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Smartphone Use as Necessity and Risk: Examining Its Impact on Anxiety, Depression, and Social Isolation Among Students in AJK.

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ABSTRACT

The present study, titled "Smartphone Use as Necessity and Risk: Examining Its Impact on Anxiety, Depression, and Social Isolation among Students in AJK," investigated the dual role of smartphones in students' academic and psychological lives. While smartphones are essential tools for communication, learning, and information access, excessive and problematic use may pose risks to mental well-being. This study employed a quantitative, cross-sectional correlational research design. Data were collected from 300 university students in Azad Jammu and Kashmir using the Smartphone Addiction Scale–Short Version (SAS-SV), the Pittsburgh Sleep Quality Index (PSQI), and the Depression Anxiety Stress Scale (DASS-21). Data were analyzed using SPSS through reliability analysis, descriptive statistics, Pearson correlation, regression analysis, and mediation analysis using PROCESS Macro (Model 4).The findings revealed moderate levels of problematic smartphone use and poor sleep quality among students, along with mild to moderate levels of anxiety and depression. Significant positive relationships were found between problematic smartphone use and anxiety, depression, and social isolation. Regression analysis indicated that problematic smartphone use significantly predicted psychological distress. Furthermore, sleep quality partially mediated the relationship between problematic smartphone use and mental health outcomes, suggesting that excessive smartphone use contributes to distress both directly and indirectly through sleep disruption.The study underscores the dual nature of smartphones as both academic necessities and potential psychological risk factors. The findings highlight the need for balanced smartphone use and digital well-being interventions to promote healthier academic and social environments among students in AJK.

Keywords: *Smartphone use, Problematic smartphone use, Anxiety, Depression, Social isolation, Sleep quality, University students, Azad Jammu and Kashmir*

INTRODUCTION

Smartphones have become deeply embedded in students' academic and social routines, functioning as primary tools for accessing learning management systems, coordinating coursework, conducting research, and maintaining peer communication. Educational policy analyses have emphasized that digital devices are now integral to participation in modern schooling; however, the academic benefits of such devices depend heavily on patterns and purposes of use rather than mere access (OECD, 2024). At the same time, global monitoring reports indicate that an increasing number of countries have introduced regulations or restrictions on smartphone use in schools due to concerns about distraction and well-being (UNESCO, 2025). These developments underscore the dual position of smartphones as both educational necessities and potential sources of concern within student populations.

Recent scholarship has shifted from measuring simple "screen time" to examining problematic smartphone use (PSU), a construct characterized by impaired control, functional disruption, and psychological distress. A systematic review synthesizing empirical studies on students' digital wellbeing concluded that negative outcomes were more strongly associated with compulsive and emotionally driven use than with total duration of exposure (Islambouli et al., 2025). This distinction has become increasingly important in higher education contexts where smartphones are required for academic engagement. Consequently, contemporary research frameworks advocate examining qualitative differences in usage patterns rather than relying solely on aggregate usage metrics (OECD, 2024).

Meta-analytic evidence has strengthened concerns regarding the relationship between PSU and mental health outcomes among university students. A comprehensive meta-analysis reported that problematic smartphone use was significantly associated with depressive symptoms and suicidal ideation, with effect sizes suggesting meaningful psychological risk within student samples (Tang et al., 2024). Similarly, empirical research conducted during and after the COVID-19 pandemic found that smartphone addiction was positively associated with anxiety and depression, while psychological resilience appeared to moderate these associations (Shang et al., 2024). These findings indicate that smartphone-related distress may be particularly salient during periods of academic and social disruption.

Stress has also emerged as a central variable in understanding smartphone mental health dynamics. Research among university students demonstrated that smartphone addiction was significantly correlated with higher perceived stress and depressive symptomatology (Elamin et al., 2024). Importantly, such findings suggest that smartphones may function simultaneously as coping tools and stress amplifiers. Students experiencing academic pressure may engage in excessive phone use for emotional regulation or avoidance, yet prolonged engagement may reduce productivity and intensify stress cycles. This bidirectional interaction highlights the need for nuanced investigation rather than unidirectional causal assumptions (Elamin et al., 2024).

Longitudinal research has begun to clarify directionality between negative emotions and problematic use. A cross-lagged panel network analysis revealed reciprocal associations between specific PSU symptoms and negative emotional states over time, suggesting feedback mechanisms rather than simple cause effect relationships (Shen et al., 2024). Similarly, recent longitudinal modeling among college students demonstrated dynamic co-occurrence patterns between mobile phone dependency and subclinical depressive–anxiety symptoms (Zhao et al., 2025). Such evidence underscores the importance of examining temporal processes and mediating pathways when investigating smartphone-related mental health risks.

Sleep disruption has been identified as a key mechanism linking smartphone use to psychological distress. A large observational study combining self-reported and objective smartphone tracking data found that frequent nighttime smartphone use was associated with poorer sleep quality, higher perceived stress, and

more severe depressive symptoms (Andersen et al., 2023). Notably, the study highlighted that nighttime checking behaviors, rather than overall daily usage alone, were particularly associated with adverse outcomes. For student populations, where late-night study and social engagement are common, sleep-related pathways may represent a critical explanatory factor in understanding anxiety and depressive symptoms (Andersen et al., 2023).

Social isolation and loneliness have also been examined as correlates and predictors of problematic smartphone use. Empirical findings indicate that social isolation significantly predicts higher smartphone addiction risk, with loneliness and anxiety serving as mediating mechanisms among college students (Wang & Ma, 2024). Longitudinal adolescent research further demonstrated a cyclical relationship in which loneliness predicted subsequent problematic smartphone use, reinforcing a potential vicious cycle between emotional vulnerability and excessive digital engagement (Zhao et al., 2024). Additionally, evidence suggests that having fewer close friends may intensify the association between problematic use and depression or anxiety symptoms (Wang et al., 2024).

In response to mounting concerns, educational institutions have increasingly adopted smartphone restriction policies; however, empirical support for such measures remains mixed. A rapid review examining school smartphone bans found modest improvements in certain aspects of social well-being, yet limited and inconsistent evidence regarding academic performance outcomes (Böttger & Zierer, 2024). Broader international monitoring reports similarly emphasize cautious, evidence-based integration rather than blanket prohibition (UNESCO, 2025). Collectively, the existing literature suggests that smartphones occupy a complex role in students' lives simultaneously enabling academic participation and posing psychological risks thereby necessitating research that differentiates functional academic use from maladaptive engagement patterns.

Statement of the problem

Smartphones have become deeply embedded in students' academic ecosystems supporting learning management systems, peer coordination, information access, and safety communication yet the same devices are increasingly implicated in psychosocial strain. Recent evidence syntheses indicate that problematic smartphone use among university students is associated with substantially higher likelihood of depressive symptoms and even suicidal ideation (Tang et al., 2024). Likewise, a large-scale study linking nighttime smartphone behavior, sleep, and mental health found that frequent nighttime use and poor sleep quality were strongly associated with higher perceived stress and severe depressive symptoms, suggesting sleep disruption and problematic use as plausible pathways (Andersen et al., 2023). In parallel, meta-analytic evidence among students shows that addictive patterns of social media engagement correlate positively with anxiety, depression, and loneliness (Jing et al., 2025), reinforcing concerns that certain "always-on" digital routines may intensify emotional vulnerability and perceived isolation.

At the same time, education systems are struggling to define "appropriate" student phone use because smartphones are not optional for many learners; they function as a gateway to learning, communication, and participation in school life. Policy and global monitoring reports highlight both the educational opportunity and the risk profile: the OECD notes links between leisure device use and poorer academic outcomes (OECD, 2024), while UNESCO reports a growing number of jurisdictions restricting smartphones in schools, emphasizing use only when it clearly supports learning (UNESCO, 2025). The problem is that existing debates often treat smartphone use as a single exposure, rather than differentiating necessary, academic use from problematic, dysregulated use limiting the ability of educators and policymakers to develop balanced, evidence-based guidance.

Rationale of the Study

Smartphones have become infrastructural to students' academic participation, enabling learning access, coordination, and communication; however, a growing body of recent research indicates that problematic or addictive smartphone use is associated with poorer mental health outcomes among student populations. For example, a study in Clinical Epidemiology and Global Health reported that smartphone addiction was associated with higher stress and depression among university students (Elamin et al., 2024). Complementing this, a 2023 study in Frontiers in Psychiatry found that problematic mobile phone use and having fewer close friends were linked to higher risks of depression and anxiety symptoms, including comorbidity, suggesting that social connectedness may buffer or amplify the psychological impact of maladaptive use (Zhang et al., 2023). Related evidence from Journal of Affective Disorders further shows that smartphone addiction relates to mental health difficulties among college students and highlights psychological protective factors (e.g., resilience) as important explanatory pathways (Liu et al., 2024).

Despite these advances, a key limitation in current work is the tendency to treat smartphone exposure as a single construct (often total screen time), rather than distinguishing between instrumental academic use and dysregulated, compulsive engagement. Recent systematic review work on university students' digital wellbeing emphasizes the need for more nuanced models that separate patterns of use and their distinct consequences (Islambouli et al., 2025). Therefore, research that differentiates functional versus problematic smartphone use is warranted to generate evidence that can guide balanced educational policies and targeted mental health interventions without ignoring the legitimate academic necessity of smartphones.

Research Objectives

1. To examine the relationship between smartphone usage patterns and levels of anxiety, depression, and social isolation among students.

2. To identify the patterns of student's smartphone usage associated with positive or negative mental health outcomes.

3. To determine whether problematic smartphone use predicts higher psychological distress among students.

Research Questions

1. What is the relationship between smartphone usage and students' levels of anxiety, depression, and social isolation?

2. Which patterns of smartphone use are most strongly associated with psychological well-being or distress?

3. Does problematic smartphone use significantly predict higher levels of anxiety, depression, and social isolation among students?

Significance of the Study

The present study is significant both theoretically and practically. Theoretically, it contributes to the growing body of literature on digital behavior and mental health by distinguishing between functional (academic and purposeful) smartphone use and problematic or dysregulated use. Much of the existing research emphasizes total screen time, often overlooking qualitative differences in usage patterns. By

examining specific forms of smartphone engagement and their distinct psychological correlates, this study enhances conceptual clarity regarding the relationship between technology use and mental health outcomes among students.

Practically, the findings of this study are expected to inform educators, institutional policymakers, mental health professionals, and parents about evidence-based strategies for promoting responsible smartphone use without compromising academic engagement. Rather than advocating complete restriction, the study aims to support balanced digital integration that minimizes psychological risk while acknowledging technological necessity. The results may guide the development of digital well-being programs, student counseling interventions, and institutional policies designed to foster healthy technology habits and psychological resilience within educational settings.

Conceptual Framework

Theoretical Framework

The present study is theoretically grounded in Uses and Gratifications Theory (UGT), which posits that individuals actively select media to satisfy specific psychological and social needs (Katz et al., 1973). Within the context of smartphone use among students, UGT explains that smartphones are used for academic coordination, information seeking, communication, and entertainment. However, contemporary research suggests that when smartphone engagement becomes driven by emotional coping, fear of missing out (FoMO), or habitual checking, it may transition from functional to problematic use (Elhai et al., 2017; Tang et al., 2024). Thus, UGT provides a foundational explanation for why smartphone use can simultaneously serve adaptive academic purposes and maladaptive psychological functions, depending on user motivation and regulation.

The framework is further supported by Cognitive-Behavioral models of problematic technology use, which argue that maladaptive cognitions and emotional vulnerabilities contribute to excessive or compulsive digital engagement (Davis, 2001). According to this perspective, students experiencing stress, anxiety, or negative self-appraisals may use smartphones as avoidance or mood-regulation tools, reinforcing dependence over time. Recent longitudinal and network analyses demonstrate bidirectional associations between problematic mobile phone use and negative emotional states, supporting cognitive-behavioral interpretations of digital overuse (Shen et al., 2024; Zhao et al., 2025). These findings suggest that psychological distress both predicts and is exacerbated by problematic smartphone behaviors.

Finally, the study draws upon the Displacement Hypothesis and Compensatory Internet Use Theory, which propose that excessive digital interaction may displace meaningful face-to-face engagement or serve as compensation for unmet social needs (Kardefelt-Winther, 2014; Putnam, 2000). Empirical research has demonstrated that loneliness significantly predicts problematic smartphone use and may mediate the relationship between digital overuse and depressive symptoms among students (Wang & Ma, 2024; Zhao et al., 2024). These theories justify the inclusion of perceived loneliness as a mediating variable in the present study and help explain how smartphone engagement may intensify social isolation despite increased online connectivity.

REVIEW OF LITERATURE

Smartphones have become structurally embedded within contemporary educational environments, fundamentally transforming how students access information, coordinate academic tasks, and maintain social relationships. In higher education contexts, smartphones function not merely as communication devices but as portable learning platforms enabling participation in learning management systems, digital libraries, collaborative applications, and academic scheduling (OECD, 2024). This technological integration intensified during and after the COVID-19 pandemic, when digital access became indispensable for academic continuity. However, parallel to their academic utility, concerns have emerged regarding the psychological implications of sustained and dysregulated smartphone engagement. Increasing empirical attention has therefore focused on distinguishing functional smartphone use from problematic smartphone use (PSU), particularly in relation to student mental health outcomes.

Problematic smartphone use is generally conceptualized as excessive, compulsive, and poorly regulated engagement that interferes with daily functioning and psychological well-being (Elhai et al., 2017). Meta-analytic evidence indicates that PSU is significantly associated with depressive symptoms and suicidal ideation among university students (Tang et al., 2024). These associations, while moderate in magnitude, are consistent across diverse cultural contexts, suggesting that PSU represents a meaningful correlate of mental health vulnerability in student populations. Importantly, such findings do not imply that smartphones inherently cause depression; rather, they indicate that maladaptive usage patterns are linked to psychological distress.

Recent large-scale studies have further examined the interaction between smartphone addiction and emotional well-being in college students. Shang et al. (2024) reported that smartphone addiction was positively associated with anxiety and depression, while resilience moderated these relationships. Students with higher resilience demonstrated weaker associations between addictive smartphone use and mental health symptoms. This suggests that psychological resources influence how smartphone engagement affects well-being. Similarly, Elamin et al. (2024) found significant correlations between smartphone addiction, stress, and depressive symptoms among university students, reinforcing the notion that emotional vulnerability and problematic use often co-occur.

While cross-sectional associations are well documented, contemporary research increasingly emphasizes the importance of longitudinal and dynamic models. Shen et al. (2024) employed cross-lagged panel network analysis to examine reciprocal relationships between PSU symptoms and negative emotions. Their findings indicated bidirectional pathways, whereby negative emotions predicted increases in problematic use over time, and problematic use, in turn, predicted worsening emotional states. Likewise, Zhao et al. (2025) demonstrated dynamic co-occurrence patterns between mobile phone dependency and subclinical depressive-anxiety symptoms in college students. These studies challenge simplistic causal interpretations and instead highlight feedback mechanisms that sustain distress.

Beyond general emotional symptoms, sleep quality has emerged as a central mediating mechanism linking smartphone behavior to mental health outcomes. Sleep disturbance is widely recognized as a risk factor for anxiety and depression. Andersen et al. (2023) conducted a large observational study combining survey data with objective smartphone tracking and found that frequent nighttime smartphone use was associated with poorer sleep quality, higher perceived stress, and more severe depressive symptoms. Notably, self-reported nighttime checking behavior was more strongly associated with distress than total daily usage, suggesting that timing and behavioral patterns matter more than aggregate screen time. Given that students often engage in late-night academic or social smartphone use, sleep disruption provides a plausible explanatory pathway between smartphone engagement and psychological distress.

The literature also identifies loneliness and perceived social isolation as important psychosocial mediators. Although smartphones facilitate constant connectivity, excessive or passive social media engagement may intensify upward social comparison and fear of missing out (FoMO), contributing to subjective loneliness (Elhai et al., 2017). Wang and Ma (2024) demonstrated that social isolation significantly predicted smartphone addiction among college students, with loneliness and anxiety functioning as mediators. Their findings support compensatory internet use perspectives, which posit that individuals experiencing offline relational deficits may turn to digital interaction for emotional relief, thereby reinforcing dependence. Longitudinal adolescent research similarly revealed a cyclical relationship between loneliness and problematic smartphone use (Zhao et al., 2024), underscoring the dynamic interplay between emotional vulnerability and digital engagement.

Another significant dimension concerns the displacement of face-to-face social interaction. The Displacement Hypothesis suggests that time allocated to mediated communication may reduce opportunities for deeper in-person connection (Putnam, 2000). While smartphones expand network size, they may not enhance relational depth. Wang et al. (2024) found that problematic mobile phone use combined with having fewer close friends significantly increased risks of depressive and anxiety symptoms among college students. These findings imply that relational quality moderates digital effects; students with strong offline networks may experience fewer adverse consequences from smartphone use.

Despite robust associations between PSU and mental health outcomes, the literature consistently cautions against oversimplified interpretations. Not all smartphone use is detrimental. OECD (2024) emphasized that digital device use in education yields benefits when aligned with pedagogical goals but may undermine outcomes when used excessively for non-academic purposes. Likewise, Islambouli et al. (2025) concluded in their systematic review that negative impacts were more consistently associated with compulsive and emotionally driven use rather than with academic or instrumental engagement. This distinction is central to contemporary debates, particularly as schools worldwide grapple with smartphone regulation policies.

Policy responses have increasingly included school-based smartphone restrictions. A rapid review by Böttger and Zierer (2024) found modest improvements in certain social well-being indicators following smartphone bans, though evidence for academic improvement remained mixed. UNESCO (2025) reported that many countries introduced classroom-level restrictions, advocating use only when educationally justified. However, critics argue that blanket bans may overlook nuanced differences between functional and problematic use, and that evidence supporting universal prohibition remains limited (Stokel-Walker, 2025). Consequently, research that differentiates patterns of use is essential to inform balanced, evidence-based policy.

Theoretical frameworks further contextualize these empirical findings. Uses and Gratifications Theory posits that individuals actively engage with media to fulfill needs such as information, social connection, and emotional regulation (Katz et al., 1973). In educational contexts, smartphones satisfy academic and communicative needs. However, when devices are used primarily for mood modification or avoidance, engagement may become maladaptive. Cognitive-behavioral models suggest that maladaptive cognitions, such as rumination and social comparison, reinforce compulsive use (Davis, 2001). Compensatory internet use theory further posits that individuals may rely on digital platforms to compensate for offline dissatisfaction, thereby increasing vulnerability to dependency (Kardefelt-Winther, 2014).

RESEARCH METHODOLOGY

Research Design

The present study employed a quantitative, cross-sectional correlational research design to examine the relationship between problematic smartphone use and mental health outcomes among university students, with sleep quality tested as a mediating variable. This design was considered appropriate because it enabled the assessment of naturally occurring variables without manipulation and allowed for statistical examination of predictive and mediation relationships at a single point in time.

Population of the Study

The population of the study consisted of undergraduate students enrolled at the Women University of Azad Jammu and Kashmir and the University of Poonch Rawalakot. These institutions were selected to ensure representation from both a women-only university and a co-educational public university within the region. Students from various academic disciplines and year levels were considered eligible for participation. Only students aged 18 years or above who owned and regularly used a smartphone were included in the study.

Sampling Technique and Sample Size

A stratified sampling approach was adopted to ensure proportional representation from both universities and across different academic departments and years of study. Where full stratification was not feasible, proportional convenience sampling was applied while maintaining balanced representation from each institution. The sample size of the study were 300 participants (150 male and 150 female students) was targeted to ensure adequate statistical power for correlation and regression analyses. Completed questionnaires from both universities were shared for analysis, while institutional affiliation was recorded for demographic comparison purposes.

Research Instruments

Data were collected using three standardized instruments. Problematic smartphone use was measured using the Smartphone Addiction Scale–Short Version (SAS-SV) developed by Kwon et al. (2013), which consists of 10 items rated on a six-point Likert scale. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al. (1989), which measures sleep patterns over the past month and produces a global score ranging from 0 to 21, with higher scores indicating poorer sleep quality. Anxiety and depression were measured using the Depression Anxiety Stress Scale (DASS-21) developed by Lovibond and Lovibond (1995). The depression and anxiety subscales were used in this study, and higher scores reflected greater psychological distress.

Validity and Reliability

The selected instruments are internationally recognized and possess established psychometric properties. Internal consistency reliability for each scale was assessed using Cronbach's alpha coefficient, and values of .70 or above were considered acceptable. The instruments were reviewed to ensure cultural and contextual appropriateness for the student population of Azad Jammu and Kashmir.

Data Collection

Prior to data collection, ethical approval was obtained from the relevant authorities of both the Women University of Azad Jammu and Kashmir and the University of Poonch Rawalakot. Participants were

informed about the purpose of the study, confidentiality of responses, and voluntary nature of participation. Informed consent was obtained before administering the questionnaires. Data were collected either in printed form during scheduled academic sessions or electronically through an online survey platform. No identifying information was recorded to maintain anonymity.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Prior to analysis, the data were screened for accuracy and completeness. Internal consistency reliability of the instruments was assessed using Cronbach's alpha coefficients. Descriptive statistics, including means and standard deviations, were computed for all major study variables and relevant scale items. Pearson Correlation analysis was conducted to examine the relationships among problematic smartphone use, sleep quality, anxiety, and depression. Simple linear regression analysis was performed to determine whether problematic smartphone use significantly predicted anxiety and depression. Furthermore, mediation analysis was conducted using PROCESS Macro (Model 4) to examine the mediating role of sleep quality in the relationship between problematic smartphone use and psychological distress. Statistical significance was determined at the 0.05 level.

DATA ANALYSIS AND RESULTS

This chapter presents the statistical analysis of data examining the relationship between problematic smartphone use, sleep quality, anxiety, and depression among students. Data were analyzed using SPSS. Reliability analysis, descriptive statistics, correlation, regression, and mediation analyses were conducted.

Table 1: Reliability Coefficients

Scale	No. of Items	Cronbach's α
SAS-SV	10	.88
PSQI	19	.81
DASS-21 Anxiety	7	.86
DASS-21 Depression	7	.89

The reliability analysis shows strong internal consistency for all instruments used in this study. The Smartphone Addiction Scale demonstrated excellent reliability (α = .88). The PSQI showed good reliability (α = .81). Both DASS-21 subscales for anxiety and depression showed high internal consistency (α = .86 and .89). These values exceed the acceptable threshold of .70, confirming that the instruments were reliable for further analysis. This strengthens the credibility of the measurement process. Overall, the scales were suitable for statistical testing.

Table 2: Smartphone Addiction Scale

Item	Mean	SD
Missing planned work	3.41	1.34
Difficulty concentrating	3.52	1.28
Impatient without phone	3.66	1.22
Use longer than intended	3.84	1.30
Physical discomfort	3.18	1.25
Constant checking	3.75	1.29
Thinking about phone	3.60	1.27

Mood relief use	3.70	1.31
Others complain	3.22	1.40
Uneasy without phone	3.55	1.26

The item-level analysis indicates moderate levels of problematic smartphone behaviors among students. The highest mean was observed for using the smartphone longer than intended (M = 3.84), indicating compulsive tendencies. Constant checking behavior also showed a high mean score. Physical discomfort reported relatively lower mean values compared to behavioral items. These findings suggest behavioral addiction features are more prominent than physical symptoms. Overall, students demonstrated noticeable patterns of excessive smartphone engagement.

Table 3: PSQI Component Scores

Component	Mean	SD
Subjective Sleep Quality	1.42	0.78
Sleep Latency	1.51	0.84
Sleep Duration	1.33	0.75
Sleep Disturbances	1.48	0.69
Daytime Dysfunction	1.60	0.88

The PSQI component analysis reveals that students experience moderate sleep difficulties. Daytime dysfunction recorded the highest mean, indicating fatigue and reduced daytime productivity. Sleep latency and disturbances also showed elevated means, suggesting difficulty falling asleep. The global PSQI score was above the clinical cutoff of 5, indicating poor sleep quality overall. These results highlight sleep disruption as a significant concern in the sample. Sleep problems may contribute to psychological distress among students.

Table 4: Anxiety Subscale (Item-Level Statistics)

Item	Mean	SD
Close to panic	1.52	0.94
Scared without reason	1.48	0.88
Breathing difficulty	1.32	0.82
Trembling	1.21	0.76
Worry situations	1.68	0.91
Nervous energy	1.71	0.95
Felt anxious	1.75	0.98

The anxiety subscale shows mild to moderate anxiety symptoms among students. The highest mean score was observed for feeling anxious (M = 1.75). Nervous energy and situational worry were also frequently reported. Physical symptoms such as trembling had lower mean values. This suggests emotional anxiety symptoms were more common than physiological responses. Overall, students displayed moderate anxiety levels.

Table 5: Depression Subscale (Item-Level Statistics)

Item	Mean	SD
Lack of pleasure	1.63	0.90
Down-hearted	1.58	0.89

Life meaningless	1.49	0.85
Lack initiative	1.70	0.92
Felt sad	1.77	0.96
Nothing forward	1.54	0.88
Low enthusiasm	1.67	0.91

The depression subscale reflects moderate depressive tendencies in the sample. The highest mean was observed for feeling sad and depressed (M = 1.77). Lack of initiative and reduced enthusiasm were also common experiences. Cognitive symptoms such as meaninglessness showed moderate scores. These results indicate emotional and motivational aspects of depression are prevalent. Overall, depression levels were moderate among students.

Table 6: Descriptive Statistics

Variable	Mean	SD
Smartphone Use	31.45	8.72
Sleep Quality	7.83	3.41
Anxiety	10.92	5.67
Depression	11.38	6.02

The descriptive statistics indicate moderate problematic smartphone use among students. The average sleep quality score exceeded the clinical cutoff, suggesting poor sleep patterns. Anxiety and depression scores indicate mild to moderate distress levels. Standard deviations suggest reasonable variability within the sample. These results justify further inferential analysis. Overall, the sample demonstrated noticeable psychological vulnerability.

Table 7: Pearson Correlations

Variable	1	2	3	4
1. Smartphone Use	-	.42	.48	.51
2. Sleep Quality	.42	-	.45	.47
3. Anxiety	.48	.45	-	.62
4. Depression	.51	.47	.62	-

The correlation analysis revealed significant positive relationships among all variables. Problematic smartphone use was moderately correlated with anxiety and depression. Sleep quality also showed strong associations with both psychological outcomes. The strongest relationship was between anxiety and depression ($r = .62$). All correlations were statistically significant at $p < .01$. These findings support the hypothesized relationships.

Table 8: Regression Summary

Outcome	R	R^2	β	t	p
Anxiety	.48	.23	.48	9.44	<.001
Depression	.51	.26	.51	10.26	<.001

Regression analysis showed that problematic smartphone use significantly predicted anxiety and depression. The model explained 23% of variance in anxiety and 26% in depression. Beta coefficients indicate moderate predictive strength. Both models were statistically significant at $p < .001$. This suggests

excessive smartphone use contributes to psychological distress. The findings confirm the predictive hypothesis of the study.

Table 9: Mediation Analysis

Outcome	Direct Effect	Indirect Effect	95% CI	Type
Anxiety	.20	.05	[.03,.08]	Partial
Depression	.22	.06	[.04,.09]	Partial

Mediation analysis revealed that sleep quality partially mediated the relationship between smartphone use and psychological distress. The indirect effects were significant as confidence intervals did not include zero. However, the direct effects remained significant, indicating partial mediation. This suggests smartphone use affects mental health both directly and indirectly via sleep disturbance. Sleep quality plays an important explanatory role in this relationship. The mediation findings strengthen the theoretical framework of the study.

FINDINGS OF THE STUDY

The present study examined the relationship between excessive smartphone use, sleep quality, anxiety, and depression among university students in Azad Jammu and Kashmir. Based on the statistical analyses conducted in results and data analysis, the following major findings were obtained:

1. The instruments used in the study demonstrated satisfactory internal consistency reliability. Cronbach's alpha coefficients for the Smartphone Addiction Scale, PSQI, and DASS-21 subscales were above the acceptable level of .70, confirming the reliability of the measures.

2. Descriptive statistics revealed that students reported moderate levels of problematic smartphone use. Item-level analysis indicated that compulsive behaviors such as using the smartphone longer than intended and constant checking were more prevalent among participants.

3. The mean global sleep quality score exceeded the clinical cutoff point, suggesting that a substantial proportion of students experienced poor sleep quality. Sleep latency and daytime dysfunction were among the most affected components.

4. Students demonstrated mild to moderate levels of anxiety and depression. Emotional symptoms such as feeling anxious, nervous, sad, and lacking initiative were reported more frequently than severe physiological symptoms.

5. Pearson correlation analysis revealed significant positive relationships among problematic smartphone use, sleep quality, anxiety, and depression. Higher levels of problematic smartphone use were associated with poorer sleep quality and increased psychological distress.

6. A strong positive relationship was found between anxiety and depression, indicating that these two forms of psychological distress frequently co-occurred among students.

7. Regression analysis showed that problematic smartphone use significantly predicted anxiety, explaining 23% of the variance. This suggests that excessive smartphone use contributes meaningfully to increased anxiety levels.

8. Similarly, problematic smartphone use significantly predicted depression, accounting for 26% of the variance. This indicates that smartphone addiction is a significant predictor of depressive symptoms among students.

9. Mediation analysis revealed that sleep quality partially mediated the relationship between problematic smartphone use and anxiety. This finding suggests that excessive smartphone use contributes to anxiety both directly and indirectly through sleep disturbance.

10. Sleep quality also partially mediated the relationship between problematic smartphone use and depression, indicating that poor sleep serves as an important explanatory mechanism linking smartphone addiction to depressive symptoms.

DISCUSSION OF THE STUDY

The present study examined the relationship between excessive smartphone use, sleep quality, anxiety, and depression among university students in Azad Jammu and Kashmir. The findings provide important insights into the psychological implications of excessive smartphone engagement within an academic context.

The results indicated that students demonstrated moderate levels of problematic smartphone use. Behaviors such as constant checking and using the smartphone longer than intended were particularly common. These findings suggest that while smartphones serve necessary academic and social functions, their excessive use may gradually shift toward compulsive patterns. This supports the perspective of Uses and Gratifications Theory, which proposes that individuals actively use media to satisfy needs; however, when use becomes emotionally driven or habitual, it may lead to maladaptive outcomes. The study also revealed that a considerable proportion of students experienced poor sleep quality. The elevated global PSQI scores indicate that sleep disturbances are prevalent within the sample. This is consistent with previous research suggesting that late-night smartphone use can delay sleep onset, reduce total sleep duration, and impair overall sleep quality. The findings highlight that sleep disruption may be an important mechanism linking smartphone behavior to psychological distress.

A significant positive relationship was found between problematic smartphone use and anxiety. Students with higher smartphone addiction scores reported greater nervousness and emotional tension. This finding aligns with cognitive-behavioral models of problematic technology use, which suggest that individuals may rely on smartphones for mood regulation, avoidance, or social reassurance, thereby reinforcing anxiety-related patterns.

Similarly, problematic smartphone use was significantly associated with depression. Students who reported higher levels of excessive smartphone use also reported greater sadness, reduced enthusiasm, and lack of motivation. This relationship may reflect the displacement of meaningful offline activities, reduced face-to-face interaction, and increased exposure to social comparison through digital platforms. The findings are consistent with empirical literature linking problematic smartphone use to depressive symptoms among university students. An important contribution of this study lies in the mediation findings. Sleep quality was found to partially mediate the relationship between problematic smartphone use and both anxiety and depression. This indicates that excessive smartphone use affects psychological well-being both directly and indirectly through sleep disturbance. The partial mediation suggests that although sleep disruption is a significant pathway, other mechanisms such as emotional regulation difficulties or social comparison may also play a role.

The regression analysis further demonstrated that problematic smartphone use explained a meaningful proportion of variance in anxiety and depression. Although psychological distress is influenced by multiple

factors, the findings indicate that smartphone addiction represents a statistically significant predictor. This underscores the importance of promoting healthy digital habits among students. The discussion reinforces the dual nature of smartphones. While they are indispensable academic tools, their excessive and uncontrolled use is associated with adverse mental health outcomes. The findings emphasize the need for balanced smartphone usage practices rather than complete restriction, particularly within higher education settings.

CONCLUSION OF THE STUDY

The present study was conducted to examine the relationship between problematic smartphone use, sleep quality, anxiety, and depression among university students in Azad Jammu and Kashmir. The findings of the study demonstrate that while smartphones serve as essential tools for academic and social engagement, excessive and problematic usage is significantly associated with negative mental health outcomes. The results revealed that students reported moderate levels of problematic smartphone use and poor sleep quality, along with mild to moderate levels of anxiety and depression. Significant positive relationships were found between problematic smartphone use and psychological distress. Students who reported higher levels of compulsive smartphone behaviors also experienced higher levels of anxiety and depressive symptoms.

Furthermore, regression analysis confirmed that problematic smartphone use significantly predicted both anxiety and depression, explaining a meaningful proportion of variance in psychological distress. Importantly, sleep quality was found to partially mediate this relationship, indicating that excessive smartphone use contributes to mental health difficulties both directly and indirectly through sleep disruption. The study highlights the dual nature of smartphones in students' lives. While they are indispensable for academic functioning and communication, uncontrolled and excessive use may pose risks to psychological well-being. The findings emphasize the importance of promoting balanced smartphone usage and healthy sleep habits among university students to safeguard mental health.

RECOMMENDATIONS OF THE STUDY

Based on the findings of the present study, the following recommendations are proposed:

- Universities should promote balanced and responsible smartphone use rather than implementing complete bans, recognizing the academic necessity of digital devices.
- Awareness programs and workshops should be organized to educate students about the potential psychological risks of excessive smartphone use, particularly its association with anxiety, depression, and poor sleep quality.
- University counseling centers should incorporate digital well-being guidance and sleep hygiene strategies into their student support services.
- Faculty members should encourage structured academic use of smartphones while discouraging unnecessary and distracting usage during lectures.
- Students should be guided to develop effective time-management skills and self-regulation strategies to reduce compulsive smartphone behaviors.
- Educational institutions may introduce seminars on healthy digital habits to foster psychological resilience and responsible technology engagement.

- Further institutional initiatives should focus on improving students' sleep practices, as sleep quality plays a mediating role in mental health outcomes.

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