

RELATIONSHIP BETWEEN LATE-NIGHT MOBILE PHONE USE, PERCEIVED STRESS AND SLEEP QUALITY AMONG YOUNG ADULTS

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KEYWORDS:

Late-Night Mobile Phone,
Perceived Stress, Sleep Quality,
Young Adults

CITE THIS ARTICLE:

Khan, S., & Shaheen, S. (2026). Relationship between late-night mobile phone use, perceived stress and sleep quality among young adults. *Pakistan Journal of Positive Psychology*, 3(6), 264-272.

ABSTRACT

The current study explores the relationship between Late-night Mobile phone use, Perceived Stress and Sleep Quality among young adults. A quantitative correlational was used to collect data from 340 young adults aged 18 to 25 years in Islamabad, Pakistan, through convince sampling. Participants completed a demographic questionnaire, the Perceived Stress Scale (PSS-10) and Pittsburg Sleep Quality Index (PSQI). Pearson correlation, multiple regression and independent samples *t*-test were conducted using SPSS 27. Perceived stress ($r = .30, p < .01$) and late-night mobile phone use ($r = .25, p < .01$) were significantly related to poorer sleep quality. However, perceived stress and late-night mobile phone use were significantly not related ($r = .10, p > .05$). Multiple regression analysis showed that perceived stress and late-night mobile phone use significantly predicted sleep quality, accounting for 14% of the variance ($R^2 = .14, F = 26.80, p < .001$). Independent samples *t*-test showed a significant gender difference in late night mobile phone, with males reporting higher usage, while no significant gender differences were found in Perceived Stress or Sleep Quality. Perceived stress and Late-night Mobile phone usage significantly predict Sleep Quality among young adults, highlighting the importance of managing stress and limiting night time phone use.

I. INTRODUCTION

Sleep is widely acknowledged as a fundamental biological function that is critical for mental flexibility, emotional regulation, cognitive function and physical well-being. Healthy sleep improves memory, attention, decision making and emotional stability whereas chronic sleep disturbances are connected to numerous negative consequences, for example, bad academic performances, dysregulation in mood, increase stress reactivity and long-term health risks (Hyndych et al., 2025). In recent years, concerns about decreasing sleep quality have readily increased, especially among young adults. Young adulthood is a very important developmental period highlighted by independence, demands from school, workplace and their growing social networks also greater use of digital technology. Young adults are more liable or sensitive to irregular sleep patterns and unhealthy sleep due to these influences (Vestergaard et al., 2024). Almost over the past 10 years, the late-night mobile phone use has been grown extraordinary. According to different polls many individuals use their phone in the last hours before going to bed and most of them continue using beyond lights out. This is just because of the habitual phone checking, the fear of missing out on social media or social connections and it is also because of academic expectations and the urge to be available all the time. Late night-mobile phone use causes sleep fragmentation, increase sleep latency and delays the bedtime. Since 2015, researches have constantly showed that those who uses mobile phones late

at night tend to sleep for shorter periods of time overall and have less subjective sleep quality than people who use their phones for fewer or no time at night (de Sá et al., 2023).

Furthermore, stress has been a major factor in determining sleep quality. The psychological and physical reaction to perceived stress that cannot be coped normally is concluded as stress. Young adults are more sensitive to high stress because of academic restraints, competitive school environments, job insecurity, financial concerns and complicated social relationships. Stress levels can increase due to the evolving nature of young adults, which constantly involves changes and uncertainty. Recent research has also found that perceived stress has increased among young adults, which is associated with the rise in poor sleep quality (Qayyum et al., 2024). In Maslow (1943) hierarchy sleep is placed at the bottom of physiological demands, making it the body's most important need. It fosters healing, maintain cognition and sharpen our focus which are essential for academic success etc. However, the flow of sleep is constantly broken by the demanding period of college life in young adults which then leads to the irregular patterns of sleep. It is crucial to understand that problems like Late-night mobile phone usage are not distinct from stress. Recent studies show a significant link between stress and late-night mobile phone use, specifically in young adults. These components altogether cause what academic refer to as information overload or cognition overload and a new term for this is "technostress". According to Elhai et al. (2017), notifications and even mere presence of a smart phone act as learned cue, that trigger habitual checking behavior, through a process resembling Pavlovian conditioning. Overtime, individuals develop an attention bias towards these cues, making phone checking a compulsive habit. Researches on social media and information overload shows that cognitive and social overload contribute to emotional strain and mental fatigue, particular among young adults and early career professionals who depends heavily on digital communication (Fu et al., 2020; Alheneidi., 2019).

Using a phone right before bed can shorten sleep duration, the onset of sleep and negatively affect overall quality of sleep due to mental stimulation and exposure to blue light, Poor sleep quality, in turn, is closely linked with higher stress levels, reduced concentration and emotional exhaustion. Joshi et al. (2022), reported that night time mobile phone use each predict sleep quality among young adults, a finding consistent with increasing concern regarding digital habits and psychological well-being. Given the far-reaching consequences of sleep disturbance during young adulthood, understanding these interconnected factors is of considerable importance. Chronic sleep deprivation has been linked to diminished academic performance, impaired emotional regulation, heightened vulnerability to anxiety and depression and reduced overall well-being (Hershner et al., 2014; Yoo et al., 2007; Alvaro et al., 2013; Thompson et al., 2022).

II. LITERATURE REVIEW

Growing smartphone usage and the increasing occurrence of stress and sleep disturbances in young adults have sparked greater research interest. A consistent pattern in the literature ties smartphone use after bedtime, (sometimes labeled "digital nightlife") with reduced sleep quality, since it postpones the onset of sleep and interrupt restorative rest. Siebers et al. (2026), found that past bedtime smartphone use had an increased negative effect on young adult's sleep quality compared to daytime or pre-bedtime use, highlighting the importance of regulating night-time phone habits for better mental and physical well-being. According to Zablotsky et al. (2025), there is connection between late night device use and sleep disturbances because teens and young adults who spend a lot of time on screens, specifically at night, reported disturbed sleep patterns, decreased physical activity and increase in psychological stress. Using the Pittsburgh Sleep Quality Index, Rafique et al. (2020), examined the impact of late-night mobile phone use on young individuals sleep quality. Participants who used their phone for at least half an hour after lights out reported much poorer sleep quality and prolonged sleep onset latency. Greater sleep disruptions and increased daytime tiredness were also linked to keep the phone close to the pillow. The high frequency of these bedtime mobile activities in the sample indicates that phone use at night may act as a behavioral stressor that disrupts sleep cycles and increase physiological arousal. Overall, the study demonstrates a strong inverse relationship between young people late-night mobile phone use and their sleep quality.

The quality of sleep has a substantial association with stress. Aggarwal et al. (2021), discovered a strong link between poor sleep quality and greater levels of acute stress in a study of young adults aged 18 to 25. Their results

highlight how fragmented or inadequate sleep not only co-occurs with stress, but also actively intensifies stress reactions, most likely due to neuroendocrine dysregulation and poor emotional control. In support of this, Dulger and Alkaya, (2025), study discovered a moderate to considerable positive correlation between stress and sleep quality, suggesting a reciprocal relationship in which stress exacerbates poor sleep and poor sleep exacerbates stress. Night time device engagement has been repeatedly associated with sleep difficulty in young adults. According to Lemola et al. (2015), late night electronic media usage considerably delays the sleep onset, reduces overall sleep quality. In the same way, Demicri et al. (2018) found a strong association between problematic mobile phone use and poor sleep quality in young adults. Their study found that greater reliance on mobile phone use was related with less sleep, greater sleep disturbances and elevated levels of stress. This lends validity to concerns that mobile phone use, particularly in the period before bed, functions as a genuine behavioral risk factor, given that excessive use appears to compromise both sleep patterns and psychological wellbeing. More recent research reinforces this pattern still further. A study by Zhang et al. (2022) found that young adults who used smartphones more often reported both poor sleep and elevated stress. The findings indicate that one of the main ways that excessive smartphone use causes stress is through poor sleep quality, which may help to explain why young adults with high mobile phone use, have poor mental health outcomes. Overall, research shows that young adults who use their phones late at night and have high levels of perceived stress experience poorer sleep. Phone use at night has a vital impact on psychological well-being through sleep disturbances and stress intensifies sleep disturbances in vicious cycle.

Rationale

Overall health i.e. physical, emotional and cognitive health all highly depends on getting enough sleep. However, many individuals find it hard to do so because of lifestyle choices like late night phone usage and encountering increased levels of stress. Researches have repeatedly shown that using mobile phones before or during sleep can cause sleep to be delayed, fragmented and of lower quality overall. Moreover, stress itself causes physiological arousal, concern and rumination, everything interferes with sleep. In spite of these those proven links, most studies have examined mobile phone use, stress and sleep independently rather than taking potential interactions into account. This underscores the need to examine their combined impact within a single study, particularly among young adults, who typically exhibit the highest rates of mobile phone use, while simultaneously navigating academic and social demands. Late-night mobile phone use is a modifiable behavior, which makes it the center focus of this study. Moreover, understanding the role of stress may help interpret why certain individuals are more susceptible to sleep problems than others, offering a valuable insight for therapeutic approaches. The researches attempt to give a better and more comprehensive understanding of what effects sleep quality of adults by focusing on both behavioral (mobile phone use) and psychological (stress) elements simultaneously. The results may provide useful insights into stress management, reducing late night phone use and enhancing sleep hygiene for young adults, teachers and medical professional. In the end, this research may aid in the creation of straightforward methods to promote improved sleep, emotional health, and general day-to-day functioning in young adults.

Objectives

1. To examine the relationship between late-night mobile phone use, perceived stress and sleep quality among young adults.
2. To explore the predictive role of late-night mobile phone use and perceived stress on sleep quality.
3. To find gender difference between late-night mobile phone use, perceived stress and sleep quality.

Hypotheses

1. There will be a relationship between late-night mobile phone use, perceived stress and sleep quality among young adults.
2. Late-night mobile phone use and perceived stress will predict Sleep Quality.
3. There will be a gender difference between late-night mobile phone use, perceived stress and sleep quality.

III. METHOD

Participants

This study used a quantitative correlational research design and a survey method was used to collect the data using standardized questionnaires. Convenient sampling method was used to obtain data from designated participants which were young adults from Islamabad of ages 18 to 25 years. The use of G-power (version 3.1.9.7) was employed in order to calculate the size of the sample. The minimum sample size provided by G-power was 216. Young adults in Islamabad, both male and female with age range from 18 to 25 years. Foreigners and adults with any diagnosed physical disability and mental illness were excluded from the study.

Measures

The Questionnaire employed for this study consists of the following forms and instruments. Before completing the questionnaire, participants were provided with an informed consent. The research goal and the process for participating were explained in detail. Participants were asked to participate willingly and were free to leave the research any time. Additionally, participants received assurance that the data they submitted would be kept confidential and used solely for research. The demographics data sheet included age, gender, employment status, diagnosed sleep disorder, duration of phone use past bedtime (e.g. after 10 p.m.) and lastly about diagnosed physical and psychological illness. [I] The Perceived Stress Scale (PSS), created by Cohen et al. in 1983, was used to measure perceived stress. The objective of the respective scale is to measure that how much people think that their lives are stressful. The scale is graded on a Likert scale of 0 to 4, with 4 being the highest frequency. The PSS-10's Cronbach's alpha was assessed as $>.76$. [II] Buysse et al. (1989), created the Pittsburgh Sleep Quality Index (PSQI). It is a self-rated questionnaire that evaluates sleep disruptions and quality over a period of one month. The Cronbach's alpha for the PSQI is 0.83, which indicates a high level of internal consistency. Each sub scale receives a 4-point Likert scale score, with values ranging from 0 to 3.

Procedure

To execute this research study, firstly permissions from respective authors of aforementioned scales were obtained via electronic mail. Moreover, a survey method was employed in data collection process. Survey questionnaires were distributed among participants in person to ensure the smoothness throughout the process of gathering relevant data. The research participants of the study include university population of different private, semi-government and government universities in vicinity of Federal Capital Islamabad. The informed consent was given at the start of the questionnaire followed by a demographic sheet and scales. The participants were authorized to drop out at any time without facing any consequence and their participation was completely voluntarily. Initially, the purpose of carrying out this research and its significance was briefed to the potential participants while doing so, maintenance of confidentiality was also guaranteed. The average time an individual took to completely fill the form was approximately ten minutes. After the procedure of collection of data, data was computed and examined using statistical package for social sciences (SPSS-version 27).

IV. RESULTS

Table I: Demographic Characteristics of study (N = 340)

Characteristics	n	%	M	SD
Age (in years)			21.39	1.782
Gender				
Male	170	50		
Female	170	50		
Employment Status	340	100		
Student Only	275	80.9		
Student with Part-time Job	51	15		
Full-time Employed	14	4.1		
Duration of Late-night Mobile phone use (e.g. after 10 p.m.) in hours			2.71	1.44

Table 1 illustrates the descriptive statistics of the participants (N=340). All the participant's age means and standard deviation was 21.39 and 1.782 respectively. The sample consist of 50% males and 50% females. The employment status of 4.1% were full time employed, 15% students with part-time job and only students were 80.9%. Along with this their late-night mobile use (e.g. after 10 p.m.) mean and standard deviation are 2.71 and 1.441 respectively.

Table II: Descriptive Statistics and Reliability Estimates of Study Variables (N = 340)

Variables	<i>k</i>	<i>M</i>	<i>SD</i>	<i>Range</i>	α
Perceived Stress Scale-10	10	21.74	6.0	2-40	0.760
Pittsburg Sleep Quality Index	10	8.64	4.24	0-21	0.82

Table 2 illustrates the psychometric properties of study variables which are PSS-10 and PSQI. The PSS-10 scale exhibits the value of mean as 21.74, standard deviation as 6.1, the range lies between 2-40 while the alpha is 0.760. In, PSQI scale the value of mean is 8.64, standard deviation is 4.25, range is from 0-21 and the alpha is 0.815.

Table III: Pearson Product-Moment Correlations Among Study Variables (N = 340)

Variables	1	2	3	<i>M</i>	<i>SD</i>
1. Perceived Stress	—	.10	.30**	21.74	6.09
2. Late-night Mobile phone use (e.g. after 10 p.m.)		—	.25**	2.71	1.44
3. Sleep Quality			—	8.64	4.25

** $p < .01$

Table 3 illustrate the linking of the independent variables of perceived stress and late-night phone use (e.g., after 10 p.m.). Perceived stress and sleep quality are significantly positively correlate (.30**) and Late-night Mobile phone use (e.g., after 10 p.m.) and Sleep Quality are also significantly positively correlated (.25**). Furthermore, there is a (.10) correlation between perceived stress and late-night phone use, such as after 10 p.m.

Table IV: Regression with Dependent Variable; Sleep Quality (N = 340)

Variables	<i>B</i>	<i>SE</i>	β	<i>p</i>	95% <i>CI</i>
Constant	2.7	.86		.00	[1.01, 4.33]
Late-night Mobile phone use (e.g. after 10 p.m.)	.64	.15	.22	<.00	[.35, .94]
Perceived Stress	.19	.04	.28	<.00	[.12, .26]

$R = .37, R^2 = .14, F = 26.8$

Table 4 illustrates the multiple regression which was computed to predict the impact of perceived stress and late-night phone use (e.g. after 10 p.m.) on Sleep Quality in young adults. The R value of .14 indicates that the predictors illustrated 14% variance in the outcome variables with $F = 26.8$ ($p < .001$). The findings revealed that the perceived stress and Late-night Mobile phone use (e.g. after 10 p.m.) significantly predicted Sleep Quality. Model is fit for data $F = (26.8, p < .001)$.

Table V: Independent Samples t-Test Comparing Male and Female on Study Variables (N = 340)

Variables	Males		Females		<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Late-night Mobile phone use (e.g. after 10 p.m.)	2.9	1.6	2.5	1.24	2.9	.01	.32
PSS-10	21.5	6.22	22	6	-.69	.16	-0.08
PSQI	8.33	4.2	9	4.3	-1.4	.7	-0.15

Table 5 shows the independent sample t-test which indicates the gender differences on variable sleep quality. The analysis demonstrated significant gender differences among males and females in correspondence to late-night phone use (e.g. after 10 p.m.) as result is significance where $p = .01$. While gender difference on other variables is insignificant.

V. DISCUSSION

The present study examined the relationship between late-night mobile phone usage, perceived stress and sleep quality among young adults. The findings partially supported the proposed hypotheses. Correlation analysis demonstrated that perceived stress and Late-night mobile phone use were both significantly linked with poor sleep quality. However, contrary to the initial hypothesis, Perceived stress and Late-night mobile phone use had no statistically significant link between them. The present findings demonstrated significant positive relationship between perceived stress and sleep quality, indicating that elevated levels of perceived stress were associated with poorer sleep quality among young adults. These findings of research are aligned with previous literature. A systematic review by Chu et al. (2023), concluded that poor sleep is closely associated with psychological distress and that stress is an important contributor to deteriorating sleep among young adults. Likewise, Khan et al. (2023), reported that great levels of stress were significantly associated with poorer sleep quality among Australian adults with excessive smartphone use. The findings further revealed a positive relationship between late night mobile phone use and poor sleep quality, suggesting that participants who reported more mobile phone use after 10:00 p.m. experienced poorer sleep quality. This finding supports a growing body of evidence indicating that night time smartphone use adversely affects sleep. Using objective measurement, Kheirinejad et al. (2023), demonstrated that in bed, smartphone use undermines several sleep parameters, including how long it takes to fall asleep and how often sleep is interrupted overnight. In parallel finding, Rafique et al. (2020), reported that extended phone use corresponded with weaker self-reported sleep quality among university students and young adults. Considered jointly, this body of work lends strong empirical backing to the present findings and suggests that curbing bedtime smartphone use may genuinely enhance sleep.

Contrary to what had been anticipated; however, the current study didn't detect a statistically significant link between perceived stress and late-night mobile phone use. This suggests that stress alone may not be the principal driver of night time phone use within this sample. Instead, young adults may turn to their phones at night for an assortment of reasons such as academic obligations, entertainment, habitual engagement with social media or simply staying connected with peers. This inconsistency echoes earlier literature on the stress and phone use relationship. Thomee et al. (2011), for example, found that the association between phone use and stress varied depending on the specific pattern of use rather than on overall volume, implying a relationship more nuanced than a straightforward link. Likewise, Katevas et al. (2018), found that high levels of smartphone use alone did not reliably predict weaker psychological wellbeing, suggesting that the context and manner of use may matter more than sheer quantity. In the last, the current study has identified a statistically significant gender difference in late-night mobile phone use, with male participants reporting higher rates than female participants. The effect size, however, was small (Cohens' $d=0.32$), indicating that the practical distinction between the two groups was modest at best. No significant gender difference was observed for perceived stress or sleep quality. The small gender difference may reflect variations in the type and purpose of smartphone use rather than overall smartphone engagement. Busch and McCarthy. (2021), in their study concluded that evidence related to gender differences in problematic smartphone use remains inconsistent across studies and populations, as it can be dependent on contextual, behavioral and cultural factors rather than representing a universal pattern. Therefore, the small gender difference observed in the present study may represent characteristics specific to the sampled population rather than a universal pattern.

Implications

The findings of this research may be beneficial for improving sleep habits among young adults. Universities and other educational institutions can help by spreading awareness about healthy sleep, responsible phone use at night and ways of managing stress. Counseling services can also guide students on reducing mobile phone use before bedtime and introduce simple coping methods such as relaxation, mindfulness and time management. Mental health professionals may help students understand that how stress and frequent phone use late at night can disturb their sleep. The results may also be useful for healthcare professionals, university administrators and policymakers who are working on student well-being. Awareness programs about healthier smartphone habits may help reduce sleep problems and at the same time support students in their studies, emotional health and everyday functioning. Since perceived stress and late-night mobile phone use were both found to predict sleep

quality independently, it would make sense for interventions to focus on both factors rather than dealing with just one. This study also adds to the limited research on sleep quality among young adults in Pakistan and may help to provide a basis for future programs related to student mental health and digital wellbeing.

Limitations and Suggestions

Since the reserach used a cross sectional and correlational design, it cannot confirm that stress or late-night phone use directly causes poor sleep quality. The participants were selected through convenience sampling and came only from Islamabad, so the findings may not fully represent young adults from other cities or backgrounds. The study also depended on self-report questionnaires which means some answers may have been influenced by inaccurate memory or by participants giving socially acceptable responses. Other factors such as academic workload, physical movement, caffeine intake, mental health and daily lifestyle may also have an effect. Future research could use longitudinal or experimental studies to understand these relationships more clearly and to examine possible cause and effect. Researchers could also use objective measures together with questionnaires, such as mobile phone screen time records or wearable tracking devices for sleep, to get more accurate information. Other psychological and behavioral factors, including anxiety, depression, social media dependency, coping strategies and resilience could also be studied.

VI. CONCLUSION

The findings revealed that both perceived stress and late-night mobile phone use were significantly linked with poor sleep quality. However, no significant relationship was found between perceived stress and late-night mobile phone use. Additionally, males reported significantly higher late-night mobile phone use than females, whereas no gender differences were observed for perceived stress or sleep quality. Overall, the findings of this research show the importance of cultivating healthier smartphone habits and effective stress management practices as a path towards better sleep quality among young adults.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Funding

The author received no funding from any organizations.

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