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Effect of Smartphone Addiction on Sleep Quality and Mental Well-Being

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Abstract

This correlational study examines the effect of smartphone addiction on sleep quality and mental well-being on people of Pakistan from different cities. Using probability simple random sampling technique; a sample of 150 participants, we used a research in this study and found that smartphone addiction is positively correlated with sleep quality and negatively correlated with mental well-being. To assess this relationship, we used Smartphone Addiction Scale-Short Version (SAS-SV; Kwon et al., 2013), Pittsburgh Sleep Quality Index (PSQI; Buysee et al, 1989) and Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant et al., 2007). A descriptive study of people from different cities of Pakistan was conducted. It posed inquiries concerning smartphone addiction, the impact on sleep quality, mental health conditions and demographic information. The results including multi linear regression and post hoc analysis show significant relationship among smartphone addiction, sleep quality and mental well-being. Addiction to smartphones has a negative impact on one's health. The findings indicate that there is a growing need to inform people about the negative impacts that smartphones have on our mental and physical well-being.

The study's new findings have significant theoretical and practical ramifications and add to the corpus of empirical research on smartphone addiction.

Key Words: Smartphone Addiction, Sleep Quality, Mental Well-being

Introduction

For what is increasingly being considered as a severe behavioral addiction on smartphones it is not yet recognized as a distinct psychiatric illness, despite being classified as such on major diagnosis manuals. Like other addictions, it is compulsive, preoccupied, has loss of control over use, and persists despite harm to daily functioning. Compulsive smartphone use habits constitute this type of addiction with which someone's performance in areas as social, academic, and alone life are affected; (Müezzin, 2023). Here gains are rising about the frequency of phone addiction, especially among college students and young people. High prevalence rates ranging from 6.2% to 73.0% has been recorded in this category, for instance, a prevalence rate of as high as 37.9% was recorded in Palestinian medical and health sciences students. Findings from this study showed that first year students had higher rates than those at succeeding years, implying that they are more vulnerable during critical conversion periods. However, these groups pose a real and high risk, and it is essential to find these high risk groups for targeted prevention and therapeutic efforts (Sarhan, 2024).

Smartphone use can be harmful in a number of cognitive functions for learning and executing everyday tasks. Neuroimaging studies have suggested that smartphone addicts have abnormal brain activity, in particular in brain areas correlated with the prefrontal cortex involved in attention, cognitive or control, and original ideas. Thus, a reduction of the connection between the prefrontal and temporal regions may be used to explain how people with dysfunctional attention and executive function have difficulties (Liao et al., 2022).It seems that using a smartphone excessively can have a detrimental effect on academic performance. Studies on the effects of academic performance, smartphone addiction and related digital habits such as social media use on students have found a statistically significant, although minor, negative association. This bad effect could be due to insulation that results in additional distractions during the study sessions, little use of time for study, or inability to concentrate with deleterious consequences to mental capacities that facilitate learning and performance (Baazeem et al., 2025).

Method to reduce smartphone addiction has been researched, and proved to be very promising in reduction of dependence and also decline in negative impacts associated with smartphone addiction. There are also many studies that have shown that brief online mindfulness based interventions (MBIs) can significantly reduce the many features of mobile phone addiction among college students. Indeed, there are other approaches that are being studied to increase executive control and decision making around smartphone use, such as cognitive behavioral therapy or even technological tools (for example, exergaming or transcranial direct current stimulation (tDCS) (Fu et al., 2025). Particularly, problematic smartphone use has been specifically found to relate to a number of negative sleep outcomes, such as delay of sleep onset (increased sleep latency), reduced sleep duration, reduced sleep efficiency (percentage of time in bed spent asleep), and increased frequency of nighttime awakenings. According to Chellappa

et al. (2025), scores of people with smartphone addiction are very lower as compared to their peers who are not addicted and during standardized tests such as the Pittsburgh Sleep Quality Index (PSQI), which suggests clinically significant difference in both subjective and objective sleep quality. Such disruptions may add up to chronic sleep deprivation.

The sleep in adolescents and college students is especially vulnerable to being affected by smartphone addiction: a number of variables such as developmental changes in sleep patterns, scholastic stress, growing independence, and a reliance on digital communication for a strong social life. Despite this, research repeatedly shows that compared to older adults, these age groups have higher rates of smartphone addiction and related poor sleep quality such as insomnia symptoms and daytime acts of somnolence, which support a critical window for preventative health suite (Parlak et al., 2024). The problem with most previous research on smartphone addiction and sleep is that it has relied on subjective reports about the amount of hours that people spent with the smartphone and their quality of sleep, both of which can be biased (i.e. by social desirability effects and recall bias). Moreover, the predominance of cross-sectional study designs restricts understanding of the long term temporal interaction between the components or determine the role of temporality between these components to definitive causality (Mehmood et al., 2025). In the future research more objective measures and longitudinal methods will be the only ways of knowing further.

People have started questioning excessive smartphone usage because these devices are present everywhere in present-day society. Kwon et al. developed the 10-item Smartphone Addiction Scale Short Version (SAS-SV) that serves as a commonly recognized instrument to evaluate smartphone addiction among users. The SAS-SV operates as a swift assessment instrument to measure smartphone addiction by using the core elements of its parent tool the 33-item Smartphone Addiction Scale. Studies conducted during 2020 to 2024 continuously validate the SAS-SV as a dependable and valid assessment tool for multiple languages and population segments. The tool serves as an effective instrument which professionals and researchers may use for analyzing and managing problematic smartphone utilization. (Olson et al., 2023)

People commonly use the Pittsburgh Sleep Quality Index (PSQI) as a subjective questionnaire to evaluate their sleep quality. The instrument operates during a monthly period to provide standardized assessments between people with different sleep quality traits. The instrument quantifies sleep latency with subjective sleep quality and habitual sleep efficiency and sleep length as the essential seven parameters for evaluation. The survey also analyzes sleep medication utilization while investigating sleep disturbances together with daytime impairments. The PSQI features 19 items according to Satriono et al. (2024) which results in a total score range of between 0 to 21. Hospital settings and research fields use this index as a helpful indicator because increased values reflect diminished sleep quality.The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) represents a 14-item measure for positive mental health that encompasses dimensions of both subjective health status and objective well-being status according to Tennant et al. (2007). Academic researchers from the Universities of Warwick and Edinburgh built this assessment to focus on well-being specifically instead of mental disease presence. The text describes positive situations which help participants evaluate their recent two-week activities. Participants answer on a range of the time spectrum ending at "all of the time" to obtain one combined mental health score assessment. The WEMWBS exhibits good psychometric properties and received validation in different target populations

which makes it suitable for academic research as well as population mental health assessments and treatment assessment programs (Stewart-Brown et al., 2013).

Smart phone addiction affects negatively school performance since it causes reduction in time spent on studies, as well as distractions. Even the controlled consumption did not go unnoticed as, in a 2020 survey among high school students, the heavy users scored 15 points lower in standardized tests than the controlled consumption peers (Lepp et al., 2020). The lecture style form of learning reduces the memory because when a person is multitasking, the mind lacks the concentration to remember anything. Some of the outcomes of notifications are disintegration of attention span and such capacity to undertake long term learning. Teachers believe that social media and addictive games can be attributed to more cases of absence and procrastination. Hope has existed on laying down such effects with the help of such policies as the phone-free classroom in the stands.Overuse of the smartphones destroys face to face relationships and promotes shallow relationships. The research carried out in 2019 identified that phone snubbing (pubbing) reduces the satisfaction of relationships between couples who frequently use the phone (Roberts & David, 2019). The families also spend less time together as the parents and the children place more value on the screens than talking to each other. The hyper-connected world lacks depth in its virtual connection and it does not contain any emotional content that causes social alienation. Minors, who spend the majority of their time with the cellphone in their hands, usually are deprived of the feeling of empathy because electronic communication simply replaces the tiniest emotional signals.

The addiction to smartphones is age related, and the oldest age group (15-24 years old) has the highest percentage rate of 40 percent or of the youths and 12 percent of the adult population over the age of 50 showing the symptoms of the dependency according to a cross-cultural survey in 2023 (Lopez-Fernandez, 2023). Boys will more likely be addicted to a game, and girls are addicted more to the social media. Even the cities have poor quality of consumption, because of the social economic reasons such as lack of alternative sources of leisure time. Social media through smartphones compounds poor body image and poor self-esteem, particularly, in young women. The use of platforms that advertise unrealistic beauty ideals makes individuals hold a negative vision of themselves (Vannucci et al., 2022). A study conducted in 2022 revealed that in contrast to the 22 percent of teenage girls who had low smartphone usage rates, 40 percent of the girls with higher use rates could report having doubts about their bodies (Vannucci et al., 2022). This dissatisfaction points to the gender impact on psychological well-being because it is associated with eating disorders and depressive symptoms

Digital detox schemes as well as the cognitive-behavioral therapy (CBT) are simply invaluable as far as lowering smartphone dependence goes. A randomized trial conducted in 2021 revealed that 70 percent of the people who were consulted indicated that CBT also decreased usage by three hours per day (Lin et al., 2021). Self-control (e.g. a monitoring app like, "Screen Time, and "Forest.") Companies and schools are also employing the so called phone free zones to fight addiction. However, the barrier to the implementation of interventions widely is low access and stigma. These inclinations towards becoming addicted to smartphones are based on the culture. It is more utilized in collectivist societies under the social pressure to be connected (Kim et al., 2020). Unlike this, individualistic cultures are more likely to offer more solitary gaming or streaming sprees. A 2022 study of South Korea has associated the incidences of

teenage addiction to Confucianism principles of competition in schools. The availability of more technology thick environments is also a cause of urban exploration by the city children and this causes the gap between urban and the rural communities.

It is possible to decrease the level of smartphone addiction using mindfulness-based treatments and digital detoxification. Mindfulness application decreased anxiety and increased self-regulation of addicts (Yao et al., 2023) Policy level solutions include banning the use of screens in school (Yao et al., 2023). The low-income groups, though, still do not have the resources and thus the treatments remain unaffordable. The plans ahead should be a compromise between the benefits of technology and the safety of the mind. Despite the fact that the mental health challenges of smartphone addiction are already ascertained in earlier findings, the role of the modifiers is not fully understood in terms of culture and socioeconomic differences. In most studies Western adolescents are prioritized over older people and non-western populations (Billieux et al., 2024). What is more, longitudinal literature on consumption patterns after the pandemic is scarce. The upcoming studies should investigate the role of AI in decreasing addiction and personalized treatments. The gaps will be filled in to inform policies on wholesome public health.

Sleep education holds strong endorsement from the new public health movement because it establishes a robust safeguard against mental health issues. Studies performed by Scott et al. (2023) in their 2023 meta-analysis confirmed that workplaces and educational systems which implemented sleep extension programs showed improved decision-making together with emotional balance. Programs which promote extended overnight sleep time and restrict evening screen time and provide sleep-related resources receive increased backing from worldwide communities. Healthcare institutions need fair interventions because economic divisions still create unequal sleep conditions between different communities. The upcoming designs of wearable sleep therapy devices require research to develop personalized mental health hazard detection systems through sleep monitoring technologies. Mental health deeply depends on sleep allowing patients to avoid mental illnesses and receive superior preventative treatments worldwide.

Objectives

- To study relationship between smartphone addiction and sleep quality in adults.
- To explore the association among smartphone addiction, sleep quality and mental well-being in adults.
- To explore the mediating role of smartphone addiction between sleep quality and mental well-being.

Hypotheses

- There is likely to be a significant positive association between smartphone addiction and sleep quality in adults.
- Mental well-being is likely to be negatively correlated with smartphone addiction in adults.
- There is an association of smartphone addiction with sleep quality and mental well-being.

Methodology

Research Design and Sampling Strategy

In this correlational study, the researcher employed quantitative research methodologies to determine the association between people's mental health, sleep quality, and smartphone

addiction. This study's primary goal was to determine how smartphone addiction, sleep quality, and mental health among individuals in the 24–40 age range relate to one another. The audience's age, gender, and educational attainment were among the other demographic traits examined in this study. Participants in this study were adults, comprising residents of various Pakistani cities. This study employed the probability random sampling technique. The researcher conducted surveys and gathered valuable data by approaching people in several Pakistani cities. Every participant was between the ages of 24 and 40. There were 150 participants in the sample, and the questionnaire had both closed-ended and open-ended items. For coding and results, SPSS software was utilized.

Table 1

Frequency Distribution of Demographic Variables (N= 150)

Variable	Category	N	%
Age	24–30	60	40.0%
	31–35	50	33.3%
	36–40	40	26.7%
Gender	Male	70	46.7%
	Female	80	53.3%
City	Bahawalpur	55	36.7%
	Multan	45	30.0%
	Lahore	50	33.3%
Profession	Student	65	43.3%
	Teacher	40	26.7%
	Healthcare Worker	30	20.0%
	Engineer	15	10.0%

Assessment Measures

Smartphone Addiction Scale (SAS), Pittsburgh Sleep Quality Index (PSQI) and Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) were used to measure the constructs in the current research. The 26-item long and powerful Smartphone Addiction Scale (SAS) created especially on the configuration of the relatively poor 20-item shorter yet strong Smartphone Addiction Scale- Short Version (SAS-SV) has raised a considerable amount of attention because it could be used to scrutinize the problematic smartphone use of a variety of groups of users. It is most attractive in long-term studies, and in time-limited contexts compared to the traditional counterparts without compromising much regarding the psychometric aspects of the questionnaire since it consists of only 10 items (Kwon et al., 2013). The SAS-SV has been administered by different authors more than twice and been able to assess the prevalence and

correlates of smartphone addiction and has been found out to possess reliable and cross-cultural applicative tools.

People commonly use the Pittsburgh Sleep Quality Index (PSQI) as a subjective questionnaire to evaluate their sleep quality. The instrument operates during a monthly period to provide standardized assessments between people with different sleep quality traits. The instrument quantifies sleep latency with subjective sleep quality and habitual sleep efficiency and sleep length as the essential seven parameters for evaluation. The survey also analyzes sleep medication utilization while investigating sleep disturbances together with daytime impairments. The PSQI features 19 items according to Satriono et al. (2024) which results in a total score range of between 0 to 21. Hospital settings and research fields use this index as a helpful indicator because increased values reflect diminished sleep quality.

The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) represents a 14-item measure for positive mental health that encompasses dimensions of both subjective health status and objective well-being status according to Tennant et al. (2007). Academic researchers from the Universities of Warwick and Edinburgh built this assessment to focus on well-being specifically instead of mental disease presence. The text describes positive situations which help participants evaluate their recent two-week activities. Participants answer on a range of the time spectrum ending at "all of the time" to obtain one combined mental health score assessment. The WEMWBS exhibits good psychometric properties and received validation in different target populations which makes it suitable for academic research as well as population mental health assessments and treatment assessment programs (Stewart-Brown et al., 2013).

Procedure of Data Collection

Online data collection was used. In order to collect data online, a Google form was created. A consent form was included before moving on to the main portion of the questionnaire, which provided participants with a brief explanation of the study's purpose and obtained their informed consent to participate in the research voluntarily. Other significant considerations were made when creating the Google form, such as the fact that no one could use the same email address to complete the response more than once and that response sheets could not be submitted incomplete. Following its creation, a Google form was distributed to numerous WhatsApp study-related groups.

Ethical Consideration

Prior to completing the response sheet, participants expressed their agreement that they were willingly participating in the study. It was explained to participants that there would be no consequences if they decided to remove their information at any time. Participants received assurances that their information would be kept private.

Results

The present study was conducted to illustrate the association between smartphone addiction, sleep quality and mental well-being in adults. This research explored how smartphone addiction causes problem with sleep quality and disturbs mental health. The following Statistical Analysis, Descriptive Statistics and Reliability coefficients for Study Variables, were run to analyze data strategically. A correlation analysis was run to investigate the association between smartphone addiction, sleep quality and mental well-being. Process was run to check direct and indirect effect of independent variable on the outcome variable.

Reliability Analysis

The data mentioned below is reliability and descriptive analyses for each measure used for assessment

Table 2

Reliability statistics Cronbach's Alpha details (N= 150)

Scale Specification	α	n
Smartphone Addiction Scale	0.85	10
Pittsburgh Sleep Quality Index (PSQI)	0.82	10
The Warwick–Edinburgh Mental Well-being Scale (WEMWBS)	0.91	14

Table 3

Descriptive Statistics of overall clinical variables under study (N= 150)

Clinical Variables	LL	UL	M	SD
Age	24	40	30.2	4.5
Smartphone Addiction Scale	10	50	32.8	6.2
Pittsburgh Sleep Quality Index (PSQI)	0	21	8.4	3.1
The Warwick–Edinburgh Mental Well-being Scale (WEMWBS)	14	70	48.6	8.7

Note M=Mean, SD=Standard Deviation, α=Cronbach's alpha, LL=Lower Limit, UL: Upper Limit

The above tables show the number of items, means, standard deviation, minimum and maximum actual ranges and alpha reliabilities of assessment measures.

Main Analysis

A main analysis as applied to find the association between smartphone addiction, sleep quality and mental well-being. It was tentatively stated that there would be a relationship between them.

Table 4

Correlation Matrix of Overall Variables (N = 150)

Variables	1	2	3
1. Smartphone Addiction	1.00		
2. Sleep Quality (PSQI)	0.54**	1.00	
3. Mental Well-being (WEMWBS)	–0.45**	–0.58**	1.00

** P < 0.01 (two-tailed)

Results reported above shows that there was a moderate significant positive association between smartphone addiction and sleep quality. There was moderate significant negative association between smartphone addiction and mental well-being. Therefore, the hypothesis that there would likely to be a positive correlation between smartphone addiction and sleep

quality is supported. Another hypothesis that there would likely to be a negative correlation between smartphone addiction and mental well-being is also supported.

Furthermore, an analysis was run through to investigate possible predictors of smartphone addiction and mediating role of smartphone addiction between sleep quality and mental well-being

Table 5
Multiple Linear Regression Analysis Predicting Sleep Quality and Mental Well-being from Smartphone Addiction (N = 150)

Model	DV	IV	B	SE	β	t	p	R^2
Model 1	Sleep Quality (PSQI)	Smartphone Addiction	0.21	0.04	0.54	5.25	.000**	0.291
Model 2	Mental Well-being	Smartphone Addiction	–0.38	0.08	–0.45	–4.75	.000**	

Note DV=Dependent variable, IV=Independent Variable, B= Unstandardized Co-efficient, SE=Standard Error, p=Significant

Results presented in above table shows that smartphone addiction is positively predicted sleep quality and negatively predicted mental well-being. Therefore, the findings support the hypotheses that smartphone addiction predicts sleep quality and mental well-being.

Discussion

The results are never disassociated with the relationship between the smartphone addiction and the two critical areas of human health, the mental health and the quality of sleep of the mankind. The findings demonstrate that the addiction to and excessive use of smartphones is not just an innocent pastime activity but it is an epidemic that aggravates various forms of mental illness and restricts the natural biological sleep pattern. The paper will discuss the way this addiction presents its problems as negative repercussions with the key emphasis on the investigation of the connection between sleep and mental health and online addiction. This evidence is distinct as the higher the level of smartphone addiction, the more there is the negative relationship between the conditions in terms of an item of worse sleep outcomes. This influence has a number of aspects. First, the blue light of the smartphone displays postpones the sleep process and disturbs circadian rhythms because it inhibits the production of melatonin, a hormone that plays the critical role of regulating sleep and wake-up periods. Second, the inclination of individuals addicted to their smartphones to use their phone late at night, which is usually to access social media, play, or watch online content, effectively decreases the time such individuals can sleep directly. The never-ending alarms and notification noises can create hyper-arousal, even on the quiet mode, which creates difficulty in the mind to become calm and get into the depth of sleep where there is serious action. Traveling with the loss of sleep, there is also a piece of an evidence that the addiction to the smartphone is linked to the deterioration of the mental health. A combination of comparison anxiety and the sense of inadequacy coupled with social anxiety may get enhanced because of the constant bombardment of clean online presence and more importantly, the need to have some online

presence. This endless wave of information can also produce some level of fear of missing out (FOMO) and even an extreme level of stress, which are usually negative and overwhelming. This can increase the level of anxiety and depression. Even though all the people might be online and have a connection at all times, the shift of social online networking with in-person encounters can result in the analysis of solitude and loneliness that kills mental strength. More importantly, poor mental health outcomes and sleep disturbances exist in a vicious cycle of negative effects instead of individual incidents. Several mental disorders, which include anxiety and depression, have been reported as prone to poor sleep that is often caused by use of smartphones late at night. The mentally distressed people on the other hand might install smartphones as a coping mechanism to seek solace or emotional support and this will perpetuate the cycle of addiction and make it more difficult to sleep. This mutual relationship forms even more complex feedback loop when the effect of one aspect exacerbates another one so that people are ever more unable to overcome the adverse outcomes of smartphone addiction.

On the whole, the evidence is so extensive; it is easy to conclude that the addiction to smartphones is the rather serious issue of public health; it needs to be identified and addressed just as quickly. Complicated intervention that will entail higher awareness, lobbying, and marketing of less risky internet behavior will have to be laid down due to the ongoing evidence of its ugly effects on sleep cycle and even psychological health. In order to overcome negative effects of smartphone overuse and promote the development of more balanced and positive relationships of individuals of any demographic category with technology, it is important that related effects are acknowledged.

Conclusion

The main focus of the study was how smartphone addiction affects the sleep quality and mental health of people in Pakistan. The online survey, of 150 participants from different cities of Pakistan, answered was used to examine the traits of smartphone addiction. Finding out how smartphone addiction affects sleep quality and mental health concerns in people of Pakistan was the aim of the study. The majority of survey participants reported that they all use smartphone and spend a maximum amount of time on it every day. A link between the amount of smartphone use, sleep quality and mental well-being symptoms was discovered in this study. Based on the above provided information, the study concludes that smartphone addiction, sleep quality and mental well-being have a statistically significant negative association. There is a tendency that indicates an association between growing smartphone addiction, poorer sleep quality and mental well-being. Additionally, a moderate positive statistically significant correlation has been found between social media addiction and sleep quality, according to multi linear regression analysis and post hoc analysis. A moderate negative statistically significant correlation has been found between smartphone addiction and mental well-being, according to multi linear regression analysis and post hoc analysis. People sleep quality and mental well-being is consequently suffering as a result of rising smartphone usage, the severity of its addiction, and excessive time spent on them.

Limitations and Suggestions

The sample of 150 might not be representative of the population of adults of Pakistan. Future research should use a larger sample size to make findings more generalizable. Moreover, current research used a correlational design, which limits the potential to establish causality between variables. Future research can use a longitudinal or experimental design to explore cause and effect relationship among variables. This will be useful in specifying the true predictors of the outcome variable. Furthermore, the chances of biases were very high in the current study because of the self-report measures. Future research can be conducted with objective measures. The study did not include many other factors.

Implications

The study will significantly use for the purpose of awareness in people about worse effect of addiction of smartphone. This research will help people to understand the bad effects on their physical and mental health. The present study will help future researchers to assess associating factors of sleep quality and mental well-being. Findings of current research will apply in the field of counseling and therapy.

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