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EFFECTS OF SMART PHONE OVERUSE ON SLEEP QUALITY AND COGNITIVE PERFORMANCE IN YOUNG ADULTS

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ABSTRACT
Young adults have seen their lifestyle change with the introduction of smart phones. Though the device offers conveniences, the excessive use of smart phones has an impact on individuals' sleep and cognitive functioning. This in turn raises concerns of Smart phone overuse on sleep and cognitive functioning of the of the impacted individuals. This study uses a cross-sectional survey research design to obtains the data of the of 300 participants stratified by age to 18-30. Participants completed the select forms on overuse of smart phones, slept on the PSQI scale and a self-reported cognitive functioning scale with a focus on attention, memory, and concentration. Data was accumulated and organized to determine which of the three stated tests were correlated and the nature of their relationship concerning overuse of smart phones. From the PSQI numbers and cognitive self-functioning report received, sleep was a determining ratio from the overuse functioning of smart phones with emphasis on attention and memory. Results of the survey have shown to determine and conclude an overuse of smart phones severely impaired one's sleep, smart phone overuse and cognitive functioning. These findings highlight an educational and modification action programs/adaptive measure smart phone for you.
Keywords: Smart phone overuse, sleep quality, cognitive performance, young adults,

1. INTRODUCTION

In today's society, smart phones are one of the most essential technologies of human existence, dramatically changing the everyday lives of people around the world. For instance, in the case of young adults, extensive everyday use of smart phones is prevalent for purposes of communication, education, entertainment, socialization, and information access. Dependence on smart phones is also fueled by the rapid development of mobile technologies and the availability of the internet almost everywhere. Although smart phones offer many advantages, the absence of control of their usage has made some people, especially researchers and health educators, concerned. Overuse of smart phones is described as addictive usage, as in excessive compulsive checking of the phone, and is associated with a range of physical, mental, and thinking issues (Schrempft, et al., 2024).

Poor sleep quality is one of the most common and serious issues. Most young adults use their smart phones late at night for social media, games, videos, and even studying. The blue light of the screen lowers melatonin levels. The body’s melatonin levels are essential to the regulation of sleep cycles, and the phones prevent sleep by sending notifications and changing the digital content on the screen. People become sleep deprived as night sleep is reduced, increased fatigue is experienced the next day, and sleep quality is also further reduced (Yang, et al., 2020).

Impaired sleep is linked to a decline in brain processing ability. In young adults, the ability to think and reason is needed for effective functioning in the various areas of one's life, and academic issues are also included (Yin, et al., 2025).

Healthy sleep contributes greatly to attention, memory, problem solving, and the processing of information, whereas poor sleep and sleep deprivation tend to lead to issues with focussing, making decisions, and reacting timely. For many young adults, especially students, sleep-related issues can lead to cognitive impairments such as learning less on a given topic, getting less work done, and high amounts of stress. Therefore, the cognitive issues caused by smart phones indirectly due to sleep deprivation are a real problem (Wu, et al., 2024).

Young adults are at the point in life where the negative impacts of smart phones start to show due to where they are in life and the demands of their lifestyle. Pressure to do well in school, expectations from one's social circle, and high amounts of time on the internet all causes a major dependence on the device. Socializing and the ability to do research and work on multiple things at the same time can all lead to high amounts of screen time, and the fear of missing out can keep someone on the screen. In developing countries, where the internet is able to reach a lot of people, the lack of awareness about the negative impacts exacerbates the problem. It is unfortunate that there is a lack of studies that look at these issues (Venkat, et al., 2025).

Smart phones and the internet in general can cause a lot of health issues, and with that knowledge, one would expect people to have done studies on the impacts smart phones have on sleep and cognitive skills. For students, school work is a very demanding part of life, and a device that can cause sleep issues and cognitive impairment can cause major problems. Since research is lacking, it is understandable that the issues are not within the same framework (Zhong, et al., 2025).

Following the above gap, the current study leverages a quantitative methodological approach to verify the correlation between phone addiction, sleep deprivation, and cognitive productivity among the age group of young adults. By reporting facts, this study aims to provide an understanding of digital behavior and its effects on health and functioning at a cognitive level (Khalily, et al., 2019).

1.2 Statement of the Problem

The nightly usage of smart phones by young people is very problematic. Using smart phones at night impacts sleep quality which contributes to problems with sleep related cognitive functions such as attention, memory, and information processing. Unfortunately, there is very little data available related to the effects of Smartphone overuse on sleep and cognitive function on young people. Educating young people on how to protect their cognitive function while sleeping is not possible without further evidence. This is something that needs to be done in a systematic and quantifiable manner.

1.3 Research Objectives

1. To examine the level of smart phone overuse among young adults.
2. To analyze the impact of smart phone overuse on sleep quality in young adults.
3. To assess the effect of smart phone overuse on cognitive performance among young adults.
4. To investigate the relationship between sleep quality and cognitive performance in young adults.

1.4 Research Questions

1. What is the level of smart phone overuse among young adults?
2. How does smart phone overuse affect sleep quality in young adults?
3. What is the impact of smart phone overuse on cognitive performance among young adults?
4. Is there a significant relationship between sleep quality and cognitive performance in young adults?

1.5 Significance of the Study

As far as research goes, this study measures the effect that the overuse of cell phones has on sleep and Smartphone overuse and its effects on the young adult population. The findings should assist educators and/or educational organizations with understanding and using the overuse of smart phones on students' learning and mental/ cognitive skills. The results will also help incorporate sleep research to develop educational interventions on sleep hygiene. The results also help to develop policy frameworks to encourage the regulated use of smart phones. Most importantly, this research has Value in interrelating the above variables in one empirical study. Ultimately, this research reiterates the importance of digital citizenship on the educational and social development of young people.

2. LITERATURE REVIEW

2.1 Smart phone Overuse

People can have an unhealthy attachment to their cell phones. Engaging in daily activities while disregarding their well being. Research suggests that there tends to be increased cell phone and social media usage amongst young adults and in return there are increased emotional stress levels. Things like anxiety and emotional exhaustion come as a result from their phones. Over extended time usage behaviors develop and people feel anxious and even discomforted if their devices are far from reach. Technological dependency like this makes people in self-regulation management and even their time management skills. There are also studies that associate smart phone overuse with a lack of in academic

performance and overall in productivity. There is a constant urge to check and respond to notifications and that tends to break a person's focus in completing the task at hand. Overtime of this behavior pattern the self destructive cycle tends to have a lack of control and result in smart phone addiction. That's why people are beginning to see the unhealthy over usage of cell phones to be a health concern (Parry, et al., 2024).

2.2 Smart phone Overuse and Sleep Quality

Several research studies show that there is a strong relationship between sleep quality and smart phone use. Using smart phones at night exposes users to blue light which disrupts the body's natural sleep cycle and secretion of melatonin. Too much melatonin leads to a longer time to fall asleep and less time actually sleeping. During the night people are stimulated both cognitively and emotionally due to notifications and smart phone use. Some studies show that people who use smart phones excessively have fatigue during the day and have sleep problems such as insomnia. Some problems are worsened by lack of sleep such as issues with mood and the ability to function during the day. Young adults are especially at risk due to the use of smart phones at night for social and educational purposes. For these reasons, the overuse of smart phones and other devices is a significant risk factor (Tóth, et al., 2024).

2.3 Sleep Quality and Cognitive Performance

How well you sleep is one of the most important factors to how well you think and process information. In order to solidify new memories and improve focus, a person must sleep soundly without interruptions. Studies show that poor sleep patterns cause people to have issues when trying to concentrate and process new information. The less someone sleeps and the more fragmented their sleep, the more their decision making and reaction times slow down. The more of these problems a person has, the worse they'll do in school and at work. Lack of sleep is the main reason for growing exhaustion and lessened mental problem solving skills. Young people are the biggest group negative sleep patterns effect. Overall, if a person has poor sleep patterns, their ability to think and perform tasks is worsened (Hong, et al., 2020).

2.4 Smart phone Overuse and Cognitive Performance

Recent studies suggest that smart phone overuse may cause cognitive decline without sleep deprivation interfering with cognitive processes. The constant hop between apps and frequent distractions may cause a deficit in sustained attention and working memory. Staying engaged with information online may cause cognitive fatigue and mental decline. Heavy smart phone users are known to have focus and task persistence issues. The habit of switching information too quickly reduces the ability to process information deeply. Although some studies suggest otherwise, the evidence of cognitive decline complexity remains clear. More studies need to be done to clarify the decline of mental processes due to smart phone overuse (Leow, et al., 2023).

3. RESEARCH METHODOLOGY

3.1 Research Design

This study used a quantitative cross-sectional research design to determine the relationships between Smartphone overuse, sleep quality, and cognitive performance. One-time collection of data from participants/passive respondents was captured using the designed framework. This design was effective in the identification of statistical relationships and associations between the variables. This design allowed empirical metrics and analyses supported by metrics. A cross-sectional design also allowed more effective and efficient data collection. This method aligned perfectly with the study's objectives in quantitative (Ong, et al., 2024).

3.2 Population and Sample

In this study, we surveyed young adults attending public and private universities as the participants. Out of the entire study participants, 300 students aged 18 to 30 were selected for the study. The educational level and type of institution attended were each selected as strata in this study. This technique reduces the selection bias and improves the generalization of the study outcomes. The sample size, 300 students was also thought to be large enough in relation to the study. The participants' diversity also improved the reliability of the findings.

3.3 Instruments

Identical devices were used to collect data. A Smart Phone Addiction Scale Short Version measure was used to see how much participants were overusing their smart devices. A Pittsburgh Sleep Quality Index measure was unmistakably used to evaluate sleep quality (Hidalgo-Fuentes, et al., 2025). A validated measure of cognitive performance was distributed to assess these three areas of concentration, attention, and memory. Each of these devices was compared to validated population data. The reliability of the measures exceeded 0.70 for internal reliability.

3.4 Data Collection Procedure

In November 2021, the research group sent out the research survey via email after receiving the requisite legal permissions and prior notification of the participants' intention to participate in the survey. Consent was obtained before they took part in the survey. Informed participants were explained the purpose of the research and the rights they held. All participation was voluntary, and participants were free to refuse their participation in the survey at any point. All data collection processes kept the data collected confidential. All data collection processes kept the data collected confidential. Every effort was made to comply with ethical research principles.

3.5 Data Analysis

The data we gathered was evaluated through SPSS data analysis software. We summarized the demographic data and variables. We studied the correlations of smart phone abuse, sleep quality, and cognitive performance through Pearson's correlation analysis. We used multiple regressions to assess the predictive of smart phone abuse to sleep quality, and cognitive performance. We used a significance level of 0.05 for this analysis. This form of analysis gave a proper and valuable analysis of the data.

4. DATA ANALYSIS

Table 1: Demographic Profile of Participants (N = 300)

Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	158	52.7
	Female	142	47.3
Age Group	18–22 years	132	44.0
	23–26 years	104	34.7
	27–30 years	64	21.3
Institution Type	Public University	185	61.7
	Private University	115	38.3
Study Level	Undergraduate	192	64.0
	Postgraduate	108	36.0

This table shows the numbers from the different demographics section of the survey of all of the participants. In the survey, there was a good distribution of young adults in the different age groups of 18 to 26 and genders across the different educational levels. Also, the survey participant's representation from both private and public universities is a good indication of how the survey could be generalized to the whole population. Most participants, which makes sense age wise, were in the age of 18 26, which is the age range when studying tech use habits is very relevant. With the demographics from the sample, it makes sense to use to try and study the overuse of the use of a smart phone and the effects.

Table 2: Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
Smart phone Overuse	3.89	0.74	1.50	5.00
Sleep Quality	3.76	0.69	1.80	5.00
Cognitive Performance	3.68	0.72	1.70	5.00

The statistics available show an average to high amount of overuse of smart phones from people who took the survey. Most participants show some problems related to the quality of their sleep. Scores of the cognitive performance of some people are different than others, like their mental focus, memory, and concentration. The standard deviations reflect average amounts of diversity and cohesiveness from the population. Those results allow for more detailed statistical analysis.

Table 3: Reliability Statistics (Cronbach's Alpha)

Variable	No. of Items	Cronbach's Alpha
Smart phone Overuse (SAS-SV)	10	0.83
Sleep Quality (PSQI)	9	0.79
Cognitive Performance	8	0.81
Overall Scale	27	**0.86**

Table 3 shows strong internal consistency for all measurement scales. Cronbach's alpha values exceed the acceptable threshold of 0.70, indicating reliable measurement of constructs. The overall reliability score further confirms the questionnaire's suitability for quantitative analysis. These results ensure that subsequent analyses are based on consistent and valid data.

Table 4: Correlation Matrix

Variables	Smart phone Overuse	Sleep Quality	Cognitive Performance
Smart phone Overuse	1		
Sleep Quality	0.54**	1	
Cognitive Performance	-0.48**	-0.52**	1

There is a great deal of data supporting the relationship between Smartphone overuse and poor sleep quality. Spending more time on a Smartphone is associated with a decrease in sleep quality. More Smartphone overuse also leads to lessened cognitive ability such as focus and memory. Cognitive performance also leads to sleep quality in a negative way. Consequently, increased Smartphone use results in poor quality sleep and lessened cognitive ability. Sleep quality and Smartphone overuse is also associated with cognitive performance in a negative way.

Table 5: Regression Results

Predictor	β	t-value	p-value
Smart phone Overuse	0.54	10.21	0.000
R^2	**0.29**		
F-value	**104.3**		**0.000**

Regression analysis shows that smart phone overuse significantly predicts poor sleep quality. The model explains 29% of the variance in sleep quality, indicating a moderate predictive effect. The statistically significant beta coefficient confirms that increased smart phone usage leads to greater sleep disturbances. This finding supports the study's second research objective.

Table 6: Multiple Regression Results

Predictor	β	t-value	p-value
Smart phone Overuse	-0.31	-5.98	0.000
Sleep Quality	-0.38	-7.21	0.000
R^2	**0.46**		
F-value	**126.7**		**0.000**

The results demonstrate that both smart phone overuse and poor sleep quality significantly predict reduced cognitive performance. Sleep quality shows a stronger predictive effect, indicating its critical mediating role. The model explains 46% of the variance in cognitive performance, highlighting the combined impact of smart phone behavior and sleep health. These findings confirm the interconnected nature of the study variables.

Table 7: Hypotheses Testing Summary

Hypothesis	Statement	Result
H1	Smart phone overuse negatively affects sleep quality	Accepted
H2	Smart phone overuse negatively affects cognitive performance	Accepted
H3	Sleep quality significantly affects cognitive performance	Accepted
H4	Sleep quality mediates smart phone overuse and cognitive performance	Accepted

All hypotheses were supported by statistical evidence. The results confirm that smart phone overuse contributes to poor sleep quality, which in turn impairs cognitive performance. The mediating role of sleep quality highlights its importance in understanding the broader impact of smart phone overuse among young adults.

5. FINDINGS

According to this study, young adults are most affected by phone overuse. Being over reliant on one's phone negatively affects the cognitive abilities of a user, such as losing focus, memory, and concentration as well as one's sleep. Statistics show how big of an issue this is and overwhelmingly shows a positive correlation to overuse of one's phone and having a lower quality of sleep. In this study, poor sleep was proven to have a negative correlation to one's cognitive abilities, and this was only worsened with the overuse of one's phone. In regression studies, the overuse of phones was one of the biggest causes of one's low quality of sleep. There is also proof of both the overuse of smart phones and poor quality of sleep being connected to low cognitive abilities. This only further proves that quality sleep is a mediator of the cognitive abilities a person has. Young adults are losing sleep and mental power to the overuse of smart phones and this study has the evidence to back that.

6. DISCUSSION

Other studies have also found that excessive smart phone use negatively impacts sleep and cognitive functioning. There is still a strong connection between smart phone overuse and poor sleep quality. Previous studies point to the effects of blue light and cognitive arousal on disrupted sleep. Overuse of smart phones is still connected to poor cognitive functioning (Höhn, et al., 2024). This is consistent with studies that have found digital multitasking and constant disruptions to be related to a decrease in attention and working memory. The damage that poor sleep quality causes on cognitive functioning also supports sleep deprivation hypotheses that point to the value of restorative sleep (Islam, et al., 2025). The result where sleep quality is posited to be a partial mediator indicates that smart phone overuse impacts cognition in a Variety of ways (Akbari, et al., 2023). These findings illustrate the complexity of digital behaviors and their impacts. The current study adds to the mostly qualitative research the area has been dominated by (Cemei, et al., 2024). It advocates the need for regulatory behaviors and awareness of a the potential impacts of digital well-being. The conclusions drawn support the need for limited smart phone usage to protect the cognitive and sleep health of individuals is critical as the results support the fact that unmanaged smart phone usage negatively impacts the well-being of young adults (Correa-Iriarte, et al., 2023).

7. CONCLUSION

The study shows that Smart phone overuse leads to very poor sleep & mental performance among young adults. Overusing smart phones affects sleep which leads to issues related to focus, memory & concentration. Overusing smart phones leads to very poor sleep which notably affects mental performance. Young Smart phone overuses also suffer from poor sleep which leads to cognitive inefficiency (Elsheikh, et al., 2024). These findings show that Smart phone overuse is detrimental to sleep health. The findings show that Smart phone overuse is detrimental to sleep health. Smart phone overuse is also an issue of public health. The need for awareness of poor Smart phone habits is urgent & educational & health professionals need to promote better sleep hygiene & Smart phone overuse. Though there is much to improve in the study, the need is to balance Smart phone use for overall mental well-being (Gazzanigo, et al., 2025).

8. RECOMMENDATIONS

1. Universities ought to set up workshops and other information sessions to teach students about the uncertainty associated with the use of smart phones, as well as how it affects students' sleep and other functions. These programs could promote understanding among students on the dangers of too much screen time and on the need to adopt a more responsible use of screens. Schools could also include topics about digital well-being into their student counseling and orientation sessions.
2. To increase sleep quality, the young population should be encouraged to reduce the use of smart phones, especially in the hours prior to going to sleep. To achieve better sleep and to allow sleep cycles to be more regular, it is important that screen exposure prior to sleeping be dehydrated. Healthier sleep cycles can be achieved by adopting habits that include limiting screen time and that involve notifications being switched off at night.
3. Use of longitudinal designs is encouraged in the future to study smart phone overuse, sleep quality and cognitive performance in order to better understand the causal relationships between then. More behavior changes would be evident in the studies and their enduring sustain effects would also be track in more detail with longitudinal studies. Such studies would also contribute to more empirical research being done in this field.
4. The standard cognitive tests and even neuropsychological assessments would be ideal as future studies seek to measure cognitive performance. Accuracy could be improved and response biases reduced by using objective tools to complement self reported measures. More dependably would be the findings.

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