Original Research Article

Relationship between Smartphone Addiction and Knowledge of Smartphone Addiction among Adolescents: Cross-Sectional Study

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Abstract

Background: The smartphone as a multifunctioning device has become an indispensable resource in everyone's life, especially among adolescents. Owning advanced smartphones and becoming overly reliant on them may result in behavioural addiction. Adolescents may overuse smartphones, sometimes knowingly or unknowingly, but it impacts their physical and mental health.

Objectives To find a relationship between smartphone addiction and knowledge of smartphone addiction among adolescents.

Materials and Methods: A descriptive correlation design where 209 adolescents (105 males and 104 females) were selected using multi-stage random sampling techniques from selected high schools, and the same sampling technique is employed to select the high schools. Personal variables include the general aspects of the adolescents. In order to assess the level of smartphone addiction, SAS-SV was utilized, and the researcher constructed self-administered questionnaires to assess knowledge regarding smartphone addiction.

Results/discussion: The majority (66.99%) of adolescents are at high risk for smart phone addiction, whereas 27.75% of adolescents were found to be addicted to smart phones. The majority (48.8%) of the adolescents possessed above the median level of knowledge of smartphone addiction. The correlation between smartphone addiction and knowledge of smartphone addiction scores of adolescents was found to be a negligible negative correlation ($r = -0.091$, $p > 0.05$), which is not statistically significant.

C**onclusion:** Smartphone addiction emerged as a behavioural addiction of an individual and independent entity, not based on the level of knowledge of smartphone addiction. Smartphone use can be affected by the socio-cultural contexts in which individuals live and the purpose of use their smartphone.

Keywords: Smartphone addiction; Knowledge of smartphone addiction; Adolescents

Introduction

The development of mobile technology has led to the smartphone becoming an essential tool in everyday life in the 20th century.[1] India had the second-most smartphone users, amounting to around 659 million, with China being the first-leading user with around 974 million, and this number continues to rise.[2]

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Owning advanced smartphones and users tending to become overly attached and preoccupied with their devices may lead to overuse of smartphones. Problematic use of smartphone is described as a type of behaviour, characterized by persistent utilization of the mobile phone that produces a variety of physical, social, and psychological harm and that can lead to addiction.[3]

Problematic smartphone overuse is known as 'smartphone addiction', but it has no uniform definition. Smartphone addiction is "an inability to regulate or control its own use of a mobile phone, which subsequently leads to negative effects on daily life.[4]Smartphone addiction is characteristic symptoms of obsessive behaviour, tolerance, withdrawal, and functional impairment in an individual.[5]

A core aspect of problematic use of mobile phones is that their use must cause dysfunction in a person's life.[6] A new public health problem is smartphone addiction. In many nations, the epidemic of smartphone addiction has emerged quickly and expanded from young adults and teens to children, particularly in Asian countries.[7] The prevalence of smartphone addiction among the participants was 33.0%, which was higher. Smartphone addiction was observed to be more prevalent among boys than girls.[8] Addiction to smartphones among adolescents may be accompanied by interpersonal problems, depression, stress, anger, and aggression as psychological impacts. Negative impacts on physical health include headache, earache, neck and back pain, discomfort in and around the shoulder, arms, wrist, and finger, eye strain, dryness of the eyes, loss of appetite, obesity, changes in the sleeping pattern, etc.[9] Smartphone addiction refers to the potential harm brought on by excessive and maladaptive use of smartphones. It is linked with a carving, compulsive desire for mobile use, creating interpersonal conflicts, and an inability to identify their own behaviour as being problematic.[10] For adolescents, a key area of functioning is their academic performance.[6] Several studies reveal that smartphone addiction is regarded as an emotional regulation approach for mood enhancement that requires cognitive effort.[10]

Adolescents involve quick physical growth, psychological development, and cognitive development. This affects their feelings, thinking, decision-making process, and interaction with the world around them. During this phase, adolescents develop behaviour that can protect their health or put it at risk, both now and in the future. In this regard, understanding the level of knowledge on smartphone addiction, which helps the researcher plan the intervention required to combat the problematic overuse of smartphones, is important. Hence, the researcher aims to find the relationship between smartphone addiction and knowledge of smartphone addiction among adolescents.

Materials and Methods

Study Design

This was a descriptive cross-sectional correlation study where adolescents were requested to answer self-administrated questionnaires about smartphone addiction.

Selection of Study Setting and Participants

The study participants were adolescents studying in high school either in the 8th or 9th standard, and their age group was between 13 to 16 years. In this study, a total of 209 adolescents were enrolled from selected high schools in Bangalore, Karnataka (India). These high schools were selected by using multistage random techniques (probability) in the study. In Stage I, stratified random sampling techniques were used in the selection of high schools. Administratively decentralized, the high schools in Bangalore district (urban) have a total of two zones, North and South, and each zone is divided into four blocks under the administrative control of BEOs (Block Education officers), like North: 1, 2, 3, and 4, and similarly South: 1, 2, 3, and 4. By using the lottery method, blocks N-1 and N-2 from the north zones and blocks S-1 and S-3 from the south zones were selected for study. From the selected blocks, one high school was selected using a computer-generated random table. Data collection was carried out between August 2022 to September 2022.

Ethical Considerations

Formal permission was obtained from the high school authority, and the Institutional Ethical Board approved conduct in accordance with the declaration of the research ethics committee (MECT/IEC/06/2019, dated 11/10/2019). Before

the collection of data, the informed written consent of the parent and assent of the adolescents were obtained.

Instruments

The self-administrated questionnaires used in this study consisted of three sections.

Socio-demographic Variables of the Adolescents

The socio-demographic variables were developed by the researcher, viz., age, gender, ownership of the school, class in which the adolescent is studying, religion, type of family, family income, parent's education and occupation, number of siblings, type of ownership of the phone. The duration of time to complete these data was approx. 8–10 minutes.

Smartphone Addiction Scale – Short Version (SAS-SV)

The Smartphone Addiction Scale-Short Version (SAS-SV) is a validated subjective tool (English version), developed by **Min Kwon**, to identify the level of smartphone addiction and to distinguish the 'high-risk for smartphone addiction' group from 'addiction' group. This tool includes 10 statements on smartphone usage on a 6-point Likert scale, with a score range from minimum 1 (strongly disagree) to maximum 6 (strongly agree). It categorizes the different ranges of scores for males and females, we can call "addicted" if the score was higher than 31in males and if the score more than 33 in females, and if the score was between 22 to 31 and 22 to 33 is referred "high risk for smartphone addiction" among male and female respectively,[11] score less than 22 is referred to as "No addiction" in both genders. The required time to complete was approx. 8–10 minutes. Cronbach's alpha correlation coefficient of 0.91 was obtained for the SAS-SV.[12]

Knowledge of Smartphone Addiction Questionnaires

The researcher developed the self-administered questionnaires on knowledge of smartphone addiction. It has a total of 26 questions, with four alternative options for each question, one of which is the correct answer. Each correct answer is awarded a score of '1', whereas a wrong answer is awarded a score of '0'. (Refer Table 5) Students needed around 30-35 minutes to answer 26 questions. This instrument was validated by 13 experts in the fields of child health nursing, pediatrics, and psychology. Cronbach's alpha correlation coefficient of **0.73** was obtained for knowledge questionnaires.

Data Collection Procedure

Prior permissions were obtained from selected high schools, the adolescents were identified using a multistage random sampling technique from selected high schools in Bangalore (an urban district) who fulfilled the inclusion criteria. Consent from the parent or legal guardian and assent from the participant were obtained. The participants were distributed the self-administered questionnaires (English version) on socio-demographic data, the SAS-SV and the Knowledge of Smartphone Addiction questionnaires. Total duration to answer these questionnaires, which lasted approximately 50–55 minutes.

Data Analysis

The data entry and coding were carried out using Microsoft Excel and transferred to SPSS software version 18. For categorical variables, descriptive univariant statistics such as frequencies, percentage, mean, and standard deviation were used. The correlation between smartphone addiction and knowledge of smartphone addiction was assessed using Karl Pearson's correlations. The chi-square test was used to find the association between socio-demographic characteristics and smartphone addiction and knowledge of smartphone addiction.

Results

Sample Characteristics

A total of 209 adolescents were screened for smartphone addiction. The distribution of the socio-demographic characteristics of adolescents is described in Table 1.

Table 1. Distribution of the Socio-demographic variables characteristics of the adolescents N=209

Socio-demographic characteristics		Frequency	%
Age (in years)	13-14	130	62.20
	15-16	79	37.80
Gender	Male	105	50.20
	Female	104	49.80
Type of School	Government	92	44.00
	Private	117	56.00
Class/Standard	8th Std	90	43.10
	9th Std	119	56.90
Type of Family	Joint	72	34.40
	Nuclear	121	57.90
	Single parent	16	7.70
Religion	Hindu	171	81.80
	Muslim	26	12.40
	Christian	7	3.30
	Any other	5	2.40
Monthly Family Income (INR)	Less than Rs. 20,000	120	57.40
	Rs. 20001-40,000	64	30.60
	Rs. 40,001-60,000	13	6.20
	More than Rs. 60,000	12	5.70
Father's Education	Not literate	20	9.60
	Primary school	60	28.70
	High school	79	37.80
	Pre-university College	30	14.40
	Degree	18	8.60
	Above degree	2	1.00
Mother's Education	Not literate	20	9.60
	Primary school	48	23.00
	High school	89	42.60
	Pre-university College	31	14.80
	Degree	18	8.60
	Above degree	3	1.40
Parent Occupation	Only Father is working	86	41.10
	Only Mothe is working	39	18.70
	Both father & mother working	78	37.30
	None of them working	6	2.90
No. of sibling	No sibling	30	14.40
	One	118	56.50
	Two	44	21.10
	Three & more	17	8.10
Ownership of mobile	Own mobile	57	27.30
	Using parent's mobile	150	71.80
	other	2	1.00

Assessment of Smartphone addiction among the adolescents

Findings show that the majority of 66.99% (140) of adolescents were found to be "high risk for smart phone addiction", followed by 27.75% (58) and 5.26% (11) of adolescents who were found to be "addicted to smart phone", and "not addicted to smart phone" usage, respectively. Among adolescents at 'high risk for smart phone addiction, 39.2% (82) were females and 27.8% (58) were males. Similarly, among adolescents with smartphone addiction, 41 (19.6%) were males and 17 (8.1%) were females. (Table 2)

Table 2: Levels of Smartphone addiction among the adolescents

Level of Smartphone Addiction	Male		Female		Total	
	Number	%	Number	%	Number	%
No Smartphone Addiction	6	2.9	5	2.4	11	5.26
High risk for Smartphone Addiction	58	27.8	82	39.2	140	66.99
Smartphone Addiction	41	19.6	17	8.1	58	27.75
G. Total	105		104		209	100%

Mean and Standard deviation of overall knowledge score of smartphone addiction questionnaires among adolescents

Findings show that out of 26 knowledge questionnaires (maximum score: 26), the obtained mean and median values were 11.57 and 11, respectively. (Table 3)

Table 3: Mean and Standard deviation of overall knowledge score of smartphone addiction questionnaires among adolescents

Knowledge questionnaires	Total No. of items	Min. Scored	Max. Scored	Range	Mean	Median	Mode	SD
	26	3	20	17	11.57	11	11	3.77

Assessment of knowledge regarding smartphone addiction among adolescents

Findings show that the majority, 48.8% (102) of the adolescents, were 'above the median level of knowledge on smartphone addiction', followed by 40.2% (84) and 11.0% (23) who were 'below the median' and 'median' levels of knowledge, respectively. (Table 4)

Table 4: Classification of adolescents on their level of knowledge regarding smartphone addiction

N=209

SL. No	Level of Knowledge	No. of respondent	% of respondent
1	Below Median	84	40.2
2	Median	23	11.0
3	Above Median	102	48.8
G. Total		209	100%

Assessment of adolescents to Knowledge of smartphone addiction questionnaires on area wise

Findings reveal that the overall knowledge score on smartphone addiction questionnaires was 44.6%, out of which the majority (51.66%) of correct responses were found on control and preventive measures of smartphone addiction and the least (34.21%) of correct responses were found on the impact of smartphone addiction on physical health questionnaires. (Table 5)

Table 5: Area wise responses of adolescents to Knowledge questionnaires on Smartphone addiction

Sl. No	Area	No. of items	% of correct response
1	General aspects of smartphone addiction	6	46.33
2	Impact of smartphone addiction on physical health	6	34.21
3	Impact of smartphone addiction on psychological health	5	42.3
4	Control/preventive measures of smartphone addiction	9	51.66
Grand total		26	44.6

Assessment of relationship between the smartphone addiction and knowledge of smartphone addiction among adolescents

Findings show that Karl Pearson's correlation statistics were computed to find the relationship between smartphone addiction and knowledge of smartphone addiction scores, which was found to be a negligible negative correlation ($r = -0.091$, $p > 0.05$), which is not statistically significant. (Table 6)

Table 6. Correlation between the smartphone addiction and knowledge of smartphone addiction among adolescents. N=58

Variables	Mean	SD	Pearson Correlation (r)
Smartphone Addiction	39.91	5.73	- 0.091*
Knowledge on Smartphone Addiction	11.72	3.69	

Association between smartphone addiction &knowledge of smartphone addiction and their selected Socio-demographic characteristics of adolescents

Findings revealed the association between smartphone addiction and socio-demographic characteristics of adolescents, revealing that there was a significant association found among variables such as gender and class/standard at 0.05 significance. (Table 7)

Findings related to the association between knowledge of smartphone addiction and socio-demographic characteristics of adolescents reveal that there is no significant association between them at 0.05 significance. (Table 7)

Table 7. Association between smartphone addiction & knowledge of smartphone addiction and their selected Socio-demographic characteristics of adolescents N=58

Sl. No	Socio-demographic characteristics	Association between smartphone addiction and Socio-demographic variables		Association between Knowledge of smartphone addiction and Socio-demographic variables	
		df	X^2	df	X^2
1	Age (in years)	2	4.88	2	3.87
2	Gender	2	14.13*	2	0.78

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3	Type of school	2	0.66	2	5.00
4	Class/Standard	2	10.44*	2	6.37
5	Type of family	4	3.52	4	2.58
6	Religion	6	10.04	6	4.96
7	Monthly family income (INR)	6	3.19	6	2.17
8	Father's Education	10	11.19	10	9.37
9	Mother's Education	10	16.32	10	5.48
10	Parent occupation	6	3.10	6	7.97
11	Number of siblings	6	11.05	6	6.59
12	Type of ownership of smartphone	4	10.83	4	4.16

X^2 (2df, p<0.05) = 5.991; * - Significant @ 0.05

Discussion

The main objective is to determine the relationship between smartphone addiction and knowledge of smartphone addiction among adolescents. The cross-sectional study included a sample of 209 adolescents selected randomly from selected high schools in Bangalore urban district. Results of the study revealed that the majority (66.99%) of adolescents were found to be "high risk for smart phone addiction", and 27.75% of adolescents were found to be "smartphone addicts," and addiction was higher in males. In a similar study conducted in Delhi, smartphone addiction among the participants was 33.0% (95% CI: 27.2-38.6), and addiction was higher among boys (33.6%) than girls (32.3%) (p = 0.835)[10]. A study conducted in India revealed that 33% of male and 43% of female students were addicted to smartphones. This study result was found to contradict the present study, as female students were found to have greater smartphone addiction than boys.[13]

Study findings revealed that the majority, 48.8% of adolescents, possessed above the median level of knowledge on smartphone addiction. The overall mean knowledge score was 44.6%, out of which 51.66% correct responses were found on "control/ preventive measures of smartphone addiction" questionnaires. As a result of the descriptive survey study conducted in Jaipur to assess the knowledge on ill effects of cell phones among the adolescents and nearly48% had average knowledge, around 46% had poor knowledge, and only 6% had good knowledge regarding the ill effects of cell phones.[14] Another descriptive study to assess the knowledge regarding ill effects of excessive usage of computers and mobile phones on the health of adolescents reveals that 32% adolescents had good knowledge and 6% had excellent knowledge and only 2% had poor knowledge regarding ill-effects of excessive usages of mobile phones and computers.[14]

Finding of the present study revealed that the association between knowledge of smartphone addiction and socio-demographic characteristics of adolescents was found significant among the class/ standard in which they were studying. The study conducted by Pooja Joshi, Hardeep Kaur reveals the association of socio demographic variables with knowledge such as age, sex, education, family income, family type, religion, residence, father occupation, mother occupation was not significant at>0.05.[14]

In the present study the majority (51.66%) of correct responses were found on "control and preventive measures of smartphone addiction" and the least (34.21%) of correct responses were found on the "impact of smartphone addiction on physical health questionnaires". Similarly, study conducted by Bibra, A., & Yadav, Y.C reveals that area-wise mean score percentage on knowledge of adolescents regarding the ill effects of cell phones reveals that the highest mean percentage (55.20%) was found in the area of knowledge regarding "basic concepts of cell phones", and least mean percentage (35.50%) of knowledge score in the area of "effects of cell phones".[15]

Findings of the present study revealed that the relationship between smartphone addiction and knowledge of smartphone addiction scores was

found to have a negligible negative correlation ($r = -0.091$, $p > 0.05$), which is not statistically significant. Findings from this study indicate that the level of smartphone addiction is independent and may not have a relationship with the knowledge an adolescent possesses. Among the knowledge areas studied, the majority (51.66%) of correct answers were found in the area of control and preventive measures for smartphone addiction questionnaires. However, some adolescents are addicted to smartphones despite having better knowledge control and preventive measures for smartphone addiction, which makes it more alarming to contemplate the inclusion of self-control techniques or measures for safe usage of smartphones along with inculcating the knowledge of smartphone addiction. In this respect, the present research has a new and original quality.

Limitations

The expression level of smartphone addiction was obtained from the subjective expression of adolescents to the given statements, which may introduce bias, and the samples were drawn from the heterogeneous groups of high schools, viz., private, aided, local, and Government institutions which were following the state pattern curriculum. Another limitation in this study, the knowledge questionnaires included only four areas on smartphone addiction.

Implication of the study

The results of this study have significant implications for decision-makers in terms of keeping the interest of adolescents' health. though young age groups are very knowledgeable regarding the new advancement and technology of new era but they are not aware about its consequences.

A. Nursing Practice:

i. Assess knowledge of adolescents regarding ill effects of excessive usage of smartphone on the health.

ii. This result of study helps the nurse to enlighten their knowledge on ill effects of excessive usage of smartphone on the health and how to get rid of smartphone addiction.

B. Nursing Education:

i. The instructor may utilize the outcome as an example in the classroom to emphasize the value of health education.

ii. In light of this study, efforts must be made in the nursing education field to include more topics pertaining to the negative effects of advanced technologies, such as the health risks associated with smartphone use in the nursing profession.

C. Nursing Administration:

i. Nursing administrator have more responsibility as supervisor on creating awareness among adolescents regarding ill effects of excessive usage of mobile phones on the health.

ii. Nursing administration can depute nurses/ nursing students for various workshops, conferences and special courses; and in service education programs can be arranged for the nursing staff and students

D. Nursing Research:

i. This study can be effectively utilized by the emerging research for their reference's purposes.

ii. A vital component of nursing is research since it advances the field, creates new standards for practice, and builds a corpus of knowledge.

Recommendations

Intervention studies should be aimed at improving the healthier use of smartphones among adolescents through educational programs and training them to articulate and regulate self-control measures with the help of psychological interventions like mindfulness programs, meditation, pranayama, and yoga therapies to combat the overuse of smartphones.

Conclusion

The study helps to find a relationship between smartphone addiction and knowledge of smartphone addiction among adolescents. A negligible negative correlation between knowledge and smartphone

addiction, which is not statistically significant, suggests that Smartphone addiction emerged as a behavioral addiction of an individual and independent entity, without regard to their level of knowledge or education on smartphone addiction. Smartphone use can be affected by the socio-cultural contexts in which individuals live. Future research can investigate the effect of various psychological measures to improve the healthier use of smartphones and enhance their self-control abilities to prevent the problematic overuse of smartphone as smartphone addiction among adolescents.

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