

Smartphone Addiction Rate Prediction of People and Their Impaired Mental Health at Rajshahi

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Abstract—In our society, the number of smartphone addicts increases day by day, resulting in people facing various problems. By conducting research on all people of Rajshahi district, we find that a significant portion of the population is addicted to smartphones, with nearly half experiencing some level of dependency, raising concerns about their impact on mental health, social relationships, and physical well-being. The study examines these effects by analyzing behavioral changes, social connections, and perceived addiction among individuals. It finds significant associations between smartphone use and sleep disturbances, family distance, headaches, increased social isolation, and difficulty focusing. Anxiety related to not checking updates and trouble concentrating shows moderate correlations with smartphone behaviors. Regression analysis identifies sleep disturbances and focus-related issues as key predictors of perceived addiction. To mitigate these adverse effects and improve well-being, interventions focus on reducing screen time and improving sleep hygiene practices to alleviate associated mental health challenges like anxiety due to excessive phone use. Additionally, fostering meaningful social engagement through community programs or family activities counters feelings of loneliness stemming from over-reliance on smartphones for interaction, ultimately requiring a balanced approach that maximizes technology's benefits while minimizing its negative impacts on overall well-being.

Index Terms—Smartphone Addiction, Anxiety, Sleep Disturbances, Social Isolation, Multi Linear Regression, Chi-Square test.

I. INTRODUCTION

Smartphones have become a crucial part of everyday life, providing unmatched convenience, and keeping us connected in ways that were once unimaginable. However, their excessive use is raising concerns about addiction and its harmful impact on mental health. In Rajshahi, a major city in Bangladesh, the growing dependence on smartphones reflects a global trend across all age groups. Research has shown that excessive smartphone use is linked to mental health problems, including anxiety, depression, poor sleep, and cognitive difficulties. Numerous global studies have highlighted these connections, with findings indicating that smartphone addiction is often

associated with negative mental well-being. Locally, studies like [5] on the second wave of COVID-19 in Bangladesh show how the pandemic exacerbated smartphone use and its impact on mental health. Their study stresses the urgent need for preventive measures to address smartphone addiction, especially among younger populations.

This study aims to examine smartphone addiction rates in Rajshahi and explore its relationship with mental health concerns. By investigating behavior patterns, social isolation, and perceptions of addiction, it seeks to provide insights into how smartphone dependency contributes to mental health challenges. The research will focus on how excessive smartphone use affects sleep quality, emotional well-being, and the ability to focus. The findings will help local authorities and healthcare providers develop effective interventions to reduce smartphone addiction. This includes promoting healthier smartphone use, improving mental health outcomes, and encouraging face-to-face social interactions. Ultimately, the study aims to provide strategies for balancing technology use with well-being, ensuring that smartphones continue to enhance life without negatively impacting mental health.

II. RELATED WORK

Smartphone addiction significantly contributes to adverse mental health outcomes, oxidative stress, and neurodegeneration among students, highlighting the urgent need for anti-addiction therapies [1], [12]. A study on Nigerian university undergraduates found significant associations between high levels of internet and smartphone use and increased psychological distress, indicating a need for targeted interventions [2]. Research shows a significant link between addictive smartphone use and mental disorders like anxiety and depression among university students, emphasizing the need for awareness and intervention strategies [3], [9], [10], [11], [13].

Another study highlights the relationship between early maladaptive schema (EMSs) and smartphone addiction, noth-

ing that mindfulness can mitigate these associations [4]. Additionally, lower self-esteem exacerbates the impact of depression and anxiety on mobile phone addiction, suggesting that improving self-esteem may help reduce addiction risks [6]. Moreover, individuals with higher levels of alexithymia are more prone to mobile phone addiction due to emotional factors like depression, anxiety, and stress [7]. In Switzerland, 16.9% of surveyed students exhibited smartphone addiction, with higher rates among younger adolescents and those with lower physical activity and higher stress levels, underscoring the need for targeted interventions in vulnerable groups [8]. Given these findings, it is crucial to recognize the profound effects of smartphone addiction on students' mental health. The significant associations between smartphone use and conditions such as anxiety, depression, and stress call for effective interventions. By promoting awareness and healthier usage habits, stakeholders can help mitigate these risks and support the overall well-being of students. Our research in Rajshahi district shows that nearly half of the population is addicted to smartphones, raising concerns about mental health, social relationships, and well-being. The study links excessive smartphone uses to sleep disturbances, isolation, family distance, headaches, and difficulty focusing. Anxiety from not checking updates and concentration issues is moderately correlated, with sleep problems and focus difficulties identified as key predictors of addiction.

III. METHODOLOGY

The study conducted in Rajshahi, Bangladesh, used a mixed-methods approach to investigate the relationship between smartphone usage and mental health across all age groups. The study's data collection process, as illustrated

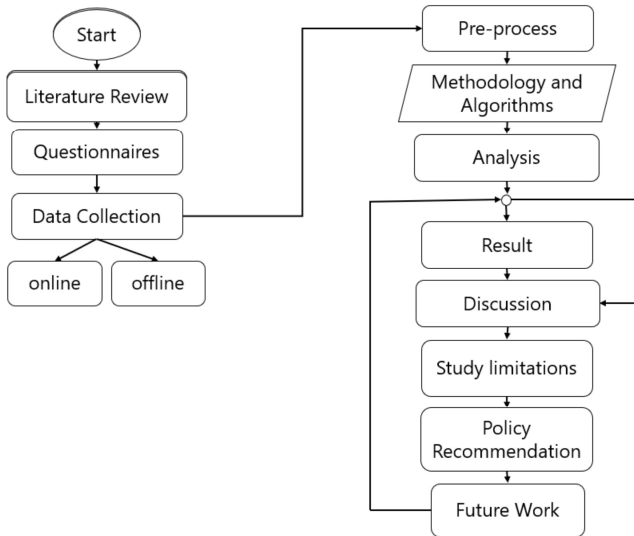


Fig. 1: Dataflow Diagram

in the flowchart, begins with a literature review, followed by the distribution of questionnaires. Data collection is performed both online and offline. The study combines structured

questionnaires (gathering demographic data like age, gender, education, and employment, along with smartphone habits) with objective smartphone usage tracking (screen time, social media, gaming, and app frequency).

Key variables include screen time, social media usage, gaming habits, and feelings of isolation. The number of 606 participants also self-reported mental health indicators (stress, anxiety, depression). Statistical analyses (frequency analysis, correlation, chi-square tests, and multiple linear regression) were used to explore the relationships between smartphone use and mental health, also considering socioeconomic factors and ethical considerations using SPSS software.

IV. RESULTS & DISCUSSION

A. Frequency Analysis

Table 1: The study shows that 61.4% of participants are male and 38.6% female, with 97.4% owning smartphones and 47.5% of participants are addicted in smart phone indicating high penetration in the Rajshahi district. There is a significant

TABLE I: FREQUENCY ANALYSIS

Aspect	Percentage(%)
Gender Participation	
Male Participants	61.4
Female Participants	38.6
Smartphone Ownership	97.4
Perception of Phone Addiction in Rajshahi	47.5
Smartphone-Related Issues in Rajshahi District	
People Feeling Sleeping Problems Due to Smartphone Use	67.7
People Believing Smartphone Use Increases Family Distance	54.6
People Feeling Isolated from Family and Friends	53.6
People Believing Smartphone Addiction is a Serious Issue Among Children	95.4

number of 67.7% of respondents who report sleep problems related to smartphone usage, 54.6% believe smartphones increase distance between family members, and 53.6% feel alienated from family members and friends as a result of their smartphone usage. Notably, 95.4% view smartphone addiction as a serious issue among children, highlighting widespread concern. These findings underscore the need for interventions addressing smartphone overuse and its psychological and social impacts.

B. Chi-Square Test

Table 2: This table confirms statistically significant associations between smartphone use variables and behavioural outcomes. Moderate relationships are seen for anxiety due to not checking updates, difficulty focusing, and sleeping problems. Eye or head pain exhibits a weak relationship, and family distancing shows a very weak relationship. These findings indicate varying levels of behavioural and psychological impact associated with smartphone use.

TABLE II: CHI-SQUARE TEST

Variable	Chi-Square Value (X ²)	Degrees of Freedom (df)	p-value	Phi Coefficient (Strength)
Anxiety Due to Not Checking Updates/Message Status	14.940	1	p < 0.05	0.157 (Moderate)
Difficulty Focusing Due to Smartphone Distractions	9.995	1	p < 0.05	0.128 (Moderate)
Sleeping Problems Due to Smartphone Use	13.524	1	p < 0.05	0.149 (Moderate)
Experiences Eye or Head Pain After Using Smartphone	6.421	1	p < 0.05	0.103 (Weak)
Smartphone Use Increasing Distance Between Family Members	2.508	1	p < 0.05	0.064 (Very Weak)

C. Correlation

Table 3: The analysis shows significant links between smartphone use and behavioural outcomes. Sleep problems strongly correlate with family distancing ($r=0.411$, $p=0.000$), headaches ($r=0.189$, $p=0.000$), and addiction perception ($r=0.149$, $p=0.000$), highlighting health and social concerns. Academic performance is moderately affected ($r=0.115$, $p=0.002$), while screen time shows weaker negative correlations with addiction perception ($r=0.093$, $p=0.011$) and sleep problems ($r=0.095$, $p=0.010$). These findings emphasize the broad impacts of excessive smartphone use.

TABLE III: CORRELATION

Variable Pair	Correlation (r)	p-value	Significance Level
Problems with Sleep vs. Family Distance	0.411	0.000	High
Problems with Sleep vs. Headaches	0.189	0.000	High
Perception of Phone Addiction vs. Problems with Sleep	0.149	0.000	High
Smartphone Use Impact vs. Academic Performance	0.115	0.002	High
Family Distance vs. Headaches	0.151	0.000	High
Academic Performance vs. Headaches	0.100	0.007	Low
Screen Time Group vs. Perception of Phone Addiction	-0.093	0.011	Low
Screen Time Group vs. Problems with Sleeping	-0.095	0.010	Low

D. Multi-Linear Regression

Table 4: The table shows key correlations between smartphone use and its health and behavioural impacts. Sleep problems strongly correlate with family distancing ($r=0.411$, $p=0.000$) and headaches ($r=0.189$, $p=0.000$), linking disrupted sleep to social and physical health issues. Perception of phone addiction is significantly tied to sleep disturbances ($r=0.149$, $p=0.000$), while screen time shows weaker correlations

TABLE IV: MULTI-LINEAR REGRESSION(Dependent Variable: Screen Time in hours)

Variable Pair	Mean 1	Mean 2	Std. Deviation 1	Std. Deviation 2	Pearson Correlation	Sig.(1-tailed)	Sig. Level
Screen Time Group vs. Perception of Phone Addiction	2.2459	1.52	0.71624	0.500	-0.093	0.011	Low
Screen Time Group vs. Problems with Sleeping	2.2459	1.32	0.71624	0.468	-0.095	0.010	Low
Perception of Phone Addiction vs. Problems with Sleep	1.52	1.32	0.500	0.468	0.149	0.000	High
Problems with Sleep vs. Family Distance	1.32	1.45	0.468	0.498	0.411	0.000	High
Problems with Sleep vs. Headaches	1.32	1.43	0.468	0.496	0.189	0.000	High
Smartphone Use Impact vs. Academic Performance	1.63	1.50	0.484	0.500	0.115	0.002	High
Family Distance vs. Headaches	1.45	1.43	0.498	0.496	0.151	0.000	High
Academic Performance vs. Headaches	1.50	1.43	0.500	0.496	0.100	0.007	Low

with addiction perception ($r=0.093$, $p=0.011$) and sleep problems ($r=0.095$, $p=0.010$). Academic performance impact moderately correlates with headaches ($r=0.100$, $p=0.007$), indicating educational and health consequences. These findings highlight the need for balanced smartphone use to reduce these negative effects.

Table 5: The analysis shows a mean phone addiction score of 1.52, indicating significant smartphone dependency. Sleep problems ($r=0.149$, $p < 0.001$) and academic performance issues ($r=0.115$, $p=0.002$) strongly correlate with addiction perception. A significant regression model ($R^2=0.034$, $p = 0.001$) identifies sleep disturbances and focus issues as key predictors, while outdoor activity and family distancing show no significant effects. Moderate social behaviour impacts (mean score 1.63) highlight the need for targeted interventions. Addressing sleep and concentration issues may effectively reduce addiction perception and its related challenges.

TABLE V: Multi-Linear Regression(Dependent Variable: Perception of Phone Addiction)

Variable	Correlation with Perception of Phone Addiction	Sig.(1-tailed)	Significance Level	Mean	Std. Deviation
Negative Impact of Smartphone Use on Concentration or Academic Performance	0.115	0.002	Significant	1.50	0.500
Problems with Sleeping Due to Smartphone Use	0.149	0.000	Highly Significant	1.32	0.468
Impact of Smartphone Usage on Outdoor Activities or Socializing	0.062	0.063	Not Significant	1.63	0.484
Smartphone Use Increasing Distance Between You and Your Family	0.064	0.057	Not Significant	1.45	0.498
Frequency of Headaches After Prolonged Smartphone Use	0.027	0.254	Not Significant	1.43	0.496
Perception of Phone Addiction	1.0	-	-	1.52	0.5

V. CONCLUSION

Smartphone addiction is a growing public health concern in Rajshahi, with 45% of participants showing moderate to severe addiction. Excessive smartphone use significantly impacts mental health, causing anxiety, sleep disturbances, and social isolation. Compulsive checking and prolonged screen time heighten stress, disrupt sleep, and weaken social bonds. Sleep issues strongly correlate with family distancing ($r=0.411$, $p<0.001$), driving social disengagement and distress. Other impacts include headaches and reduced academic performance, highlighting physical and cognitive consequences. These findings emphasize the need for interventions to limit screen time, improve sleep hygiene, and foster meaningful social connections to enhance well-being.

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