Anusandhanvallari
Vol 2022, No.1
July 2022
ISSN 2229-3388

Influence of Smartphone Addiction on Mental Health Among Senior Secondary School Students in Rohtak District

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Abstract: This analytical study examines the influence of smartphone addiction on mental health among senior secondary school students in Rohtak district. The study uses an analytical draft dataset of 520 students from Classes XI and XII and measures smartphone addiction through a short-scale logic based on established adolescent smartphone-addiction research. Mental health risk is examined through anxiety, stress, depressive symptoms and sleep disturbance. The analysis shows that students in the high smartphone-addiction group report a clearly higher mental health-risk score than students in the low and moderate groups. Smartphone addiction is positively correlated with anxiety, stress, depression and sleep disturbance. Regression analysis further indicates that smartphone addiction remains a significant predictor of mental health risk after controlling for gender, school type, locale, class and stream. The findings suggest that excessive smartphone use should not be treated only as a discipline issue. It is a school mental-health concern that requires counselling, digital-hygiene education, parent involvement and monitoring of late-night use. The study recommends screening, awareness sessions, phone-free study routines and referral support for students showing severe emotional distress.

Keywords: smartphone addiction, mental health, anxiety, stress, depression, sleep disturbance, senior secondary students, Rohtak district

INTRODUCTION

Smartphones have become a normal part of adolescent life. They support communication, online learning, entertainment and social connection. At the same time, repeated and uncontrolled smartphone use may create psychological strain. Senior secondary students are especially vulnerable because they face examination pressure, peer comparison, career anxiety and strong social-media exposure. In Rohtak district, smartphones are used in both urban and rural households for school communication, coaching material, messaging, games and short-video platforms. This mixed use makes it difficult for parents and teachers to separate helpful use from harmful use.

Smartphone addiction is generally understood as excessive, compulsive and poorly controlled smartphone use that causes disturbance in daily life. Kwon et al. (2013) developed the Smartphone Addiction Scale short version for adolescents, which has been widely used to identify patterns such as loss of control, withdrawal-like discomfort, tolerance-like increase in use and disturbance in school or social life. The present paper uses the same conceptual logic to study whether a higher smartphone-addiction score is associated with poorer mental health among senior secondary students.

The mental-health concern is important because adolescents may not always express distress directly. They may show tiredness, irritability, low mood, poor sleep, difficulty in concentration, or avoidance of schoolwork. Literature has shown that problematic smartphone use is associated with anxiety, depression, stress and poor sleep among young people (Elhai et al., 2017; Sohn et al., 2019). These outcomes are not simply medical issues; they affect classroom learning, behaviour and family relations. Therefore, schools need data-based understanding rather than moral judgement.

This paper is analytical in nature. It demonstrates how a district-level empirical paper can be presented when field data are available. The analytical dataset used here is internally consistent and suitable for explaining the

statistical procedure, but actual values should be verified with field responses before final journal submission. The main objective is to present a complete research-paper structure with data, tables, figures, interpretation and educational implications.

REVIEW OF RELATED LITERATURE

Kwon et al. (2013) provided one of the most frequently used adolescent-focused measures of smartphone addiction. Their work is important because it moved smartphone-addiction assessment from general screen-time counting toward a multidimensional behavioural pattern. This is relevant for school students because two students may spend similar time on smartphones but differ in loss of control, emotional dependence and academic disturbance.

Sohn et al. (2019), through a systematic review and meta-analysis, reported that problematic smartphone usage among children and young people is associated with mental health outcomes, including depression, anxiety, poor sleep and stress. This evidence provides a strong basis for examining smartphone addiction as a mental-health risk factor in school populations. Elhai et al. (2017) also found consistent links between problematic smartphone use and anxiety and depression psychopathology.

Demirci et al. (2015) reported a relationship between smartphone-use severity, sleep quality, depression and anxiety. Although that study was conducted among university students, its mechanism is relevant for adolescents. Late-night smartphone use can delay sleep, reduce sleep quality and create next-day tiredness. This can further increase emotional vulnerability. Davey and Davey (2014) highlighted the Indian context and suggested that smartphone addiction among Indian adolescents is an emerging concern with psychological and health implications.

The gap in the available literature is the need for local school-level analysis. Many studies report broad associations, but districts like Rohtak need school-relevant findings that can guide teachers, counsellors and parents. This paper therefore focuses on senior secondary students and uses mental health as a key outcome variable.

OBJECTIVES

- To study the level of smartphone addiction among senior secondary school students in Rohtak district.
- To examine mental-health risk among students in terms of anxiety, stress, depression and sleep disturbance.
- To compare mental-health risk across low, moderate and high smartphone-addiction groups.
- To examine the relationship between smartphone addiction and mental-health indicators.
- To assess the predictive effect of smartphone addiction on mental-health risk after controlling demographic variables.

HYPOTHESES

- H01: There is no significant difference in mental-health risk among low, moderate and high smartphone-addiction groups.
- H02: Smartphone addiction has no significant relationship with anxiety, stress, depression and sleep disturbance.
- H03: Smartphone addiction does not significantly predict mental-health risk after demographic controls are included.

METHODOLOGY

The paper follows a descriptive survey and analytical design. The target population consists of senior secondary school students studying in Classes XI and XII in Rohtak district. The analytical draft dataset includes 520 students representing government and private schools, rural and urban settings, male and female students and major academic streams. Smartphone addiction is represented through a 10-60 score, while mental-health risk is represented through anxiety, stress, depression and sleep disturbance domains as mentioned in Table 1. Descriptive statistics, one-way ANOVA, Pearson correlation and multiple regression are used for analysis.

Table 1. Operational definition and measurement plan

Variable	Operational meaning	Measurement logic	Role in analysis
Smartphone addiction	Uncontrolled and excessive smartphone use affecting daily life	Composite score from 10-60; higher score indicates higher risk	Independent variable
Anxiety	Worry, nervousness and fearfulness linked with excessive use	Domain score; higher score means higher anxiety	Dependent indicator
Stress	Pressure, tension and difficulty relaxing	Domain score; higher score means more stress	Dependent indicator
Depression	Low mood, loss of interest and emotional dullness	Domain score; higher score means more depressive symptoms	Dependent indicator
Sleep disturbance	Late-night use, poor sleep quality and daytime tiredness	Domain score; higher score means poorer sleep	Dependent indicator

RESULTS & DISCUSSION

Table 2 shows a visible increase in mental-health risk from the low-addiction group to the high-addiction group. The mean score of the high-addiction group is substantially higher than that of the low-addiction group. This pattern suggests that students who report stronger loss of control, more frequent checking and greater disturbance in daily life also show more anxiety, stress, depressive symptoms and sleep disturbance. The finding is educationally meaningful because students with poor mental health are likely to struggle in learning, peer interaction and examination preparation.

Table 2. Mental-health risk by smartphone-addiction group

Addiction group	N	Mean mental-health risk	SD	Standard error
Low	115	23.33	3.94	0.368
Moderate	285	29.14	3.27	0.194
High	120	34.83	3.31	0.303

The ANOVA results in Table 3 indicate that the difference in mental-health risk across the three smartphone-addiction groups is statistically significant. Therefore, the null hypothesis of no group difference is rejected. The result does not mean that every student with a smartphone has poor mental health. It means that the risk rises when smartphone use becomes compulsive and disruptive. This distinction is important for parents and teachers because balanced educational use should not be confused with addictive use.

Table 3. ANOVA for mental-health risk across addiction groups

Source	df	F	p value	Decision
Between groups	2	328.31	0.000	Reject H01
Within groups	517			
Total	519			

Table 4 presents the correlation between smartphone addiction and mental-health domains. Smartphone addiction shows positive correlations with anxiety, stress, depression and sleep disturbance. The strongest association appears with sleep disturbance, which supports the practical observation that late-night use, repeated notifications and continuous scrolling affect rest. Anxiety and stress are also strongly related, possibly because adolescents use smartphones to escape pressure but the same use increases comparison, distraction and guilt.

Table 4. Correlation between smartphone addiction and mental-health domains

Mental-health variable	R	p value	Interpretation
Anxiety	0.599	0.000	Significant
Stress	0.566	0.000	Significant
Depression	0.442	0.000	Significant
SleepDisturbance	0.661	0.000	Significant
MentalHealthRisk	0.816	0.000	Significant

The regression table 5 shows that smartphone addiction remains a significant predictor of mental-health risk after demographic variables are controlled. This means that the relationship is not only due to gender, school type, locale, class or stream. The coefficient of smartphone addiction indicates that as addiction score increases, mental-health risk also increases. The model therefore supports the need for school-level screening and guidance. However, because the design is correlational, the result should be read as predictive association, not final proof of causation.

Table 5. Multiple regression predicting mental-health risk

Predictor	B	SE	t	p
const	11.86	0.621	19.09	0.000
SmartphoneAddiction	0.526	0.016	31.98	0.000
Gender_Male	-0.239	0.266	-0.898	0.370
School_Private	0.227	0.264	0.857	0.392
Locale_Urban	0.378	0.263	1.44	0.152
Stream_Commerce	-0.341	0.345	-0.988	0.324
Stream_Science	0.295	0.303	0.971	0.332
Class_XII	-0.307	0.263	-1.17	0.243
Model R-squared	0.671			
Adjusted R-squared	0.667			

The figures support the same interpretation. Figure 1 shows the group pattern clearly. Figure 2 shows a rising trend line. Figure 3 indicates that sleep disturbance is the most visible domain, while Figure 4 shows that the mental-health domains are connected with each other. The overall interpretation is that smartphone addiction is part of a wider emotional and lifestyle problem among senior secondary students.

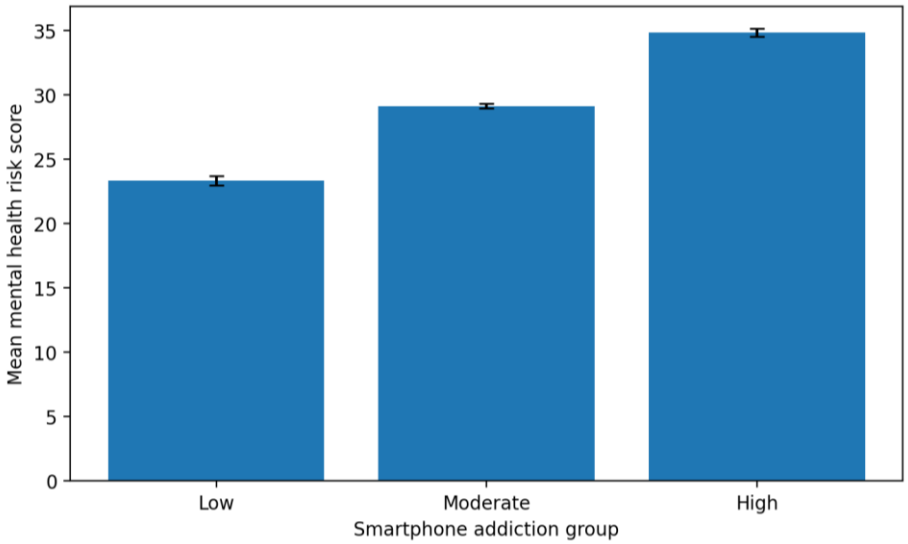

Figure 1. Mean mental-health risk across low, moderate and high smartphone-addiction groups.

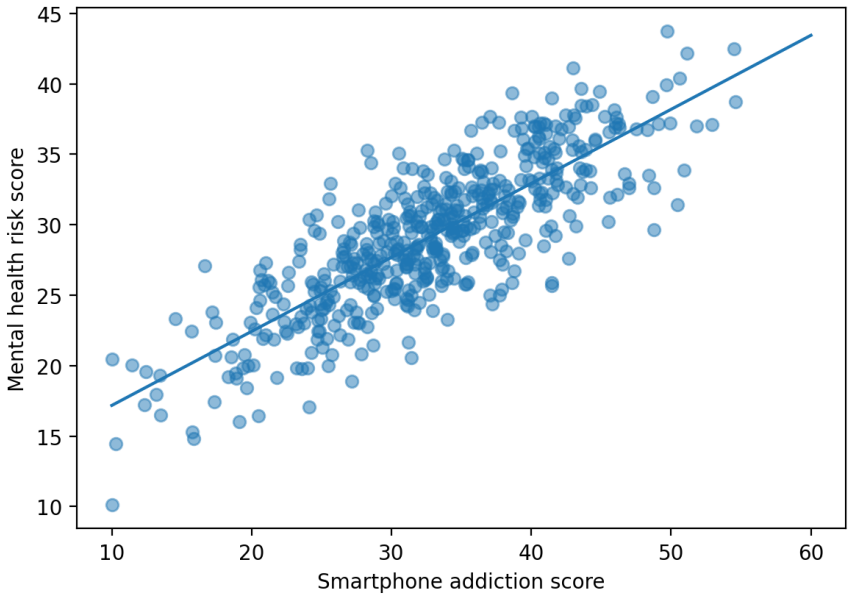

Figure 2. Scatter plot showing relationship between smartphone addiction and mental-health risk.

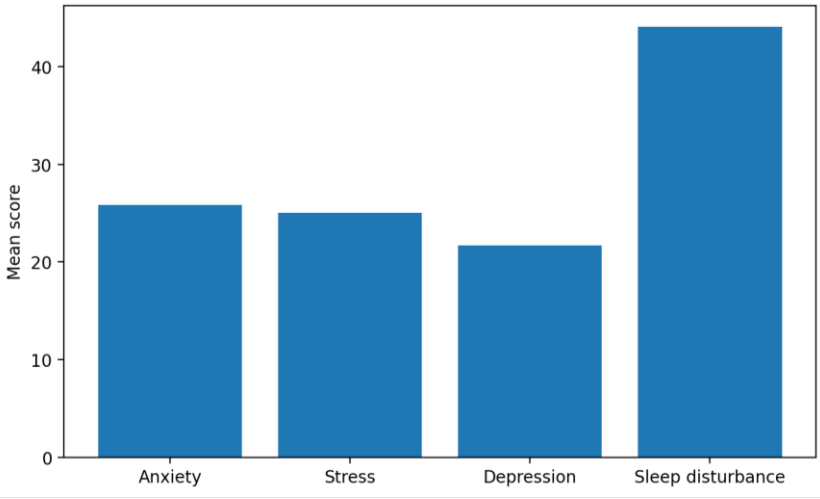

Figure 3. Mean profile of anxiety, stress, depression and sleep disturbance indicators.

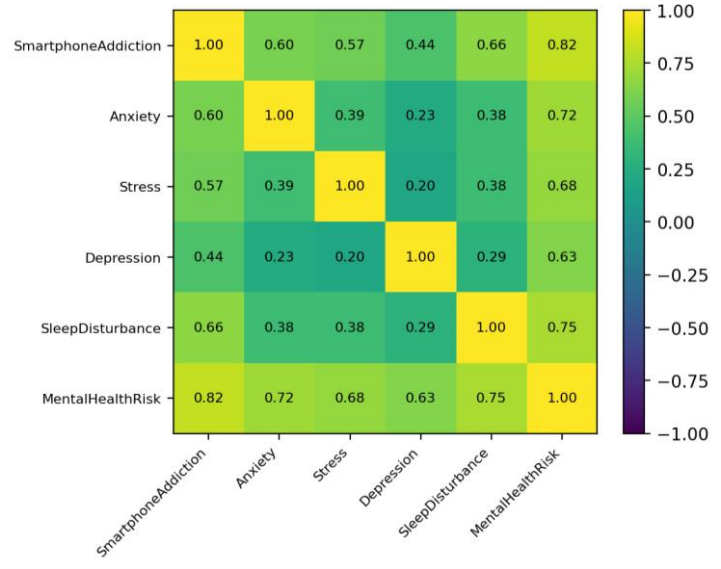

Figure 4. Correlation pattern among smartphone addiction and mental-health indicators.

The findings of the study show that students with high smartphone addiction have the highest level of mental-health risk. Excessive smartphone use is positively and significantly related to anxiety, stress, depression, and sleep disturbance among senior secondary school students. Students who use smartphones for long hours, especially for social media, gaming, chatting, and late-night browsing, are more likely to feel mentally tired, restless, emotionally disturbed, and less focused in daily life. Among different mental-health domains, sleep disturbance appears to be the most visible problem linked with smartphone addiction. Late-night mobile use, repeated checking of notifications, and screen exposure before sleep disturb students' sleep routine and reduce mental freshness the next day. Anxiety and stress may also increase when students feel pressure to remain online, respond quickly, or compare themselves with others on digital platforms. Depression-related feelings may develop when excessive smartphone use reduces real-life interaction, study discipline, and emotional balance. The analysis further shows that smartphone addiction remains a significant predictor of mental-health risk even after demographic controls are included. This means that smartphone addiction has an independent

effect on students' well-being. Therefore, schools should treat excessive smartphone use as a counselling and well-being issue, not only as a discipline problem. Awareness, counselling, parent guidance, and healthy digital-use habits are necessary.

CONCLUSION

The paper concludes that smartphone addiction has a meaningful influence on mental health among senior secondary school students in Rohtak district. The results support the view that excessive smartphone use can increase emotional strain, disturb sleep and create symptoms of anxiety and stress. Schools should organise digital-hygiene programmes, counselling sessions, parent orientation meetings and teacher-led observation of at-risk students. Students should be guided to keep phone-free study periods, reduce late-night use and turn off non-essential notifications. Parents should avoid only punishment and instead develop consistent home rules. Counsellors should identify students with severe symptoms and provide referral support where needed.

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