# An Empirical Study on Social Impact of a Product: Relationship between Smartphone Addiction and Health Problems among College Students

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**Abstract**

Purpose – Smartphone is a device which has become life necessity of the people in this modern time. Students are also using this device due to its numerous functional uses. This device is becoming a drug to users as they are using it for unlimited time. Health problems are arising because of its consistent use. The main purpose to conduct this study was to obtain the relationship between smartphone addiction and health problems among college students.

Design/Methodology/Approach – Descriptive research methodology was used in the study. A survey was conducted among two hundred college students in Delhi/NCR to describe and identify the relationship between Smartphone Addiction and Health Problems.

Findings – It was found after analyzing the data that Behavioral Addiction and Informative use of smartphone are the main factor behind addiction and this addiction leads to physical health problems among students. On the other side, it was concluded that Smartphone Addiction and Health Problems are sharing a high degree of correlation among college students. It was suggested that government and educational institutions need to aware the users to limit the use of device to overcome the health problems.

**Key Words:** Smartphone Addiction, Health Problems, Behavioral Addiction.

## Introduction

Smartphone is a portable/handheld device which inculcates operating system like personal computer. It includes many other functions such as internet, calls, messaging and bluetooth etc.

Every form of addiction is bad, whether the Narcotic, Alcohol or Smartphone. Smartphone Addiction refers to a syndrome called dependency which is found in many users of this device. This addiction leads to numerous problematic effects on users specifically mental health problems. Excessive use of Smartphone includes problematic impact such as anxiety, sleep disturbances, dry eye, social isolation and use of it while driving etc. Addiction of Smartphone even also effect relationship in negative manner and drives anxiety in users if they are distant from this device. In previous research studies, Smartphone Addiction is also termed as Internet Addiction. WHO also compared addiction of Smartphone with other dangerous addiction such as

Tobacco, Drugs and Alcohol and concluded that each addiction is dangerous at same level. Furthermore, WHO also agreed that continuous use of mobiles increases negative impact due to radiations in smartphones (Prabhakar & Hari, 2017). In India a new term is identified named Phubbing which means excessive use of smartphone and internet by adolescents.

Various studies were conducted to focus on smartphone addiction. Cha & Seo (2018) organized a study on Korean school students about social networking sites and excessive use of games. The main aim to conduct the study was to identify between Smartphone use pattern between users and non-users and to identify the factors of Smartphone addiction in students. It was found that addictive users and normal users of Smartphone had a significant difference in duration of time to use Smartphone. The main factors to find addiction were to play games and social networking sites. Fernandez et al (2017) also conducted a study on dependency of young adults on mobile phones. The main objective to conduct the study was to look upon the pattern of dependence of young adults on mobile phone in ten European countries. The respondents used mobile phones for excessive time and it was found that they had high dependency on mobile phones in almost all the activities. Goswami & Singh (2016) again added to literature about negative effect of mobile phone addiction among Indian adolescents' students. The motto of conducting this study was to examine the present literature available and to identify the effect of addiction on mobile phone on life of adolescents' users. Numerous adverse effects were identified on physical and mental health. Kwon & Peak (2016) also conducted a study on Depression and Smartphone Addiction in College Students. The primary objective of the study was to investigate the relationship among depression, communication, competencies and Smartphone addiction and also to examine the factors which indicate Smartphone addiction in college students. They conclude that following factors identified for addiction: depression, communication competence, daily usage time of Smartphone us, academic achievements and gender differences. Main factor which was highly related to smartphone addiction was Depression. Sut et al (2016) again investigated a research on relationship among science students about Smartphone Addiction and Health problems. The primary aim behind study was to look up on the impact of Smartphone addiction on educational and social life of health science students. It was found out that respondents of 20 years old or less had higher level of addiction. Deshpande (2015) also conducted a research on Addiction of Mobile Phone and Associated Factors Amongst Youth in India. The primary objective of the study was to identify the adverse

impact of mobile phone on Indian youth. It was found that smartphone addiction creates numerous physiological and physical health problems. Nikhita et al (2015) also stated a research study on Prevalence of Mobile Phone Dependence in Adolescents of Secondary School. The main objective to organize the study was to explore the dependency on mobile phone among secondary school adolescents. It was found that 31.33% students were dependent of mobile phone. It was also stated that dependency on mobile phone leads to numerous health problems. Davey & Davey (2014) again added a review analysis in literature about Smartphone Addiction in Indian Adolescents. The primary objective of study was to examine the Smartphone addiction in adolescents of India causes by overuse and adverse impact on health and studies. Various research papers were analyzed and it was concluded that excessive use of Smartphone by Indian teenagers not only produces adverse impact on studies but also it had adverse impact on physical and mental health among Indian adolescents of India.

## Objectives of the Study

1.To explore and compare the factors indicating Smartphone Addiction among college students.

2.To explore and compare the factors indicating Health Problems regarding excessive use of Smartphone.

3.To compare the relationship between Smartphone Addiction and Health Problems among college students.

## Data Collection and Methodology

The primary was collected from Delhi/NCR (National Capital Region). Descriptive research design was used in this study to examine the factors related to Smartphone addiction and health problems. To complete the objective of this study, a sample of 200 respondents was taken from Delhi/NCR. All the respondents were students and smartphone users. Some of them were under graduate and some were post graduate. Half among the respondents were male and half were female.

## Data Analysis

Cronbach's Alpha test of reliability was used to measure the internal consistency of the scale i.e., in a group of statements, a set of items are highly correlated with each other.

## Table 1: Reliability Statistics

| Particulars | Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | No. of items |
|---|---|---|---|
| Smartphone Addiction | .950 | .950 | 35 |
| Health Problems | .954 | .955 | 15 |

The above table revealed that reliability for both set of statements indicates the higher value than 0.70. It is also concluded that overall Cronbach's alpha is .950 for Smartphone addiction scale and .954 for Health Problems scale, which indicates a high level of internal consistency for the scales with this specific sample.

**Objective 1: To explore and compare the factors indicating Smartphone Addiction among College Students.**

The above objective was achieved with the help of statistical formula of factor analysis. This test was applied to reduce the data regarding Smartphone Addiction so that factors can be divided in groups according to their nature.

H0: There is no significant inter-relationship between variables affecting Smartphone Addiction among college students.

H1: There may be a significant interrelationship between variables affecting Smartphone Addiction among college students.

## Table 2: KMO and Bartlett's Test (Smartphone Addiction among College Students)

| KMO and Bartlett's Test | | Values |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | | .926 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 5018.879 |
| | df | 595 |
| | Sig. | .000 |

The above table revealed that sample adequacy is .926, which lies in excellent category. It is identified that sample adequacy is very high. The Bartlett's test of sphericity measures the null hypothesis by using significance level of 95%. The table explains that p-value is .000◻0.05, so it is concluded that Factor Analysis is valid. The null hypothesis (H0) is rejected due to p ◻ α and alternate hypothesis (H1) is accepted. To identify the appropriateness of the tool, KMO and Bartlett test were used. Approximate value for Chi-square test is 5018.879 with 595 degree of freedom, is significant at 0.05 level of significance. Value for KMO statistics is .926, so it is said that use of factor analysis was a right tool to analyze the data.

Rotated Component Matrix in Factor Analysis reflects the rotated factor loadings, which represents that there is correlation between variables and factors. These rotated components are the final factors which are extracted after reduction of data from factor analysis. These factors are divided into groups and labeled after interpreting the rotated matrix table. The table given below is extracted on the basis of rotated matrix:

**Table 3: Factors Identifying the Smartphone Addiction among College Students**

| No. of Factors | Name of Dimensions | Variables | Factor Loading |
|---|---|---|---|
| 1. | **High Usage Pattern** | As soon as I wake up in the morning I check my Smartphone. | .783 |
| | | I check my Smartphone even when it does not vibrate or ring. | .780 |
| | | I have gone to bed later and slept less because I was using my Smartphone. | .772 |
| | | I have been warned about using my Smartphone too much. | .757 |
| | | Spending a lot of time on a Smartphone has become my habit. | .755 |
| | | I use Smartphone even when it is not supposed to use. (Classroom/ during meeting/ family get together etc.) | .744 |
| | | I try to reduce the time spend on Smartphone but failed. | .721 |
| | | I have hard time doing what I planned (study/tuitions) due to excessive Smartphone use. | .699 |
| | | I have put a limit on my Smartphone use and I couldn't follow on it. | .699 |
| | | I need to use my Smartphone more and more often. | .692 |
| 2. | **Prohibited Use** | I use my Smartphone while crossing the road. | .832 |
| | | I have found myself in risky situations because I have used my Smartphone whilst walking. | .800 |
| | | I use my Smartphone while driving/walking. | .759 |
| | | I feel panic when my Smartphone has gone off even in lecture/meeting/theater. | .754 |
| | | I panic when I cannot use my Smartphone. | .723 |
| | | I get anxious and nervous without a Smartphone. | .711 |
| | | I neglect other activities such as face-to-face interaction, sports etc. | .710 |
| | | I feel tension about messages and calls when my Smartphone got out of range for some time. | .690 |

| | | My college grades dropped due to excessive Smartphone use. | .661 |
|---|---|---|---|
| 3. | **Informative Use** | I use to surfing on Smartphone for my study/other related work. | .830 |
| | | I use my Smartphone for checking information about daily life. | .796 |
| | | I frequently use my Smartphone for dictionary and emails. | .767 |
| | | I would like to grab my Smartphone now to tell others about this survey. | .731 |
| 4. | **Behavioral Addiction** | Using a Smartphone is more enjoyable than spending time with family and friends. | .710 |
| | | When I cannot use Smartphone, I feel like I have lost the entire world. | .739 |
| | | I can use text/call to someone living under the same roof. | .714 |
| | | I cannot live even a single day without my Smartphone. | .688 |
| | | People frequently comment on my excessive usage of Smartphone. | .678 |
| 5. | **Entertainment** | I prefer to listening music on my Smartphone. | .754 |
| | | I prefer to watch serials and movies on my Smartphone rather than television. | .736 |
| | | I would like to spend more time talking on Smartphone, sending sms, using whatsapp and social networking sites. | .726 |
| | | When I feel lonely I use my Smartphone. (for internet surfing, chatting, search engines) | .681 |
| 6. | **Dependency** | Even when I know I should stop, I continue to use my Smartphone. | .813 |
| | | It is hard for me to turn my Smartphone off. | .757 |
| | | If my Smartphone broken for unexpected time and took a longer time to fix, I would feel very bad. | .656 |

The main purpose to analysis of data which is shown in previous table was to identify few factors from the overall statements of scale about Smartphone Addiction. The variables present in this category are independently related to Principle Component Analysis with varimax rotation method. Six factors were extracted amongst thirty five items and values of all the statements are less than one. All the statements are having values greater than 0.6, indicating that the data set is suitable for the analysis.

**Table 4: Descriptive Statistics of Factors Indicating Smartphone Addiction among College Students**

| Sr. No. | Name of Factors | N | Minimum | Maximum | Mean |
|---------|-----------------|-----|---------|---------|--------|
| 1 | High Usage Pattern | 200 | 1.00 | 5.00 | 3.8045 |
| 2 | Prohibited Use | 200 | 1.00 | 5.00 | 2.4348 |
| 3 | Informative Use | 200 | 1.00 | 5.00 | 3.4125 |
| 4 | Behavioral Addiction | 200 | 1.00 | 5.00 | 3.9573 |
| 5 | Entertainment | 200 | 1.00 | 5.00 | 3.2862 |
| 6 | Dependency | 200 | 1.00 | 5.00 | 2.9754 |
| Overall Average of  Mean Value of Factors | | | | | 3.3117 |

The above table revealed that among six dimensions of Smartphone Addiction in college students; the highly contributing factor is Behavioral Addiction followed by High Usage Pattern, Informative Use and Entertainment. It is extracted that users are addicted to smartphone and spent more than average time. They use it every time whether needed or not. Further they use the device for seeking information and also for the entertainment purpose instead of using television and computer. The overall average of these factors states that more than average i.e., 3.3117 level of addiction was found among college students towards this device called Smartphone.

**Objective 2: To explore and compare the factors indicating Health Problems regarding excessive use of Smartphone.**

The above objective was the second objective of the study and it was also achieved with the help of statistical formula of factor analysis. Factor Analysis test was applied to reduce the data regarding Health Problems regarding Smartphone Addiction so that factors can be grouped according to their nature.

H0: There is no significant inter-relationship between variables affecting Health Problems regarding excessive use of Smartphone.

H1: There may be a statistically significant interrelationship between variables affecting Health Problems due to Smartphone Addiction.

**Table 5: KMO and Bartlett's Test (Health  Problems due to Smartphone Addiction)**

| KMO and Bartlett's Test | | Values |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | | .946 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2539.491 |
| | df | 105 |
| | Sig. | .000 |

The above table indicated that sample adequacy is .946, which lies in excellent category. It refers that sample adequacy is very high. The Bartlett's test of sphericity examines the null hypothesis by using significance level of 95%. The table explains that p-value is .000□0.05, so again it is concluded that Factor Analysis is valid. Again, the null hypothesis is rejected due to p □ α and alternate hypothesis is accepted. For identification of appropriateness of the tool, KMO and Bartlett test was used. Approximate value for Chi-square test is calculated and value for the same is 2539.491plus 595 degree of freedom, it is significant at 0.05 level of significance. Value for KMO statistics is .946, so it is concluded that use of factor analysis was a right technique to analyze the data.

Again, Rotated Component Matrix reflects the rotated factor loadings, which exerts that there is correlation between variables and factors. The table below was prepared on the basis of rotated matrix. The overall statements are 15 which are grouped into 2 factors.

**Table 6: Factors Identifying the Health problems**

| No. of Factors | Name of Dimensions | Variables | Factor Loading |
|---|---|---|---|
| 1. | **Physical Health Problems** | I feel dry eye/decreased visual capacity due to use of my Smartphone. | .859 |
| | | I feel sleep disturbance due to late night usage of my Smartphone. | .810 |
| | | I feel pain in neck, wrist or back while using my Smartphone. | .797 |
| | | I feel chronic tiredness due to excessive use of Smartphone. | .785 |
| | | Sometimes I feel hearing problem due to continuous use of earphone for listening music on my Smartphone. | .775 |
| | | I am not able to follow my fitness schedule due to excessive use of my Smartphone. | .768 |
| | | I face the problem of lethargy (lack of energy) due to use of Smartphone. | .722 |
| 2. | **Mental Health Problems** | I get annoyed easily because of excessive use of Smartphone. | .817 |
| | | I feel depressed due to excessive use of Smartphone. | .808 |
| | | I feel stress due to excessive use of my Smartphone. | .783 |
| | | I am used to get angry on small things because of my Smartphone. | .782 |
| | | I have too much aggression because of excessive use of Smartphone. | .779 |
| | | I am used to digital dementia (madness) with my Smartphone. | .763 |
| | | I feel anxiety due to excessive use of Smartphone. | .763 |
| | | I feel social isolation due to excessive use of my Smartphone. | .742 |

The objective to analysis of data which is shown in the above table was to extract factors from the overall statements of scale about Health Problems regarding Smartphone Addiction. The variables in this category are independently related to Principle Component Analysis with varimax rotation method. Two factors were extracted amongst fifteen items and values of all the statements are less than one. Besides this, the table of communalities derived from factor analysis was also examined. These all were greater than 0.6, indicating that the data set is suitable.

### Table 7: Descriptive Statistics of Factors Indicating Health Problems

| Sr. No. | Name of Factor | N | Minimum | Maximum | Mean |
|---|---|---|---|---|---|
| 1 | Mental Health Problems | 384 | 1.00 | 5.00 | 3.6312 |
| 2 | Physical Health Problems | 384 | 1.00 | 5.00 | 3.8635 |
| Overall Mean Value of Factors | | | | | 3.7473 |

The above table revealed that amongst these two dimensions of Health Problems due to Smartphone Addiction in college students; the highly contributing factor is Physical Health Problems such as chronic tiredness, eye problems and sleep disturbances etc. In fact, Mental Health problems such as anxiety, isolation, stress and depression are also high among students. The overall mean of these two factors states that more than average (i.e., 3.7473) level of health problems was found among college students who were using Smartphone.

Objective 3: To compare the relationship between Smartphone Addiction and Health Problems among college students

To achieve this objective, a statistical test named correlation was applied. Data was not normally distributed so instead of Pearson's coefficient of correlation another test named Spearman's Rank Correlation Coefficient was applied. It was applied to find out the relationship between Smartphone Addiction and Health Problems among college students.

H0: There is no statistical significant correlation between Smartphone Addiction and Health Problems among College Students

H1: There is a statistical significant correlation between Smartphone Addiction and Health Problems among College Students.

### Table 8: Spearman's Rank-Order Correlations between Smartphone Addiction and Health Problems among College Students

| Particulars | | | Smartphone Addiction | Health Problems |
|---|---|---|---|---|
| Spearman's rho | Smartphone Addiction | Correlation Coefficient | 1.000 | .752[**] |
| | | Sig. (2-tailed) | . | .000 |
| | | N | 200 | 200 |
| | Health Problems | Correlation Coefficient | .752[**] | 1.000 |
| | | Sig. (2-tailed) | .000 | . |
| | | N | 384 | 384 |

**. Correlation is significant at the 0.01 level (2-tailed).

In the above table, it is indicated that Spearman's correlation coefficient is 0.752. This value of correlation refers to highly positive significant relationship between Smartphone Addiction and Health Problems. It is concluded from the table that Smartphone Addiction and Health Problems among college students are having highly positive significant relationship. It indicates that if Smartphone Addiction increases then Health Problems also increases due to addiction. Therefore, the null hypothesis is rejected and alternate hypothesis is accepted that there is a significant correlation between Smartphone addiction and health problems among college students.

## Conclusion

The main purpose of this research paper was to identify the relationship Smartphone Addiction and Health Problems among college students. A self made questionnaire on the basis of previous studies was prepared for this purpose by dividing into two section; Smartphone Addiction and Health Problems. Various factors were explored and compared indicating Smartphone Addiction and Health Problems. Six variables of Smartphone addiction and two variables of health problems due to Smartphone Addiction were identified. It was found that there is a highly significant positive correlation between addiction and health problems. Among various statements six factors were extracted as the indication of addiction in Smartphone users. Behavioral Addiction was highly dominating factors from the addiction scale. It was suggested in previous studies that addiction level can be reduced if users avoid Smartphone in long run. Smartphone Addiction is compared with drugs addiction. Other important factors responsible for addiction were Informative Use and Entertainment. From the Health Problem scale, two factors were extracted and both were dominating i.e. Physical Problem and Health Problem. It is suggested with reference to previous studies that users must be aware of negative impact on health if excessive use of device. It is also suggested that users should participate in outdoor games as compare to digital games. Experts help should be taken wherever necessary to limit the use of smartphone. It was found that addiction of smartphone and health problems are highly correlated with each other. The problems like sleep deficiency, weak eyesight, dry eye, anxiety and depression are increasing if more time is spent on smartphone. It is suggested on the basis of literature that government, organizations and smartphone making companies should also take proper steps regarding awareness in users for the limited use of device. Universities should have strict rules and policies to ensure the proper, positive and limited use of smartphone for students. More awareness should be created of the application like Offtime, Focus Me, SPACE and AppDetox so that user can limit their time to use Smartphone. This will help in reduction of addiction.

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