RESEARCH
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IMPACT OF SMARTPHONE USAGE ON THE SLEEP AND BEHAVIOR

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Abstract

The most rapidly growing technology in the world is smartphones. Smartphones have become a very important part of our daily life because it is the most convenient way for people to communicate. However, the excessive use of mobile phones has been associated with many health problems including biology as well as psychological. The research has found that among the users who slept with their smartphones by their bedside, 70% of men and 54% of women reported poor quality of sleep. High cell phone usage was associated with sleep deprivation and symptoms of depression for both men and women. Researcher reveled that teenager who spend more hours on their gadgets are highly likely more at risk of suicide, becomes prone for addictions and isolated or aggressive behaviour.

Keywords: smartphone, Sleep, High cell phone usage, teenager

BACKGROUND OF THE STUDY

The most rapidly growing technology in the world is smartphones. Smartphones have become a very important part of our daily life because it is the most convenient way for people to communicate. However, the excessive use of mobile phones have been associated with many health problems including biology as well as psychological. The research has found that among the users who slept with their smartphones by their bedside, 70% of men and 54% of women reported poor quality of sleep. High cell phone usage was associated with sleep deprivation and symptoms of depression for both men and women. Researchers reveled that teenager who spend more hours on their gadgets are highly likely more at risk of suicide, becomes prone for addictions and isolated or aggressive behaviour.

PROBLEM STATEMENT:

"A study to assess impact of smartphone usage before sleep on the sleep and behavior among nursing students of selected institutes."

OBJECTIVES OF THE STUDY:

1. To assess the pattern of smartphone usage before sleep and the behavioral pattern of nursing students.
2. To identify association between the sleep and behavioral pattern and selected demographic variables.
3. To assess the opinion of student nurse regarding the known impact of mobile phone usage before sleep.

HYPOTHESIS

H1= There will be some significant changes in the sleep and behavioral pattern among students using the smartphone.

METHODOLOGY:

The qualitative descriptive approach and survey design was adopted by the researcher to assess the demographic data, sleep and behavior pattern of students.

STUDY POPULATION:

Setting of the study:
Students from different nursing institutions of Maharashtra
Population of the study:
In this study population comprises nursing students of selected institutions.
Sample:
Student nurses having smart phones with internet access.
Sample size : 214 Nursing students.
Sampling technique: non-probability convenient sampling technique.

TOOLS AND DATA COLLECTION:

The tool consists of the following sections:
Section A: A semi-structured questionnaire to assess the demographic profile.
Section B: A A Likert scale to assess behavioral pattern
Section C: A checklist to assess the sleeping pattern.
Section D: A Likert scale to assess the Student's opinion regarding smartphone usage
The investigators first informed regarding the link of consent and tools to various nursing institutional heads. Institutional heads forwarded the link to concern students. Later interested students gave online consent. Tools were assigned for samples to collect demographic data, to assess the behavioral and sleeping patterns.At the end participants opinions were received in relation to smartphone usage.

Demographic data,checklist data and Likert scale data was analyzed by using the frequency and percentage. Chi square is used to find associations between selective demographics and behavioral patterns as well as sleeping patterns.

ETHICAL CONSIDERATION:

There are certain ethical aspects which need to be considered in common while conducting research to ensure the rights and welfare of individuals. Approval from the Institutional ethical committee was obtained. Informed written consent was obtained from participants with adequate explanation about study as it was an online platform. Privacy, confidentiality and anonymity was guarded by ensuring codes for participants and restricted data access.

RESULTS AND DISCUSSION:

Demographic Data:

A demographic questionnaire was used to obtain data.Total number of participants were 214. Maximum students 162(75.7%) students are female.Maximum students 42(19.6%) were from 3rd year BSc nursing.Maximum 80(37.4%) students use Oppo/Vivo/Realme smartphones. Maximum 111(51.9%) students have been using their smartphones for less than 2 years. Maximum 187(87.4%) students use one smartphone. Maximum students 149(69.6%) use only one sim card. The maximum 162 (75.7%) students spend less than 1 hour on calls. Maximum students 107(50%) spend less than 1hr on hearing music. Maximum students 120(56.1%) do not use mobile phones to play games. Maximum students 85(39.7%) spend 1 to 3 hours using the internet.

Table 1: Effect of smartphone on behavior, attention span, working ability, smartphone addiction, communication: N= 214

SR NO.	Questions	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
		f	%	f	%	f	%	f	%	f	%
1	I feel panic when there is impaired network	28	13.1%	31	14.5%	88	41.1%	57	26.6%	10	4.7%
2	I use social media, more on the smartphones	21	9.8%	23	10.7%	59	27.6%	94	43.9%	17	7.9%
3	I like to play more games, on mobile phones	54	25.2%	79	36.9%	49	22.9%	27	12.6%	5	2.4%
4	I like to watch movies and other entertainment applications, more on mobile phone	20	9.3%	31	14.5%	59	27.6%	81	37.9%	23	10.7%
5	I spend most of the time using mobile phone	22	10.3%	52	24.3%	63	29.4%	62	29%	15	7%

6	I think mobile phone should be used more for educational purpose	13	6%	9	4.3%	49	22.9%	90	42.1%	53	24.7%

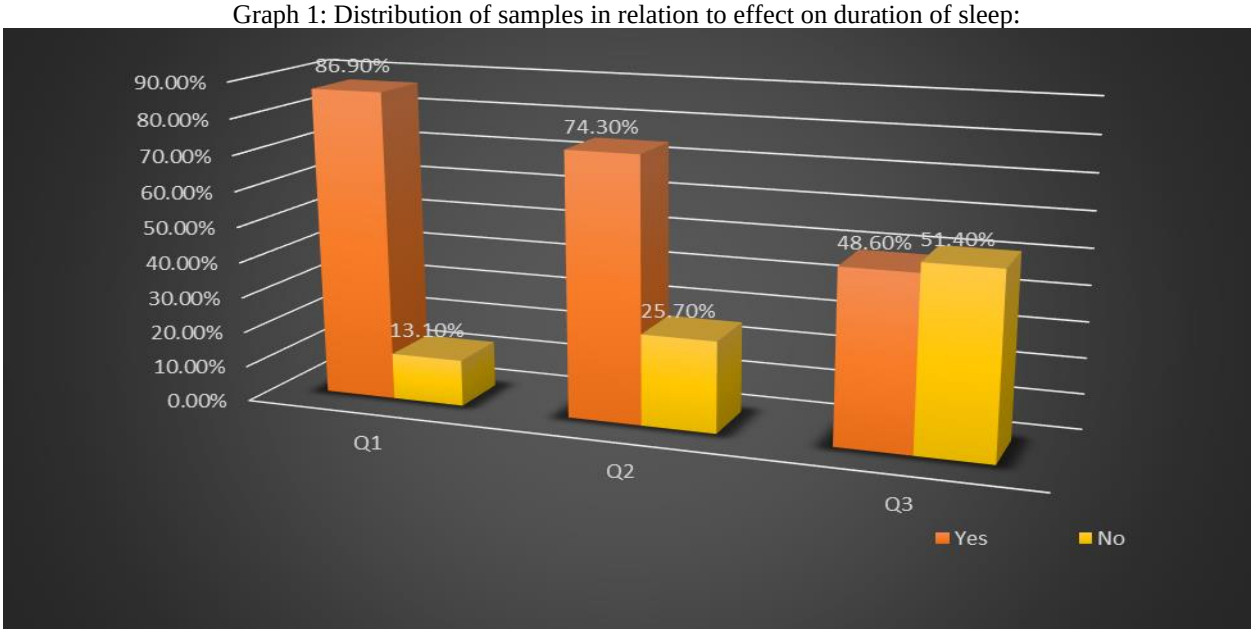
Table 1 shows the Effect of smartphone on behavior, attention span, working ability, smartphone addiction, communication Maximum students 88(41.1%) feel panic when there is impaired network. Maximum students 94(43.9%) use social media, more on the smartphone. Maximum students 79(36.9%) like to play more games on smartphones. Maximum students 81(37.9%) like to watch movies and other entertainment applications, more on smartphones. Maximum students 63(29.4%) spend most of the time using smartphones. Maximum students 90(42.1%) think smartphones should be used more for educational purpose. Maximum number of students 86(40.2%) agree that they are able to study with focused attention without checking their smartphone. Maximum number of students 82(38.3%) agree that excessive use of smartphones has reduced their ability to complete their assignment on time. Maximum number of students 64(29.9%) disagree that they become frustrated if smartphones are not around. Maximum number of students 75(35%) disagree that they feel insecure when parents check their smartphone. Maximum number of students 70(32.7%) disagree that they feel alone when they don't have their smartphone. Maximum number of students 68(31.8%) agree that they feel depressed when their smartphone is damaged or not working. Maximum number of students 68(31.8%) disagree that they unconsciously check their smartphone. Maximum number of students 87(40.7%) disagree that they use their smartphone in between lectures. Maximum number of students 59(27.6%) disagree that they feel it is difficult to live without smartphones. Maximum number of students 59(27.6%) equally agree and disagree that smartphones are the easiest way to avoid people. Maximum number of students 63(29.4%) disagree that smartphone communication is more comfortable than face to face communication. Maximum number of students 84(39.3%) disagree that they like smartphones more than human company. Maximum number of students 97(45.3%) strongly disagree that they prefer smartphones over spending time with family. Maximum number of students 83(38.8%) have a neutral opinion that they isolate themselves to use smartphones without disturbance.

Table 2: Smartphone effect on duration of sleep, quality of sleep, continuity of sleep:
N=214

SR NO	**Question (Duration of sleep)**	**Yes**		**No**	
		F	**%**	**F**	**%**
1	I get an ideal 6-7 hours of sleep daily.	186	86.9%	28	13.1%
2	I use my smartphone at least one hour before sleeping.	159	74.3%	55	25.7%
3	I feel that smartphones have reduced my sleeping time.	110	48.6%	104	51.4%

Table 2 shows the Smartphone effect on duration of sleep, quality of sleep, continuity of sleep

Graph 1: Distribution of samples in relation to effect on duration of sleep:



Graph 1 shows the Distribution of samples in relation to effect on duration of sleep:

Table 3: **Quality and continuity of Sleep questionarie**
N= 214

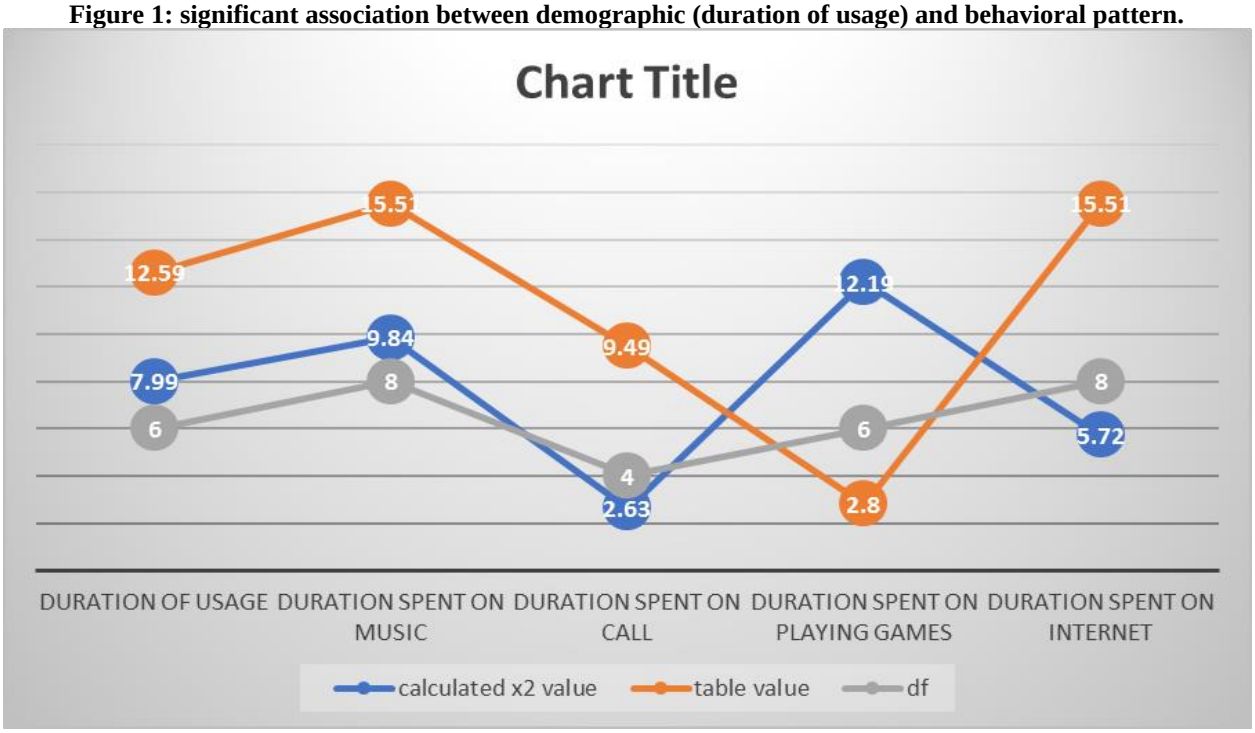
SR NO	**Question (Quality and continuity of Sleep)**	**Yes**		**No**	
		F	**%**	**f**	**%**
1	I am able to get good quality uninterrupted sleep at night.	174	81.3%	40	18.7%
2	I use my smartphone even when I'm sleepy.	76	35.5%	138	64.5%
3	I get enough sleep even after using my smartphone late at night.	96	44.9%	118	55.1%
4	I feel sleepy the next day after using my smartphone late at night.	126	58.9%	88	41.1%
5	I experience health issues (headache, acidity, indigestion, drowsiness, eye irritation) the next morning after using my smartphone late at night.	102	47.7%	112	52.3%
6	I usually get up from sleep in between during night time.	82	38.3%	132	61.7%
7	I check my smartphone when I wake up at midnight or early morning.	92	43%	122	57%

Maximum number of students 186 (86.9%) get ideal sleep of 6-7 hours daily. Maximum number of students are 159 (74.3%) who use smartphones at least 1 hour before sleeping. Maximum number of students 110(48.6%) feel that smartphones have reduced their sleeping time. Maximum number of students 174(81.3%) are able to get good quality uninterrupted sleep at night. Maximum number of students 138(64.5%) do not use smartphones when they are sleeping. Maximum number of students 118 (55.1%) disagree that they get enough sleep even after using smartphones late at night. Maximum number of students 126 (58.9%) feel sleepy the next day after using a smartphone late at night. Maximum number of students 112 (52.3%) do not experience health issues like (headache, acidity, indigestion, drowsiness, eye irritation) late morning after using smartphone late night. Maximum number of students 132 (61.7%) do not usually get up from sleep in between at night time. Maximum number of students 122 (57%) do not check smartphones when they wake up at midnight and morning (table 3).

Table 4: Association between demographic variable and behavioral pattern:

SR NO.	Demographic Data	Calculated x^2 value	Table value	df
1.	Duration of usage	7.99	12.59	6
2	Duration spent on music	9.84	15.51	8
3.	Duration spent on call	2.63	9.49	4
4.	Duration spent on playing games	12.19	12.59	6
5.	Duration spent on internet	5.72	15.51	8

Figure 1: significant association between demographic (duration of usage) and behavioral pattern.



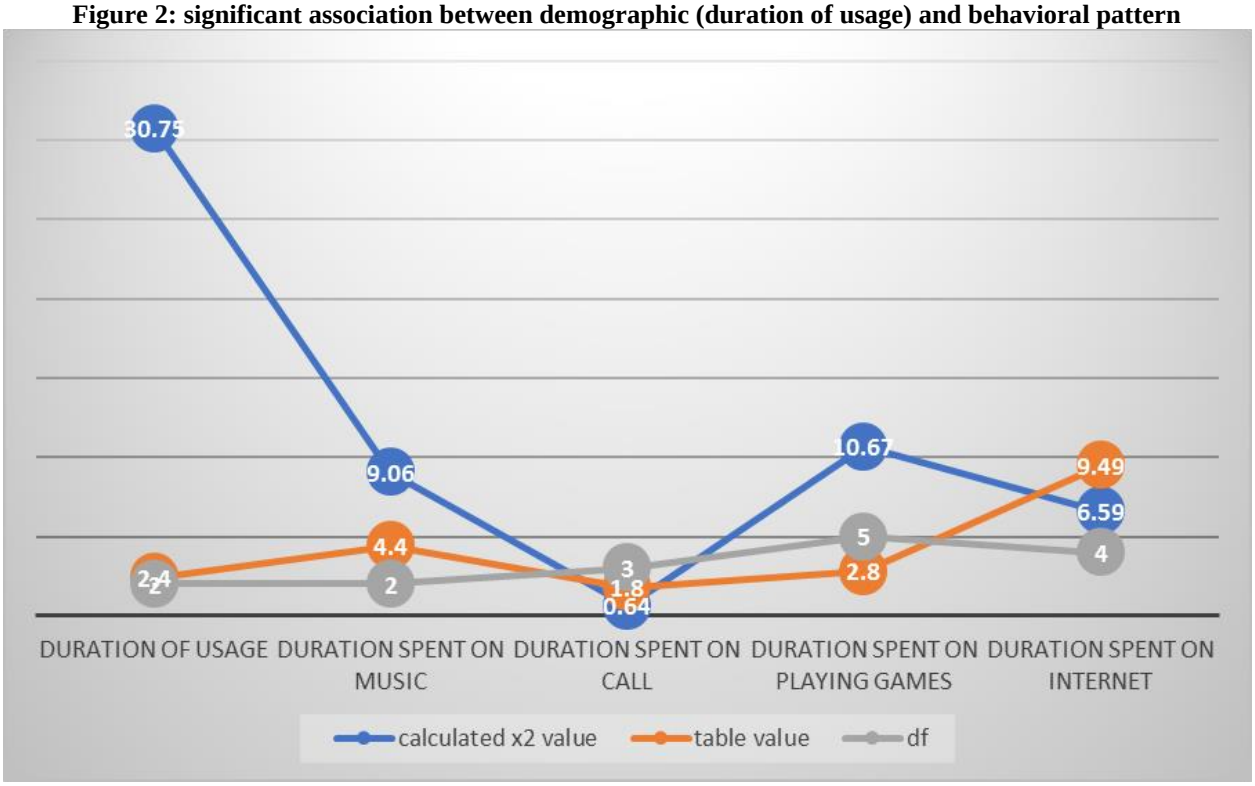
As the calculated chi square value is 7.99 which is less than tabulated value at df 6 and 0.05 significance (12.59) so the research hypothesis is accepted and there is significant association between demographic (duration of usage) and behavioral pattern. As the calculated chi square value is 9.84 which is less than tabulated value at df 8 and 0.05 significance (15.51) so the research hypothesis is accepted and there is association between demographic (duration spent on music) and behavioral pattern. As the calculated chi square value is 2.63 which is less than tabulated value at df 4 and 0.05 significance (9.49) so the research hypothesis is accepted and there is association between demographic (duration spent on call) and

behavioral pattern. As the calculated chi square value is 12.19 which is less than tabulated value at df 8 and 0.05 significance (12.59) so the research hypothesis is accepted and there is association between demographic (duration spent on playing games) and behavioral pattern (table 4 and figure 1).

Table 5: Association of demographic data with sleep pattern:

SR NO.	Demographic data	Calculated x^2 value	Table value	df
1.	Duration of usage	30.75	7.82	3
2.	Duration spent on music	9.06	9.49	4
3.	Duration spent on call	0.64	9.49	4
4.	Duration spent on playing games	10.67	7.82	3
5.	Duration spent on internet	6.59	9.49	4

Figure 2: significant association between demographic (duration of usage) and behavioral pattern



As the calculated chi square value is 30.75 which is less than tabulated value at df 3 and 0.05 significance (7.82) so the research hypothesis is accepted and there is association between demographic (duration of usage) and sleeping pattern. As the calculated chi square value is 9.06 which is less than tabulated value at df 4 and 0.05 significance (9.49) so the research hypothesis is accepted and there is association between demographic (duration spent on music) and sleeping pattern. As the calculated chi square value is 0.64 which is less than tabulated value at df 4 and 0.05 significance (9.49) so the research hypothesis is accepted and there is association between demographic (duration spent on call) and sleeping pattern. As the calculated chi square value is 10.67 which is greater than tabulated value at df 3 and 0.05 significance (7.82) so the research hypothesis is not accepted and there is no association between demographic (duration spent on playing games) and sleeping pattern. As the calculated chi square value is 6.59 which is less than tabulated value at df 4 and 0.05 significance (9.49) so the research hypothesis is accepted and there is association between demographic (duration spent on internet) and sleeping pattern. As the calculated chi square value is 5.72 which is less than tabulated value at df 8 and 0.05 significance (15.51) so the research hypothesis is accepted and there is association between demographic (duration spent on internet) and behavioral pattern (table 5 and figure 2).

Table 6: Analysis of opinionnaire of participants:
N=214

SR NO.	Parameter	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
		f	%	f	%	f	%	f	%	f	%
1	I think overuse of smartphones has caused a negative effect on my academics.	24	11.2%	46	21.5%	68	31.8%	59	27.6%	17	7.9%
2	I think I am addicted to Mobile phones.	41	19.2%	75	35%	54	25.2%	34	15.9%	10	4.7%
3	I think mobile phone usage causes various physical problems.	22	10.3%	42	19.6%	50	23.4%	84	39.3%	16	7.5%
4	I think mobile phones make me introverted and reduce social interaction.	29	13.6%	52	24.3%	61	28.5%	62	29%	10	4.6%
5	I think mobile phones badly influenced my sleeping pattern.	31	14.5%	61	28.5%	64	29.9%	53	24.8%	5	2.3%
6	I think mobile phones made behavioral changes in me.	32	15%	72	33.6%	47	22%	57	26.6%	6	2.8%

As per analysis of opinionnaire,
Maximum number of students 68(31.8%) agree and disagree that over use of smartphones has caused a negative effect on their academics.Maximum number of students 54(25.2%) agree and disagree that they are addicted to smartphones. Maximum number of students 50(23.4%) have neutral smartphone usage and various physical problems. Maximum number of students 62(29%) agree that smartphones make them introverted and reduce social interaction. Maximum number of students 64(29.9%) have a neutral opinion that smartphones had badly influenced sleeping patterns. Maximum number of students 72(33.6%) disagree that mobile phones made behavioral changes in themselves (table 6).

CONCLUSION:
The present research study concluded that there is a significant effect of smartphone usage on sleeping and behavior patterns of students. There is an association between duration of usage;

duration spent on calls, playing games, internet on sleeping and behavior pattern of students.

DECLARATION OF CONFLICTING INTERESTS:
The authors declare no potential conflict of interest with respect to the research, authorship and/ or publication of this article

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RESEARCH ABSTRACT (IMRAD)

INTRODUCTION: Smartphones have become a very important part of our daily life because it is the most convenient way for people to communicate. However, the excessive use of mobile phones have been associated with many health problems including biology as well as psychological.
High Smartphone usage was associated with sleep deprivation and symptoms of depression for both men and women. Researcher reveled that teenager who spend more hours on their gadgets are highly likely more at risk of suicide, becomes prone for addictions and isolated or aggressive behaviour.

METHODOLOGY: The qualitative descriptive approach and survey design was adopted by the researcher to assess the impact of smartphone usage before sleep on the sleep and behavior among nursing students in Mumbai, Maharashtra. Tools used were likert scale and checklist for assessing the sleep and behavioral pattern. 214 samples were selected by convenient sampling technique from various nursing colleges.

RESULTS:
Maximum 187(87.4%) students use one smartphone. The maximum 162 (75.7%) students spend less than 1 hour on calls. Maximum students 85(39.7%) spend 1 to 3 hours using the internet.
82(38.3%) of students agree that excessive use of smartphones has reduced their ability to complete their assignment on time.64(29.9%) of total students disagree that they become frustrated if smartphones are not around. Maximum number of students 75(35%) disagree that they feel insecure when parents check their smartphone. Maximum number of students 70(32.7%) disagree that they feel alone when they don't have their smartphone.
118 (55.1%) students disagree that they get enough sleep even after using smartphones late at night. Maximum number of students 126 (58.9%) feel sleepy the next day after using a smartphone late at night.
The calculated chi square value is 7.99 which is less than tabulated value at df 6 and 0.05 significance (12.59) so the research hypothesis is accepted and there is significant association between demographic (duration of usage) and behavioral pattern.
The calculated chi square value is 6.59 which is less than tabulated value at df 4 and 0.05 significance (9.49) so the research hypothesis is accepted and there is association between demographic (duration spent on internet) and sleeping pattern.

CONCLUSION: The study shows a significant effect of smartphone usage on sleeping and behavior patterns of students. There is an association between duration of usage; duration spent on calls, playing games, internet on sleeping and behavior patterns of students.We can improve the behavior and sleep quality, attention of students by providing various techniques.

KEYWORDS: Smartphone, Sleep, Behaviour pattern, Quality of sleep, nursing students.

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