A CROSS SECTIONAL STUDY TO DETERMINE THE IMPACT OF DIGITAL DEVICE USAGE DURING LATE NIGHT HOURS ON SLEEP QUALITY AMONG THE ADOLESCENTS OF AGE GROUP 18-25

Study Done By,

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Introduction

• Sleep is a state of unconsciousness from which a person can be aroused by sensory or other stimuli.Sleep is absolutely an essential factor for every living individual.A normal sleeping time is necessary for regulating internal environment,normal brain activity and prevention of psychotic behavior[1].According to the National Institute of Health an average young adult must have a sleeping time of more or less seven hours per day.But in the present fast paced society a sleeping time of atleast six hours is an absolute necessity[2].

• In the present world technological advancements have brought about a lot of changes.One very important advancement is the introduction of digital devices.Digital devices such as TVs,Computers,Mobile Phones etc are being increasedly used in the present world.Statista states that India will boast over 191.7 million households(Out of 234 million) with television sets of which over 161 million have access to cable or satellite TV[3].By the end of year 2017 Statista States that India is expected to have a mobile phone user count of 730.7 million[4].Statista also

states that by the end of 2018 India will have a tablet PC user count of 60 million [5].Thus India boasts a very high increase in the number of people using digital devices.

• The usage of technology even though having its beneficial effects also has its downsides.The main problem seems to stem from the use of digital devices at late night for work or leisure purposes.Studies have shown that about one in four people do not put their phone in silent at night or seem to keep their phone very close to them at sleep[1].Similarly many young people use digital devices for leisure purposes at late night.The main hypothesis of this study is that the usage of digital devices has an impact on sleep quality.This study is carried out on the basis that late night usage of digital devices produces changes in sleeping time[7].

Justification

• The main reason for carrying out this study among the adolescents is that technological advances have brought about large revolutions and the students have to be connected to the internet to keep themselves well updated and informed and also the fact that many adolescents prefer the use of digital devices as an escape from their stressful life[1].The impact of digital devices on sleep quality is not well documented in India and especially among medical students.This was the major impetus for taking up this topic for research.

Review Of Literature

• A study done by Chiranthie Hapuarachige,Ibukunoluwa Fakunle,Hodan Idriss Ahmed, Samantha Sparrow,Sumya Hasan,Latifa Alsaad and Shatha Al Sharbatti in 2014 among health science students in Gulf Medical University showed that nearly 83% students had a very bad sleep quality due to late night usage of digital devices and often missed nearly 3 classes the following day.Thus lack of sleep was found to have an impact on academic performances as well.[1]

• A study carried out by Thomee,Gustafsson,Eklof,Nilsson and Hagberg in 2007 found out that young adults with prolonged usage of information and communication technology as well as with a habit of increased SMS usage were diagnosed with psychological disturbances.The study was carried out as a Cohort Study among 1204 college students.The study was carried out for a period of one year.This study helped establish a relationship between high use of ICT and Stress.This study also revealed that among men high use of ICT was associated with a difficulty in falling asleep at night.[6]

• A study done in South Korea by Choi,Son,Park,Kim,Han,Lee and Gwak in 2009 revealed that internet addiction among adolescents was associated with daytime sleepiness.A Taiwanese study conducted revealed that insomnia was predominant among adolescents who had a habit of using digital devices at late night.[6]

• In Finland a research was conducted which investigated mobile phone usage,computer usage, sleeping habit and health problems among adolescents.It showed that boys played games and used the internet more often than girls but girls were identified with more vigorous mobile phone usage.The adolescents were diagnosed with various health problems.The health problems stemmed from decreased sleeping time and increased waking time tiredness.[6]

• A poll conducted in US by the National Sleep Foundation in 2011 revealed that in the hour just before trying to sleep the usage of digital devices is very high with 67% using cell phones,60% computers or laptops,43% music digital devices and 18% use video game consoles.Thus many young adults were revealed to have the habit of using digital devices during late night hours.[7]

• Galambos and his colleagues conducted a study among first year students and predicted that students with bad sleep quality had greater negative mood while those with better quality of sleep had increased positive mood and decreased stress.The study was done in 2009.[7]

• Experimental studies were conducted to find out the effects of music,games and television on sleep.Music was found to have a slightly positive effect on sleep wheras reducing television usage was found to have increased sleep quality and video game usage was found to have mixed effects.[7]

• The study done by Tavernier and Willoughby in 2014 rather seems to have a conflicting finding and states that use of digital devices does not decrease sleep quality wheras it is the students with sleep problems who use more of digital media.[7]

Objectives

• 1)To study the impact of using digital devices during late night hours on sleep quality among the adolescents of age group 18-25.

• 2)To determine the impact of lack of sleep due to digital device usage during late night hours on the daytime performance of the adolescents of age group 18-25.

• 3)To find the frequency of usage of digital devices among the adolescents of age group 18-25.

Methodology

• STUDY DESIGN:

• A Cross Sectional Study on the impact of using digital devices during late night hours on sleep quality among the adolescents of age group 18-25.

• STUDY POPULATION:Adolescents of age group 18-25.

• INCLUSION CRITERIA:

• 1)Adolescents

• 2)Age group 18-25.

• EXCLUSION CRITERIA:

• 1)Adolescents who do not use digital devices • 2)Adolescents who are not willing to participate.

 STUDY AREA:

• Old Washermanpet,Royapuram,Chennai.

STUDY DURATION: April
to August. SAMPLE SIZE:

- Sample Size calculation:

- Sample size was calculated with the help of the formula $n=4pq/d^2$

- Prevalance p=85% in the study done by Chiranthie et al[1]

- $n=(4 \times 83 \times 17)/5^2 = 5644/25 = 225.76 \approx 226$

- 10% of 226 were considered as non responders and the sample size was found to be 248 and was rounded off to 250. SAMPLING METHOD:

- Convenience Sampling.

- DATA COLLECTION TOOL:

The data will be collected from the students who have volunteered for the research study by means of a questionnaire.The questionnaire will be self administered and will consist of 14 questions.The questionnaire will be anonymous and confidential.

- DATA COLLECTION METHOD:

Data collection will be done after receiving the approval from the department and the ethical committee.Informed consents will be obtained from the participants before enrollment into the study.The questionnaire will be provided and collected by the interviewer on site.The interviewers will remain on site to clarify any doubts arose by the participants.

- ANALYSIS:

The data collected by means of the questionnaire will be recorded in excel sheets and analysed by means of SPSS.The recorded data will be interpreted in the form of tables and charts.
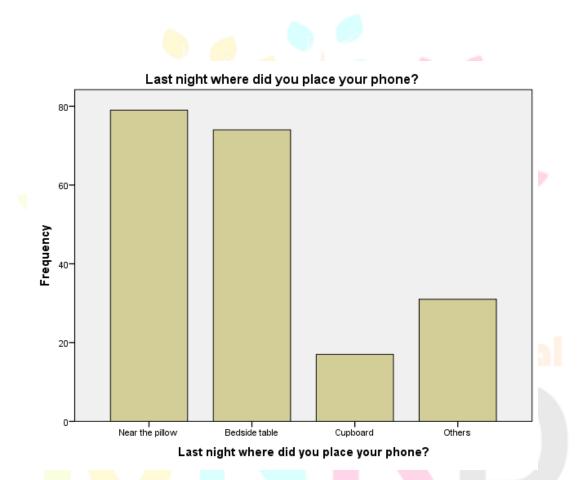
- ETHICAL CONSIDERATIONS:

The data will be collected after the participant provides the informed consent.The participants will not be forced to participate in the study.

FREQUENCY TABLES:

Last night where did you place your phone?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Near the pillow	79	39.3	39.3	39.3
	Bedside table	74	36.8	36.8	76.1
	Cupboard	17	8.5	8.5	84.6
	Others	31	15.4	15.4	100.0
	Tota	201	100.0	100.0	

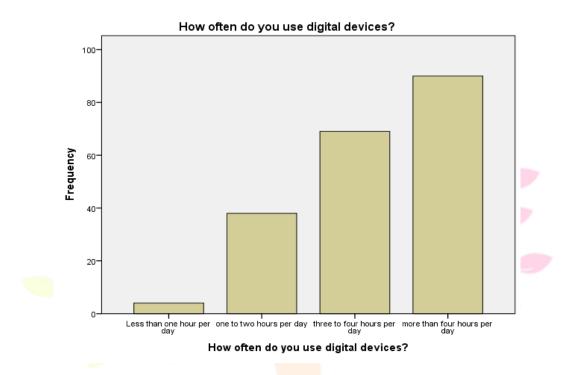Last night where did you place your phone?

INTERPRETATION

Mostly placed near the pillow

How often do you use digital devices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than one hour per day	4	2.0	2.0	2.0
	one to two hours per day	38	18.9	18.9	20.9
	three to four hours per day	69	34.3	34.3	55.2

more than four hours per day	90	44.8	44.8	100.0
Total	201	100.0	100.0	

INTERPRETATION

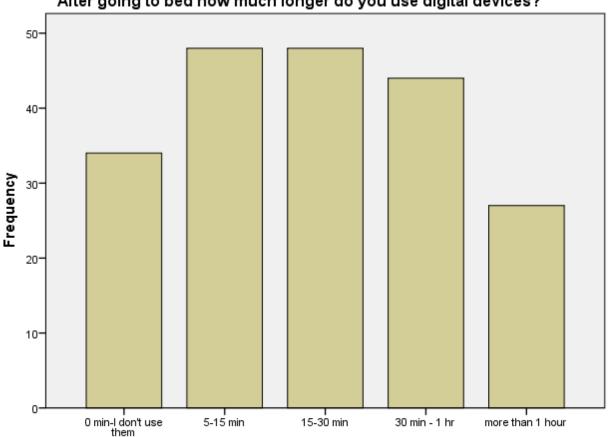Mostly used more than four hours per day

How often do you use digital devices?

After going to bed how much longer do you use digital devices?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0 min-I don't use them	34	16.9	16.9	16.9
5-15 min	48	23.9	23.9	40.8
15-30 min	48	23.9	23.9	64.7
30 min - 1 hr	44	21.9	21.9	86.6
more than 1 hour	27	13.4	13.4	100.0
Total	201	100.0	100.0	

INTERPRETATION

After going to bed most people use digital devices atleast for a period of 5 to 30 mins

After going to bed how much longer do you use digital devices?

Used Devices Frequencies

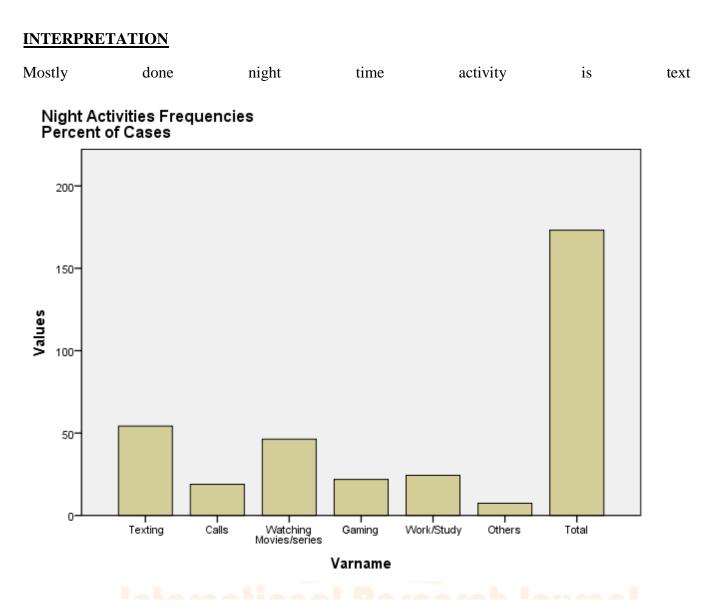|		Responses		Percent of Cases
		N	Percent	
What all devices do you use?[a]	Mobilephone	200	52.9%	99.5%
	Laptop	79	20.9%	39.3%
	Gaming Console	14	3.7%	7.0%
	Television	72	19.0%	35.8%
	Others	13	3.4%	6.5%
Total		378	100.0%	188.1%

Mobilephones are the devices used most frequently.

Used Devices Frequencies
Percent of Cases

NIGHT ACTIVITIES FREQUENCY

		Responses		Percent of Cases
		N	Percent	
Activities you do 1 hr before sleep?[a]	Texting	109	31.3%	54.2%
	Calls	38	10.9%	18.9%
	Watching Movies/series	93	26.7%	46.3%
	Gaming	44	12.6%	21.9%
	Work/Study	49	14.1%	24.4%
	Others	15	4.3%	7.5%
Total		348	100.0%	173.1%

INTERPRETATION

Mostly done night time activity is text

Night Activities Frequencies
Percent of Cases

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After going to bed how much longer do you use digital devices? * Do you think using digital device interfered your sleep last night? Crosstabulation

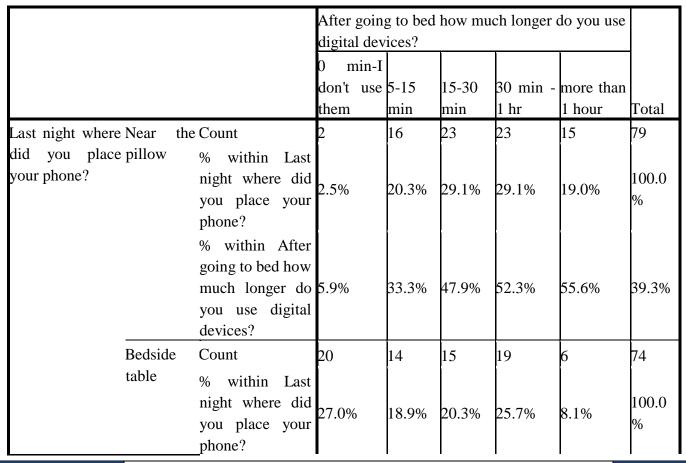|		Do you think using digital device interfered your sleep last night?		
		Yes	No	Total
After going to bed how much longer do you use digital devices?	0 min-I don't use them Count	7	27	34
	% within After going to bed how much longer do you use digital devices?	20.6%	79.4%	100.0%
	% within Do you think using digital device interfered your sleep last night?	7.4%	25.2%	16.9%
	5-15 min Count	21	27	48
	% within After going to bed how much longer do you use digital devices?	43.8%	56.3%	100.0%

		% within Do you think using digital device interfered your sleep last night?	22.3%	25.2%	23.9%
15-30 min	Count		25	23	48
		% within After going to bed how much longer do you use digital devices?	52.1%	47.9%	100.0%
		% within Do you think using digital device interfered your sleep last night?	26.6%	21.5%	23.9%
30 min - 1 hr	Count		23	21	44
		% within After going to bed how much longer do you use digital devices?	52.3%	47.7%	100.0%
		% within Do you think using digital device interfered your sleep last night?	24.5%	19.6%	21.9%
more than 1 hour	Count		18	9	27
		% within After going to bed how much longer do you use digital devices?	66.7%	33.3%	100.0%
		% within Do you think using digital device interfered your sleep last night?	19.1%	8.4%	13.4%
Total	Count		94	107	201
		% within After going to bed how much longer do you use digital devices?	46.8%	53.2%	100.0%
		% within Do you think using digital device interfered your sleep last night?	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.911[a]	4	.005
Likelihood Ratio	15.702	4	.003
Linear-by-Linear Association	12.561	1	.000
N of Valid Cases	201		

INTERPRETATION

From the confirmatory test chi square test the findings are significant since significance is less than 0.05.Hence it is proved that the longer time digital devices are used after going to bed the more sleep quality is interfered.

			After going to bed how much longer do you use digital devices?					
			0 min-I don't use them	5-15 min	15-30 min	30 min - 1 hr	more than 1 hour	Total
Last night where did you place your phone?	Near the pillow	Count	2	16	23	23	15	79
		% within Last night where did you place your phone?	2.5%	20.3%	29.1%	29.1%	19.0%	100.0%
		% within After going to bed how much longer do you use digital devices?	5.9%	33.3%	47.9%	52.3%	55.6%	39.3%
	Bedside table	Count	20	14	15	19	6	74
		% within Last night where did you place your phone?	27.0%	18.9%	20.3%	25.7%	8.1%	100.0%

		% within After going to bed how much longer do you use digital devices?	58.8%	29.2%	31.3%	43.2%	22.2%	36.8%
Cupboard	Count	4	6	3	1	3	17
	% within Last night where did you place your phone?	23.5%	35.3%	17.6%	5.9%	17.6%	100.0%
	% within After going to bed how much longer do you use digital devices?	11.8%	12.5%	6.3%	2.3%	11.1%	8.5%
Others	Count	8	12	7	1	3	31
	% within Last night where did you place your phone?	25.8%	38.7%	22.6%	3.2%	9.7%	100.0%
	% within After going to bed how much longer do you use digital devices?	23.5%	25.0%	14.6%	2.3%	11.1%	15.4%
Total	Count	34	48	48	44	27	201
	% within Last night where did you place your phone?	16.9%	23.9%	23.9%	21.9%	13.4%	100.0%
	% within After going to bed how much longer do you use digital devices?	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	35.830[a]	12	.000
Likelihood Ratio	43.345	12	.000
Linear-by-Linear Association	18.280	1	.000
N of Valid Cases	201		

INTERPRETATION

Since significance is less than 0.05 it is proved that people who place the mobile phone near the pillow tend to use it more after going to bed which interferes with their sleep.

After going to bed how much longer do you use digital devices? * What is the average time you go to sleep? Crosstabulation

			What is the average time you go to sleep?				
			10PM-11.59PM	12AM-1.59AM	2AM-3.59AM	After 4AM	Total
After going to bed how much longer do you use digital devices?	0 min-I don't use them	Count	29	5	0	0	34
		% within After going to bed how much longer do you use digital devices?	85.3%	14.7%	0.0%	0.0%	100.0%
		% within What is the average time you go to sleep?	21.5%	9.1%	0.0%	0.0%	16.9%
	5-15 min	Count	37	8	3	0	48
		% within After going to bed how much longer do you use digital devices?	77.1%	16.7%	6.3%	0.0%	100.0%
		% within What is the average time you go to sleep?	27.4%	14.5%	33.3%	0.0%	23.9%

15-30 min	Count	33	15	0	0	48	
	% within After going to bed how much longer do you use digital devices?	68.8%	31.3%	0.0%	0.0%	100.0%	
	% within What is the average time you go to sleep?	24.4%	27.3%	0.0%	0.0%	23.9%	
30 min - 1 hr	Count	27	15	1	1	44	
	% within After going to bed how much longer do you use digital devices?	61.4%	34.1%	2.3%	2.3%	100.0%	
	% within What is the average time you go to sleep?	20.0%	27.3%	11.1%	50.0%	21.9%	
more than 1 hour	Count	9	12	5	1	27	
	% within After going to bed how much longer do you use digital devices?	33.3%	44.4%	18.5%	3.7%	100.0%	
	% within What is the average time you go to sleep?	6.7%	21.8%	55.6%	50.0%	13.4%	
Total	Count	135	55	9	2	201	
	% within After going to bed how much longer do you use digital devices?	67.2%	27.4%	4.5%	1.0%	100.0%	
	% within What is the average time you go to sleep?	100.0%	100.0%	100.0%	100.0%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	35.456[a]	12	.000
Likelihood Ratio	35.306	12	.000
Linear-by-Linear Association	21.614	1	.000
N of Valid Cases	201		

INTERPRETATION

Since significance is less than 0.05 it is proved that the longer digital devices are used after going to sleep the more late the person goes to sleep clearly interfering with sleep quality.

RECOMMENDATIONS:

• The users are advised to place their digital devices away from them as they go to bed, thereby restricting their usage and promoting their sleep quality

• Practicing healthy hobbies like yoga , sports and reading books tend to reduce the usage of digital devices among users and in turn promote their sleep quality.

• There are particular mobile applications which notify the users when they use their devices for more than a particular time and displays warning signals which brings about self awareness among the users and thereby benefitting them with better sleep quality.

LIMITATIONS

• The study group only includes those in the age group of 18-25, mostly the youngsters in high schools and colleges. This study can't be applied to the other groups of children and the elderly where other factors such as generation gap and dependency come into play. Hence this study can't be applied to the population as a whole.

• Another limitation is that the study investigated only the usage of digital devices and doesn't investigate the potentially important characteristics of the screens (i.e. size of screen, closeness to face, volume of device, etc.). These

characteristics also determine the effect of the device in the health of the individual and in turn affects the sleep.

• The study can be made more reliable by expanding the study to other age groups and also including the rural community

CONCLUSION

• The study establishes the relationship between the digital device usage and the sleep quality among the users in the age group of 18-25

• The usage of digital devices tend to affect the sleep quality among the users and in turn affecting the health status of the individual

• These ill effects bring about the need for self awareness among the users and appropriate knowledge about the relationship between sleep quality and their health status

• The study could me made more reliable by expanding the study to other age groups and including the rural community.

REFERENCES:

•1.Chiranthie   Hapuarachige,   Ibukunoluwa   Fakunle,Hodan   Idriss Ahmed,Samantha Sparrow,
Sumiya Hasan,Latifa Alsaad & Shatha Al Sharbati(2014),The Effects of Electronic Device
Use on The Sleep Quality of Health Science Students in the United Arab Emirates,Gulf Medical Journal,ASM 2014;3(S2):S6-S15.
•2.https://www.helpguide.org/articles/sleep/sleep-needs-get-the-sleep-you-need.htm
•3.https://www.statista.com › Media & Advertising › Radio, TV & Film
•4.https://www.statista.com/statistics/274658/forecast-of-mobile-phone-users-in-india/
•5.https://www.statista.com/statistics/413325/tablet-users-number-india/

•6.Kerry L. Moulin & Chia-Jung Chung(2017),Technology Trumping Sleep:Impact of Electronic Media and Sleep in Late Adolescent Students,Journal of Education and

Learning;Vol 6 No1;2017 ISSN 1927-5250

•7.Kathryn M. Orzech,Michael A. Grandner,Brandy M. Roane & Mary A. Carskadon,Digital media in the 2h before bedtime is associated with sleep variables in university students,

http://www.sleepforscience.org/stuff/contentmgr/
files/3d8154fe3e5f90614519b769bb0331f2/
pdf/05__orzech_et_al__2015__computers_in_human_behavior.pdf