the metabolites that have accumulated throughout the day are cleared, and mental stress and anxiety are relieved.(15) This dose-dependent suppression of melatonin production in turn leads to sleep disruption.(16) Studies have documented that odds of an unhealthy lifestyle and subjective complaints increase with the use of electronic media beyond 1 hour.(17) These ill effects on the health/lifestyle include sedentary behavior and obesity, headache, shorter sleep duration,(18) and dry eye.(19)

This study sought to assess and evaluate the sleep quality and screen time among general population and its associations with duration of sleep. Participants in the current study ranged in age from 16-51 years, with a mean age of 27 ± 9.33 years. Similarly, a study by Patel reported an age range of , 16-40 years for their participants.(20) In terms of gender distribution, male and female in the current study were nearly equal , comprising of 49.7% and 50.3% respectively . A similar distribution was also observed in Patel's study with 49.6% males and 50.3% females.(20)

Type of screen majority of the subjects was mobile (95.8%) followed by Tv (55.6%), Laptop (49.2%) and others. Cumulative percentage were calculated because majority of the participants reported using multiple gadgets. Koushik Yeluri found in their study that the most used gadget was the smart phone (100%), followed by laptops (78.7%) and Tablets (42.3%).(21)

On evaluating the sleep quality of participants, we found that 74% were having poor sleep quality according to PQSI. Several studies have reported similar findings regarding the detrimental effects of excessive screen time on sleep patterns. Research by Hale and Guan found that prolonged screen time particularly use of electronic device like smartphones and computers was associated with reduced sleep duration and increased sleep disturbances among children and adolescents.(22) Additionally a study by Cain & Gradisar highlighted the negative impact of screen exposure before bedtime on sleep onset latency and overall sleep quality, consistent with the observed association between screen time and sleep quality in our study.(17) Continuous smartphone use for more than 1 hour had 5 times more chance of having a poor sleep quality, consistent with a previous study on smartphone usage and sleep quality in a general population.(23)

The sample was restricted to individuals with internet access and the ability to complete online surveys, potentially excluding non-digital users or those with limited internet literacy. The use of self-reported data for screen time and sleep quality, may result in selection or recall bias. Participants may under-report or over-report their behaviours, leading to inaccuracies in the data. Further studies with a larger sample size and greater number of variables are recommended.

Conclusion

This study highlights the significant impact of screen time on sleep quality among the general population. A substantial proportion of participants (74%) exhibited poor sleep quality, with prolonged screen usage (>2 hours daily) being significantly associated with inadequate sleep duration and disrupted sleep patterns.

The lack of targeted government programs addressing sleep quality in India highlights an unmet public health need. Initiatives under the Ministry of Health and Family Welfare, such as Ayushman Bharat comprehensive primary health care through health and wellness center, focus on holistic healthcare and encompass components related to lifestyle and overall well-being.(24) Although not specifically targeted at sleep, these programs address factors that indirectly impact sleep quality as part of broader health promotion efforts. It is imperative to raise awareness about the importance of regulating screen time and promoting healthy sleep hygiene practices. Interventions such as blue light filters, screen time reduction programs,

and mindfulness-based strategies to mitigate screen time may improve sleep quality and overall well-being.

Figure 1 - Type of screen used

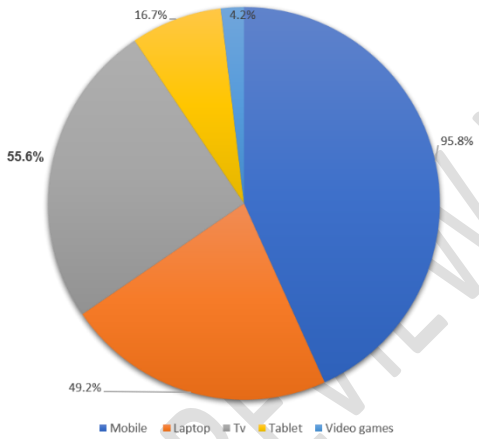

Figure 2 - Error bar Plot of Sleep quality and Screen time

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176 **Table 1 Demographic factors**

Socio demographic factors	**Frequency (n)** **Percentage (%)**
Gender	
Male	154 (49.7%)
Female	157 (50.3%)
Age	
16-22	138 (44%)
26-35	118 (37.9%)
36-45	39 (12.5%)
46-51	16 (5.1%)
Occupation	

Employed	162 (52.3%)
Un-employed	8 (2.6%)
Student	104 (33.5%)
Home maker	36 (11.6%)
Shift basis of employed	
General shift	113 (69.8%)
Night shift	49 (30.2%)

Table-2 Screen Time & Sleep Quality

Screen Time		**Sleep Quality**	
>2 hours	73.2 %	**Poor**	74 %
< 2 hours	26.8 %	**Normal**	26 %

Table 3 - **Association between age and sleep quality**

AGE (YEARS)	**SLEEP QUALITY**				**CHI SQUARE VALUE**	**P VALUE**
	NORMAL SLEEP		**POOR SLEEP**			
	N	**%**	**n**	**%**		
16-22	68	85%	70	30.4%	72.927	0.000
26-35	6	7.5%	111	48.3%		
36-45	3	3.8%	36	15.7%		
46-51	3	3.8%	13	5.7 %		

Table 4 - **Association between sleep duration and screen time**

SLEEP DURATION	SCREEN TIME				CHI SQUARE VALUE	P VALUE
	LESS THAN 2 HOURS		MORE THAN 2 HOURS			
	n	%	n	%		
LESS THAN 8 HOURS	67	81	219	96	21.116	0.0001
MORE THAN 8 HOURS	16	19	8	4		

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