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The pattern of smartphone usage, smartphone addiction, and associated subjective health problems associated with smartphone use among undergraduate nursing students

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Abstract:

BACKGROUND: The usage of smartphones has become common among adolescents, despite knowing the health-related problems of the user. Currently, the availability of electronic gadgets has become economical and this has an impact on society, especially on the behavior of adolescents.

MATERIALS AND METHODS: A cross-sectional survey design was used to find the pattern of smartphone usage, smartphone addiction, and subjective health problems associated with smartphone usage. The data were obtained from 270 nursing students using the convenient sampling technique using a sociodemographic proforma, semi-structured questionnaire on the pattern of smartphone usage, Smartphone Addiction Scale, self-reported subjective health problems questionnaire, and study habits scale.

STATISTICAL ANALYSIS: Descriptive and inferential statistics was used for the analysis using SPSS 16.0.

RESULTS: The study findings revealed that most of the participants 243 (90.0%) were using 4G phones. The majority 88 (32.60%) of the participants were using a smartphone for less than 2 hours at a stretch in a day. Most uses of a smartphone were in the night 155 (57.40%). The main usage of a smartphone was for entertainment purposes 213 (78.90%). Most of the participants 196 (72.6%) were moderately addicted to smartphones. One-third 109 (40.2%) of the participants complained of headache, followed by straining of the eyes 83 (30.6%).

CONCLUSION: The awareness of smartphone addiction and health-related problems associated with smartphone usage has been shown to decrease its impact. The study concluded that it is very much necessary to identify the pattern of smartphone usage, to prevent the consequences of addiction and health problems associated with smartphone usage.

Keywords:

Addiction, pattern of usage, smartphone, subjective health problems, study habits

Introduction

The mobile phone is a widely used gadget across the lifespan for capturing important events, browsing information, communicating with people, to share information. The quantity of cell phone clients overall is projected to add up to almost

2.7 billion by 2019. It is normal that, by 2017, very nearly 33% of the absolute worldwide general population will utilize a cell phone. India, the second most crowded country on the planet, has 340 million smartphone users. The three countries contributing to a large number of users include China, India, and United States with 100 million users.^[1,2]

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The number of smartphone users worldwide is believed to be 5.22 billion which accounts for 66.6% of the global population and the number is expected to grow hundred million times in coming years. Adolescents aged 18 to 29 years own the largest share of smartphones (96%) followed by 30 to 49 years (92%).^[3] The official name for smartphone addiction is Nomophobia which is defined as having a fear or anxiety of not having access to a mobile phone.^[4,5]

The risky use of smartphones affects negatively daily goal setting. Education and counseling programs have been suggested in the literature to prevent the risky use of smartphones and reduce the associated risk of addiction for students.^[6] Among adolescents aged 18 to 29 years, 22% of them reported that they check their smartphones every few minutes which explains the trend of addiction. 47% of the parents surveyed have believed that their children are addicted to their smartphones.^[5]

India is the second-largest for having a high number of smartphone users. In India, call facilities are mostly used compared to SMS. Extensive development and usage of smartphones in everyday life have an impact on communication and interaction between individuals. Internet addiction has been a worldwide problem and is related to stress, sleep problems, and depressive symptoms which are also related to availability demands and being awakened at night for smartphone usage. Among adolescents aged over 18 years, the health problems related to smartphone use are headaches and ear problems.^[7-9]

Latest studies have shown that increased smartphone use might be related to musculoskeletal issues,^[10] increased levels of stress and anxiety,^[11] ear-related problems,^[12] sleep problems, and^[13] depression.^[14] In addition, an increase in the time spent using smartphones is closely associated with the severity of smartphone addiction.^[15] Several studies conducted reported various levels of student nurses' smartphone addiction.^[6,16-20] Additionally, these studies showed that as the rate of smartphones increases, the academic performance decreases in student nurses.^[21] The main reason for using smartphones among most males is gaming whereas females use them for social networking such as Facebook and Twitter.^[22]

Smartphone usage and its associated problems have been increasing day by day due to the increased need felt by adolescents especially the current generation of student nurses face a greater impact of it. There is a paucity of addiction and health-related issue studies among nursing students in available literature in the Indian context. As the adolescent age group is of concern, learning about their pattern of smartphone usage could help to understand the ill impact of it; especially smartphone addiction and associated health

problems so that awareness can be given to combat these problems. The current study aimed to assess the pattern of smartphone usage, smartphone addiction, and associated health problems among nursing students.

Materials and Methods

Study design

A cross sectional survey design was used to collect the data between January and March 2020.

This study was conducted in five different nursing colleges in Udupi District, Karnataka, India.

Study participants and sampling

The five different nursing colleges of Udupi District, Karnataka, India were selected using the convenient sampling technique. To reach the maximum sample size, a convenience sampling technique was used.

In this study, the sample comprised 3rd-year and 4th-year undergraduate nursing students from selected five nursing colleges of Udupi district, Karnataka State, India.

The sample size was calculated using the following formula:

$$n = \frac{Z_{\frac{\alpha}{2}}^2 P(1-P)}{d^2}$$

Where, $Z_{\frac{\alpha}{2}}$ is confidence interval at 95% and is 1.96

P is the prevalence, for the current study prevalence was taken as 63.3%.^[23] d is the absolute error which was 0.06 at a 95% confidence interval.

$$n = \frac{(1.96)^2 0.633(1-0.633)}{0.06^2}$$

$$n = \frac{(3.842) 0.633(0.367)}{0.0036}$$

$$n = \frac{(3.842) 0.2323}{0.0036}$$

$$n = 248$$

Inclusion and exclusion criteria

Inclusion criteria

- The students who have been using smartphones for more than one year.
- The students aged 18 to 24 years studying in the third and fourth year of B.Sc. nursing.
- The students who are willing to participate in the study.

Exclusion criteria

The students with existing psychiatric illnesses and previously diagnosed with health problems similar to

those which would arise due to longstanding usage of smartphones were excluded from the study.

Data collection tool and technique

The outcome of the research investigation was developed with appropriate instruments that ensured trustworthy evidence. Self-reported rating scales are the most effective way to derive information from the research participants. A semi-structured questionnaire was used to assess the pattern of smartphone usage, a standardized Smartphone Addiction Scale^[24] was used to assess smartphone addiction, subjective health problems were assessed using a self-reported subjective health problems questionnaire, and study habits were assessed by a structured study habits scale.

Tool 1: Sociodemographic proforma

Demographic information included age in years, gender, year of study, place of stay, per month income of the family, father's occupation, mother's occupation, and kind of smartphone owned. To assess the per month income of the family, the father's occupation and mother's occupation modified Kuppaswamy socioeconomic scale was used.

Tool 2: Semi-structured questionnaire on the pattern of smartphone usage

A structured tool including 16 items with 4 or 5 responses was used. Scores ranged from 1 to 5 with a varied score for each question.

Tool 3: Smartphone addiction scale

This tool is a standardized tool, used to assess smartphone addiction. The scale is subdivided into a disturbance in daily activities, health problems, negative psychological attitudes, and positive psychological attitudes. Responses ranged from Strongly agree with a score of 6 to Strongly disagree with a score of 1. Smartphone addiction was categorized as being Severely addicted: 133-198, Moderately addicted: 66-132, and Mildly addicted: 1-65.

Tool 4: Self-reported subjective health problems

The health problems were classified under, musculoskeletal problems, sleep disturbance, psychological problems, eye problems, and ear problems. Participants were told to relate their problems occurring during or after the use of a smartphone. Each problem was given one point and the number of problems was identified. Higher scores were associated with a higher level of health problems due to smartphone usage.

Tool 5: Study habits scale

To determine the study habits, a tool of eight statements was used. Each statement had five alternatives and scored accordingly: always (5), very often (4), sometimes (3), rarely (2), and never (1). The study habits were classified

as Poor study habits: score of 27-40, Average study habits: score of 14-26, Good study habits: score of 1-13.

Validity and reliability

To ensure the validity of the tools, sociodemographic proforma, semi-structured questionnaire on the pattern of smartphone usage, smartphone addiction scale, self-reported subjective health problems, and study habits scales were given to seven experts from the Department of Medical-Surgical Nursing, Department of Psychiatric/Mental Health Nursing, Department of Obstetrical and Gynaecological Nursing, Department of Clinical Psychology and Psychosocial work. The tool was administered to 20 third- and fourth-year B.Sc. nursing students to obtain the reliability tool. The reliability of tool 2 Semi-structured questionnaire on the pattern of smartphone usage was checked using the test-retest method the tool was found to be reliable ($r = 0.73$). The reliability of the tool 3 Smartphone addiction scale and tool 5 Study habits scale was established by Cronbach's alpha. The reliability coefficient of tools 3 and 5 was 0.897 and 0.734 respectively. The reliability of tool 4 Self-reported subjective health problems was established using Kuder-Richardson formula 20 and the obtained coefficient was 0.71. Thus, all tools were found to be reliable.

Statistical analysis

The questionnaires were distributed, and the obtained responses were analyzed using SPSS statistical package (16.0 version). The pattern of smartphone usage, smartphone addiction, subjective health problems, and study habits was described using frequency and percentage. Chi-square was used to find the association between sociodemographic variables and smartphone addiction. Frequency and percentage were included in descriptive statistics to present sample characteristics, the pattern of smartphone usage of the participants, the prevalence of smartphone addiction, subjective health problems, and study habits. The association between sociodemographic variables and smartphone addiction was tested using Chi-square.

Permission and ethical clearance

Formal permissions were obtained from the heads of the institutions and ethical permission was obtained (IEC No.: 854/2019). Registered under CTRI (CTRI/2020/01/022848). The participant information sheet was given, the procedure was explained, and informed consent was signed by the participants with an understanding of the purpose of the study by maintaining the confidentiality of the study.

Results

Distribution of sample characteristics

A total sample of 270 undergraduate nursing students was surveyed, of whom the majority of the participants

229 (84.8%) were belonging to the age group of 18-21 years, and females 246 (91.1%) constituted the maximum size of the participants. Most of the participants, 199 (73.7%) were staying in a hostel, and 72 (26.7%) had a family income of less than 13,160 per month. Most of the participants 243 (90.0%) owned 4G phones [Table 1].

The pattern of smartphone usage

The study results showed that the majority 88 (32.60%) of the participants used the smartphone for less than 2 hours at a stretch and in night 155 (57.40%). The majority 248 (91.90%) of the participants used their smartphones at home. WhatsApp 155 (57.40%) was the most preferred app used. The main usage of a smartphone was for

Table 1: Frequency and percentage distribution of sample characteristics

Demographic proforma	Frequency (f)	Percentage
Age group		
18-21 years	229	84.8
22-25 years	41	15.2
Gender		
Male	24	8.9
Female	246	91.1
Year of study		
3 rd -year B.Sc.	125	46.3
4 th -year B.Sc.	145	53.7
Place of stay		
Home	71	26.3
Hostel	199	73.7
Per month income of the family in Rupees		
>52,734	55	20.4
26,355-52,733	39	14.4
19,759-26,354	48	17.8
13,161-19,758	56	20.7
<13,160	72	26.7
Occupation of father		
Professional	24	8.9
Semi-professional	30	11.1
Clerical, shop-owner/farm	81	30.0
Skilled workers	73	27.0
Semi-skilled workers	26	9.6
Unskilled workers	15	5.6
Unemployed	21	7.8
Occupation of mother		
Professional	44	16.3
Semi-professional	15	5.6
Clerical, shop-owner/farm	22	8.1
Skilled workers	46	17.0
Semi-skilled workers	28	10.4
Unskilled workers	12	4.4
Unemployed	103	38.2
Type of smartphone owned		
Have a 4G phone	243	90.0
Have an iPhone	27	10.0

entertainment 213 (78.90%). The majority 198 (73.30%) of the participants kept their phones on a table near the bed while sleeping. The majority 242 (89.60%) of the participants spent 1-2 hours per day talking and 158 (58.50%) received 1-5 calls per day whereas 135 (50.00%) received and replied to 1-10 SMS messages per day. A few of the participants 9 (3.30%) reported that they were awakened at night by smartphone usage. Only a few 7 (2.60%) of the participants reported having craving for smartphone usage. A very small number 10 (3.70%) participants complained that they were very stressed when the smartphone was not available. The reason for over usage of a smartphone was for entertainment 208 (77.00%). The majority 255 (94.40%) of the participants spent Rs. 100/- to 500/- per month toward the expenses of smartphone services and the reason for spending money on the smartphone was calling and messaging 200 (74.10%). Most of the participants preferred individual games 177 (65.60%) [Table 2].

Smartphone addiction

Most of the participants were moderately addicted 196 (72.6%) with a score of 66-132 and 14 (5.2%) were severely addicted to smartphones with a score of 133-198 [Table 3].

Self-reported subjective health problems

The results showed that the majority of the participants reported having headaches 109 (40.2%), followed by straining of the eyes 83 (30.6%). The majority 27% of the participants reported having Eye problems, 26% reported Musculoskeletal problems, 22% Sleep disturbances, 17% Psychological problems, and 8% reported Ear problems [Figure 1: Percentage distribution health problems among nursing students due to smartphone usage].

Distribution of study habits

The results showed that 136 (50.4%) of the participants had average study habits whereas 130 (48.1%) had good study habits [Table 4].

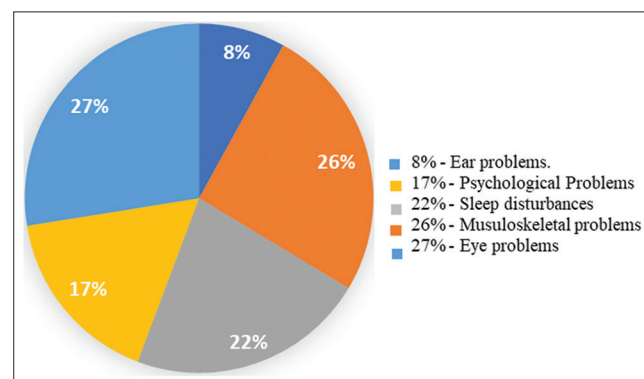


Figure 1: Percentage distribution health problems among nursing students due to smartphone usage. N = 270

Table 2: Frequency and percentage distribution of the pattern of smartphone usage

The pattern of smartphone usage	Frequency (f)	Percentage
The duration of time in hours that you spend on the smartphone per day is		
<2	88	32.6
2-3	57	21.1
3-4	50	18.5
>4	75	27.8
Maximum use per day is in the		
Morning	1	0.4
Afternoon	8	3.0
Evening	106	39.3
Night	155	57.4
Where do you use your smartphone mostly?		
In home	248	91.9
While eating	5	1.9
In public places	17	6.3
Which among the following apps do you use most?		
WhatsApp	155	57.4
Facebook	16	5.9
Instagram	97	35.9
Twitter	2	0.7
The main use of smartphones other than calling and texting is for		
Research and homework	21	7.8
News	14	5.2
Entertainment	213	78.9
Gaming	22	8.1
Where do you keep your smartphone during sleep?		
On a table near the bed	198	73.3
On bed	52	19.3
Under the pillow	20	7.4
Number of hours you spend talking on the phone per day at a time		
1-2	242	89.6
2-3	19	7.0
3-4	7	2.6
>5	2	0.7
The frequency of calls I receive and talk to is		
1 per day	102	37.8
1-5 per day	158	58.5
6-10 per day	7	2.6
>10 per day	3	1.1
The frequency of SMS messages I receive and reply to is		
1 per day	74	27.4
1-10 per day	135	50.0
11-20 per day	24	8.9
>20 per day	37	13.7
Are you awakened at night by smartphone usage?		
Never	140	51.9
Only occasionally	97	35.9
Few times per week	24	8.9
Almost every day	9	3.3
Do you have craving for smartphone usage?		
Never	143	53.0
Now and then but not daily	88	32.6
Daily, but not all-day	32	11.9
Around the clock	7	2.6
Do you feel stressed when the phone is not available?		
Not at all stressful	95	35.2

Contd...

Table 2: Contd...

The pattern of smartphone usage	Frequency (f)	Percentage
A little bit stressful	149	55.2
Rather stressful	16	5.9
Very stressful	10	3.7
I feel the reason for over usage of smartphones is		
Entertainment	208	77.0
Loneliness	35	13.0
Stress	15	5.6
Homesickness	12	4.4
What is the amount that you spend on recharging your smartphone per month?		
100-500 rs.	255	94.4
500-1000 rs.	15	5.6
What is the reason for spending money on a smartphone?		
Calling and messaging	200	74.1
Subscribing videos	32	11.9
Downloading	21	7.8
Gaming	17	6.3
Which type of game do you play?		
Individual play	177	65.6
Group play	54	20.0
Others	39	14.4

Table 3: Frequency and percentage distribution of smartphone addiction

Addiction	Frequency (f)	Percentage
Mild addiction	60	22.2
Moderate addiction	196	72.6
Severe addiction	14	5.2

Table 4: Distribution of study habits of the participants based on the obtained score

Study habits	Frequency (f)	Percentage
Good	130	48.1
Average	136	50.4
Poor	4	1.5

Association between sociodemographic variables and smartphone addiction

The study showed that the sociodemographic variables gender ($p = 0.74$), year of study ($p = 0.10$), place of stay ($p = 0.23$), and smartphone addiction are significantly not associated ($p > 0.05$).

Discussion

Sociodemographic proforma

This study was conducted to assess the pattern of smartphone usage, smartphone addiction, and subjective health problems associated with it. The study findings showed that the majority 229 (84.8%) of the undergraduate nursing students were of the age group 18-21 years, and most of them were females 246 (91.1%). Among them, 125 (46.3%) and 145 (53.7%) were belonging to 3rd-year and 4th-year B.Sc. nursing, respectively. Almost 243 (90.0%) of the participants

owned a 4G phone. The study is supported by similar studies which showed that most of the students were belonging to the age group of 20.89 (SD-3.09) and females constituted a large number of participants. Most of the participants possessed a smartphone.^[25,26]

The pattern of smartphone usage. The study findings showed that 155 (57.40%) of the smartphone usage was during night hours and the smartphone usage was for less than 2 hours at a stretch in a day for most of the participants 88 (32.60%). The main usage of a smartphone was for entertainment 213 (78.90%). Few of the participants 9 (3.30%) reported that they were awake at night using a smartphone, and 10 (3.70%) were very stressful when the smartphone was not available. Similar studies conducted to assess the pattern of smartphone users have shown that many participants used a smartphone for an hour a day, and the purpose for the usage was entertainment, one-third of the participants checked their smartphone in between sleep and a few were very stressed when a smartphone was unavailable.^[27,28]

Smartphone addiction

The majority 196 (72.6%) of the study participants showed a moderate level of addiction and 60 (22.2%) showed mild addiction to smartphone usage. The previous studies conducted to assess smartphone addiction showed that the majority of the participants were slightly addicted to smartphone usage and only a few (17%) were severely addicted to a smartphone or were identified as having smartphone addiction.^[16,17]

Self-reported subjective health problems

The present study reported that the majority 109 (40.2%) of the participants complained of headache, ringing in the ears 10 (3.7%), hearing problems 9 (3.3%), shoulder pain 45 (16.6%), cervical pain 31 (11.4%), painful fingers 29 (10.7%), joint stiffness 16 (5.9%), lack of concentration 47 (17.3%), difficulty sleeping 40 (14.8%) and morning fatigue 40 (14.8%), earache 20 (7.4%), and nocturnal awakening 15 (5.5%). These findings are congruent with previous studies which reported ear pain, followed by tinnitus and headache, hearing impairment, and other symptoms which included lack of concentration, insomnia, anxiety, and body aches. Also, symptoms of vision problems among which evident symptom was straining of the eyes.^[12,29]

Study habits

The present study revealed that half of 136 (50.4%) of the participants had average study habits. Sometimes the difficulty in concentrating during class increased absenteeism, and being late to classes was reported by (38.1%), (11.9%), and (10.7%) of the participants respectively. The present study finding is braced by similar studies which reported that late-night sleep and excessive usage of mobile phones daily are highly associated with poor study habits, poor concentration, increased absenteeism for classes, and being late to classes ($p < 0.001$).^[30]

Association between sociodemographic variables and smartphone addiction

The study showed that the sociodemographic variables gender ($p = 0.74$), year of study ($p = 0.10$), place of stay ($p = 0.23$), and smartphone addiction are significantly not associated ($p > 0.05$). A similar survey conducted showed no association between sociodemographic variables age and smartphone addiction risk group ($\chi^2 = 0.91$), as well as no association between gender and smartphone addiction risk group ($\chi^2 = 0.90$).^[31]

Conclusion

According to the study findings, more than two-thirds of the participants were moderately addicted to smartphones. Many of the participants had reported health problems; mainly headaches, followed by straining of the eye, and even they reported having average study habits. The study concludes that it is very much necessary to identify the pattern of smartphone usage, and addiction risk which in turn could help to prevent consequences of addiction and health problems associated with smartphone usage. This information helps in motivating the educators to focus to promote good practices of smartphone usage and prevent major psychological as well as other health problems associated with smartphone usage.

Declaration of patient's consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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