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Research Article

Personality Tests, Usage Patterns, Occurrence And Smartphone Addiction Among Students Of Higher Education System In Chengalpattu District Of Tamilnadu State.

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ABSTRACT

Background: Overuse of smartphones by the students of higher education institutes lands them with serious problems such as smartphone addiction, blurred vision, wrist or back pain, neck stiffness and abnormality in sleeping.

Objectives: This study is to demonstrate the effects of excessive smartphone use, addiction among college students and to understand smartphone usage patterns as well as the relationships between these variables and personality traits using an online questionnaire.

Methods: Students(n=365) of both sex studying in various higher education institutions in the local district were approached and explained about the study by the student investigator. Students who volunteered for the study were shared with the study questionnaire designed in google forms and were asked to submit their responses. Three proformas, one for sociodemographic information, second for smartphone addiction scale – short version and another one for Dimensional personality inventory were administered. Tests such as "Descriptive statistics", "Independent T Test" and multiple "Regression Analysis" were done, where the "Statistical Significance" was measured to be at $p < 0.05$.

Result: Excessive usage of smartphone addiction among students was recognized to be 48.28% while the majority risk rate regarding the addiction was high in males (25.84%) compared to the females (22.44%). From the result, it was found that the majority has been utilising smartphones for many years, till morning as some personal smartphone functions has increased their addiction level ($p<0.05$). There are several prominent individual traits, connected to students' smartphone addiction such as "Activity-Passivity", "Enthusiastic-nonenthusiastic", "Assertive-submissive", "Depressive-non-depressive", and "Suspicious-trusting" ($p<0.05$).

Conclusion: Patterns and personality traits found significantly associated with the addiction level also showed some unique patterns. The proposed individual traits such as "Activity- passivity", "Enthusiastic-non enthusiastic", "Assertive-submissive", "Suspicious-trusting", "Depressive- non depressive" and long-term usage of smartphone are the major influensive factors harming health of students.

Keywords: smartphone addiction, personality disorders, pattern of smartphone use.

Introduction

Smartphones are multitasking these days with a variety of applications, and their range of functions widen if they are connected to the internet (1). Apart from the phone call application these days smartphones can connect friends through applications specific for messaging, social networking, Chat services and to search information regarding anything of the user's interest (2). Smartphones have been found to have occupied every single person right from the youth to the elderly. Smartphone usage has been found to be very high 62% in the age group of 25- 34 years (3). Immense usage of smartphones is reported in India, to the tune of 750 million smartphone users which is estimated to rise to the tune of 1 billion by the end of the year 2026 (4).

Overuse of smartphones lands us with serious problems such as smartphone addiction, pain in waist and back, blurry vision, neck stiffness and sleep issues. These can also decline in their academic achievements, social interactions, and at times can even lead to relationship problems. Smartphone use is identified to be problematic when the following things happen in sequence 1) Individuals have been habituated to the long-term usage 2) individuals' behavior reflects their stress and resistance to face reality or experience "Euphoria" 3) individuals show their tolerance power towards the negative health conditions as per their behavior 4) individuals found themselves in critical health conditions when their addictive behavior gets interfered 5) individuals encounters interpersonal challenges when their behavior gets consistent and long-term and 6) individuals feel addictive experience against their will (5).

The four basic elements of smartphone addiction are obsessive behaviors, tolerance, withdrawal, and functional limitations (6). Students attending higher education systems use smartphones for purposes such as exploring applications, face to face instant communication, entertainments like games, and also for web surfing. A substantial correlation between the features of neurotic personality and the depth of smartphone addiction was found in studies on the subject (2). Aggression and compulsion were both found to be effective predictors of smartphone addiction in a study of Korean college students (2). Anxiety, loneliness, and sadness were found to be independent predictors of smartphone addiction in earlier investigations (7).

Studying smartphone use in this segment of the population is crucial given the prevalence of smartphone use among the young adults, who are also the most vulnerable due to the amount of time spent using cellphones and its impact on health.

Objective

For understanding the effects of excessive smartphone usage, addiction among college students and to understand smartphone usage patterns as well as the relationships between these variables and personality traits using an online questionnaire.

Methodology

Institutional human ethics committee clearance was obtained before the start of the study(IEC/918/2023 dated 26.10.2023). Students(n=365) of both sex studying in various higher education institutions in the local district were approached and explained about the study by the student investigator. Their doubts and clarifications were given appropriate explanations and were assured of the confidentiality of the data and also the right to withdraw from the study at any point of time. Students who volunteered for the study were shared with the study questionnaire designed in google forms and were asked to submit their responses. The form had an informed consent section which will deny further use of the study questionnaire if the participant choose "No" option in the informed consent. Out of 365 we had nearly 62 participants not willing to give the consent and were drop outs from our study, to make our final respondents (n=303).

This study is a cross sectional descriptive study conducted between November and December 2023, among the students studying in higher education institutions in Chengalpattu district. Sample size of 365 was calculated based 61.2% prevalence reported in the earlier published literature on smartphone addiction(3).We used snowball technique to get the desired sample size. We have included participants who are voluntary to participate, students studying in any of the higher education institution, age between 18-24 years and with a smartphone use for more than a year. Students of both gender were included and those who use smartphone with Internet access is selected with priority.

Data collection procedures & instruments used

Semi-structured questionnaire in digital form (google forms) were designed with the following sections and were used effectively for data collection via cloud capture. Informed consent documentation was included in the page 01 of the questionnaire such that the participant can quit in the beginning of the research participation itself if in case he/she is not willing further to participate.

a) Socio Demographic proforma

In the beginning part of the questionnaire, data on their age, gender, how often they use their smartphone on a typical day, how long they have been using it for, when they started using it for the first time in the morning, and which smartphone feature is most important to them personally was collected.

b) Smartphone addiction scale - SAS short version

"Scale-short" version of smartphone addiction was defined by promoting ten questions (8) which was used to measure the addiction level of the students' using smartphones. Each of the ten questions of the SAS-SV scale has a "6-point Likert scale" ranging to capture responses from the participants in "Strongly Agree" to "Strongly Disagree" and scores ranging from 1 to 6 points. The addiction cut off score was fixed to be $\geq$ 30 for both the genders(9).

c) Dimensional personality inventory

"Dimensional Personality Inventory" proposed by Mahesh Bhargava which contains 60 items measuring six individual traits such as, "I. Activity-Passivity, II. Enthusiastic-Non-Enthusiastic, III. Assertive-Submissive, IV.

Suspicious-Trusting, V. Depressive – Non depressive, VI. Emotional-Instability – Emotional-Stability"(10).
The said inventory was used to collect data for the personality classification. Each personality trait was assessed using ten items with three possible answers: "Yes," "Undecided," and "No." "Yes" was awarded two points, "Undecided" was considered one, and "No" was given zero. As a result, the range of ratings for the entire inventory will be from a minimum of 0 to a maximum of 120.
All submissions from the research participants were obtained online only and was through google forms application and the quality check of the submitted data was done on a weekly basis and interim analysis was also done. If there were any incomplete forms they were to be rejected. All collected data was pooled and stored with the investigators online account safely and there was no breach of data safety/ or data loss.

Plan of analysis/ statistical tools

Descriptive statistics was used to analyze the data. The frequency and percentage of categorical variables was expressed. To compare the variables between genders, the "Independent T-Test" was utilised. For characterizing the relationship between the SAS-SV score and other factors, "Multiple Regression Analysis" was done. The "P value < 0.05" has been optimized to have statistical significance. Entire statistical analysis was done with software Graph pad prism v 8.0.

Results

Among the 365 students, 303 have completed the surveys. Out of the participants, 125 individuals were male, accounting for 41.25% of the total, while 178 individuals were female, making up 58.75% of the total. The mean age of the respondents was twenty-one with a standard deviation of one and a half years. Out of the respondents, 51.15 percent reported using their smartphones on a regular basis for a duration of one to three years. Approximately 35.97% of the mentioned group utilizes their phones between 11 and 20 times per day, while roughly 41.91% of the same group uses their phones for a duration of three to four hours daily. Furthermore, a significant proportion of students (over 39%) engage with their mobile phones for a duration of 6-30 minutes immediately upon waking up in the morning. During this period, they are either actively using social media platforms (28.05%) or making phone calls (21.4%). Refer to Table 1 for specific information.

Table 1: "Sociodemographic profile of study participants"

Variables		Number (n)	Percent (%)
Age (years)		20 ±1.95	
Gender	Male	125	41.25
	Female	178	58.75
Duration of smartphone use(years)	1-3 years	155	51.15
	4-6	81	26.74
	>6	67	22.11
Time period of utilising smartphones per day	<10 mins	9	2.97
	11-60 mins	13	4.29
	1-2 hrs	97	32.01
	3-4 hrs	127	41.91
	5-6 hrs	32	10.56
	>6hrs	25	8.25
Frequency of smartphone usage by respondents in a single day (times/day)	<5	28	9.24
	6-10	60	19.80
	11-20	109	35.97
	21-50	79	26.07
	51-100	21	6.93
	>100	6	1.98
Time duration of using smartphones in early morning	Interacting through social media platforms Within the initial five minutes	80	26.40
	from the sixth to the thirtieth minute	118	38.94
	from the thirtieth to the sixtieth minute,	77	25.41
	and after sixty minutes	28	9.24
Most personally relevant smartphone function	social networking	85	28.05
	phone calls	65	21.45
	The activity of gaming	10	3.30
	Engaging in text messaging	40	13.20
	E-mailing	2	0.66
	Viewing video content	31	10.23
	Listening to music	48	15.84
	Reading the news	6	1.98
	Others activities	16	5.28

The participants in this study were evaluated using a dimensional personality questionnaire. The majority of individuals were classified as having a high level of impatience (60.07%), an average level of submissiveness (38.94%), an extremely high level of trust (41.58%), an extremely high level of sadness (34.98%), or an extremely high level of emotional stability (35.31%).

Table 2: "Personality traits of study participants on the dimensional personality inventory"

Variables		Number (n)	Percent (%)
Activity/ passivity	High activity	175	57.76
	Average activitypassivity	107	35.31
	High passivity	21	6.93
Enthusiastic/ non-enthusiastic	Highly enthusiastic	48	15.84
	Average enthusiastic /non-enthusiastic	73	24.09
	Highly non enthusiastic	182	60.07
Assertive/ submissive	Highly assertive	114	37.62
	Average assertivesubmissive	118	38.94
	Highly submissive	71	23.43
Suspicious/ trusting	Highly suspicious	91	30.03
	Average suspicioustrusting	86	28.38
	Highly trusting	126	41.58
Depressive/ non-depressive	Highly depressive	106	34.98
	Average depressive/ non-depressive	100	33.00
	Highly non-depressive	97	32.01
Emotional instability / emotional stability	Highly emotionally unstable	105	34.65
	Average emotional instability emotional stability	91	30.03
	Highly emotionally stable	107	35.31

Table 3 presents the statistics, which shows that 48.28% of people are dependent on telephones, with 25.64% of men and 22.44% of women being categorized as high risk.

Table 3: "SASSV scores among the study participants"

"Participants"	"Nonaddicted students"s (score <30)	"Addicted students" (score ≥30)
Males	77 (25.41%)	48(25.84%)
Females	110(36.30%)	68(22.44%)

Table 4 shows a strong correlation between smartphone addiction and the most personalised smartphone function, the timeline for using smartphones at the first time in the morning, and years of smartphone use ($p<0.05$). However, there is no significant correlation with gender, typical daily smartphone use duration, typical daily smartphone use frequency, or time for using smartphone at early morning ($p>0.05$).

Table 4: "Association of smartphone addiction with pattern of use among study participants"

Variables		Normal students (n=187)	Addicted students (n=116)	X_2	Df	P value
Gender	Male	77	48	0.001	1	0.972
	Female	110	68			
Years spent using smartphones	1 - 3	106	49	5.989	2	0.05*
	4 - 6	44	37			
	>6	37	30			
How long a person uses a smartphone in a typical day	<10 mins	5	4	5.736	5	0.332
	11-60 mins	9	4			
	1-2 hrs	52	45			
	3-4 hrs	87	40			
	5-6 hrs	19	13			
	>6 hrs	15	10			
Frequency of smartphone usage each day	<5	19	9	10.59	5	0.060
	6-10	35	25			
	11-20	74	35			
	21-50	44	35			
	51-100	9	12			
	>100	6	0			
Time elapsed till the initial utilization of the smartphone in the morning	Interacting through social media platforms Within the initial five minutes	43	37	15.79	3	0.001*
	from the sixth to the thirtieth minute	83	35			
	from the thirtieth to the sixtieth minute,	38	39			
	and after sixty minutes	23	5			
The most important feature of a smartphone for an individual	social networking	47	38	27.47	8	0.001*
	phone calls	51	14			
	The activity of gaming	6	4			

Variables		Normal students (n=187)	Addicted students (n=116)	X_2	Df	P value
	Engaging in text messaging	14	26			
	E-mailing	0	2			
	Viewing video content	19	12			
	Listening to music	34	14			
	Reading the news	4	2			
	Others activities	12	4			

* statistically significant

There was a strong link between smartphone addiction and the personality traits, which include "Activity-passivity", "Enthusiastic-nonenthusiastic", "Assertive-submissive", "Depressive-nondepressive", and "Suspicious-trusting" ($p<0.05$). Table 5 shows that there was no significant correlation ($p>0.05$) between emotional instability and smartphone addiction.

Table 5: "Personality traits and smartphone addiction in the research population"

Variables		Normal students (n=187)	Addicted students (n=116)	X_2	Df	P value
Activity / passivity	High activity	98	77	6.34	2	0.041*
	Average activity-passivity	76	31			
	High passivity	13	8			
Enthusiastic / non-enthusiastic	Highly enthusiastic	102	80	7.77	2	0.02*
	Average enthusiastic- non enthusiastic	48	25			
	Highly non enthusiastic	37	11			
Assertive / submissive	Highly assertive	62	46	15.94	2	0.001*
	Average assertive- submissive	67	57			
	Highly submissive	58	13			
Suspicious / trusting	Highly suspicious	46	44	6.10	2	0.047*
	Average suspicious -trusting	58	29			
	Highly trusting	83	43			
Depressive / non depressive	Highly depressive	56	50	14.92	2	0.001*
	Average depressive- non depressive	56	44			
	Highly non depressive	75	22			
Emotional instability-emotional stability	Highly emotionally unstable	58	47	3.30	2	0.191
	Average emotional instability - emotional stability	57	34			
	Highly emotionally stable	72	35			

* statistically significant

The multiple regression analysis showed that most personally relevant smartphone function and personality dimensions, such as Enthusiastic / non enthusiastic were predictors of smartphone addiction (Table 6).

Table 6: "If the SAS-SV score is regarded as the dependent variable, then a multiple regression analysis is conducted."

	Estimate	Std error	t value	P value	95% confidence interval for B	
					Lower bound	Upper bound
SASSV score	28.55	8.935	3.196	0.001*	10.97	46.14
Age	-0.275	0.396	0.695	0.487	-1.05	0.50
Gender	0.196	1.613	0.121	0.903	-2.97	3.37
Duration of smart phone use	1.17	1.069	1.094	0.274	-0.93	3.273
Mean daily duration of smartphone usage	-0.402	0.814	0.494	0.621	-2.00	1.2
Smartphone usage frequency	-0.017	0.778	0.022	0.982	-1.55	1.51
Timing for the initial morning use of a smartphone	-0.960	0.833	1.152	0.250	-2.60	0.68
Most personally relevant smartphone function	0.831	0.365	2.276	0.023*	0.11	1.55
Activitypassivity	-1.756	1.058	1.660	0.098	-3.83	0.32
Enthusiasticnon enthusiastic	2.390	1.049	2.278	0.023*	0.32	4.45
Assertivesubmissive	0.829	1.128	0.735	0.462	-1.39	3.04
Suspicioustrusting	-1.207	0.972	1.24	0.215	-3.12	0.70
Depressivenon depressive	0.920	0.954	0.964	0.335	-0.95	2.79
Emotional instabilityemotional stability	0.191	0.874	0.218	0.827	-1.52	1.91

* statistically significant

Discussion

The current study revealed that smartphone addiction is prevalent in 48.28% of individuals, with a larger likelihood of addiction among males (25.84%) compared to females (22.44%). There were no noticeable disparities between the genders among the students who experienced substance addiction. The research compared the rates of smartphone addiction among undergraduate students from Mysore and Assam, two regions in India, and found similar percentages (11,12). Approximately 45.8% and 44.07% of the population relied on their smartphones.

However, there are other few studies that has reported the smartphone addiction levels bit higher than what we are reporting. Smartphone addiction and mental health, as study conducted in Jordan has reported with a prevalence of smartphone addiction among its 2337 university student participants to be of 56.7% (13).Another study as reported in 2022 from Indonesia states the prevalence to be of 52.8% among the medical students (14) and even more alarming prevalence rate of 61.4% of smartphone addiction among the young adults in Bangladesh(15). Above informations on increasing prevalence of smartphone addiction among young adults is alarming with its growing impact on learning process and the mental well-being.

A strong correlation was seen between the duration of smartphone usage, the primary feature valued by individuals, and the time interval before they utilize their phones upon waking up. The statistical analysis revealed a substantial correlation ($p<0.05$) between smartphone usage and dependency among the student group.

Similar smartphone addiction study has shown students using smartphones for social networking, to watch movies and for playing online games. The other users were using smartphone for other activities such as academic literature search, and online songs(16). High prevalence of smartphone use (88.5%) with Internet use was reported in another study wherein they do internet surfing, and social networking(17).In other similar studies it was reported that the smartphone was being used for academic purposes, online shopping and making calls(18). Another study reported the large duration of hours per week spend on smartphones were for academic purposes, followed by use of chat sites and the lowest being spend on social networking site(19). Maximum use of smartphone was reported for communicating with friends and family, followed by searching information in the internet and then its used in majority for the social networking in a study reported from a health University in Jordan(20). In general we find that there is variations in the pattern of usage among the student users from region to region or from domain to domain of the study participants.

The personality dimensions, such as “Activity- passivity”, “Enthusiastic-non enthusiastic”, “Assertive-submissive”, “Suspicious-trusting”, “Depressive- non depressive” were found to be significantly correlated with smartphone addiction($p<0.05$). However, they were highly active, highly enthusiastic, highly assertive, highly trusting and highly non depressive. A strong positive correlation was found between smartphone addiction and type A personalities, which are workaholics, competitive, ambitious, impatient, aggressive, and nervous(21).

Recent research indicate that psychological features, such as a person's level of eagerness or excitement, along with the specific aspects of cellphones that are most important to them, pose a significant risk of addiction. Chen et al. researchers found that those who engaged with gaming, multimedia, and social networking applications on their mobile phones were more likely to develop an addiction to smartphones (22). Several research indicate that an excessive preoccupation with social networking sites and similar mobile applications can lead to an elevation in narcissistic tendencies (23). There is a lack of research directly linking social media addiction to excessive use of these platforms, despite participants reporting that talking with others is the main reason for usage (23).Multiple research have established a correlation between excessive smartphone usage and mental health disorders such as depression and anxiety (24). Research undertaken by other scholars in the same discipline has indicated that around thirty-three percent of medical school students suffer from insomnia (25).The observed inconsistencies may be attributed to variances in the variables and scales specific to the study. Further investigation can eliminate additional specifics of the danger factors and protective variables linked to smartphone addiction.

Conclusion

This study refutes the notion of a greater occurrence of smartphone addiction among students, in contrast to prior research. Significant correlations were found between the level of addiction and certain personality traits and patterns. Personality factors such as levels of activity, enthusiasm, assertiveness, suspiciousness, and despair, as well as the duration of smartphone use, were utilized as indicators for prediction. A recent study revealed an increasing prevalence of smartphone addiction, highlighting the importance of educating administrators, teachers, and lawmakers about strategies to mitigate this issue and promote public awareness in order to safeguard the mental well-being of young individuals.

Conflict of Interest

All authors declare that they have no conflicts of interest.

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Ethical Considerations

Institutional Ethics Committee clearance was obtained well before the initiation of the study and a written informed consent form (within google forms) was obtained. Confidentiality of the data collected was maintained.

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