

Impact of Screen Time on Sleep Quality and Mental Health in Young Male Students

Screen Time on
Sleep Quality and
Mental Health in
Young

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ABSTRACT

Objective: To determine the impact of smartphone usage on sleep quality and to assess its deleterious effect in causing depression and anxiety among male adolescents.

Study Design: Cross-sectional comparative study.

Place and Duration of Study: This study was conducted at the Sleep Lab of Lahore General Hospital from April 2021 till September 2021.

Materials and Methods: Thirty healthy male adolescents between age ranges of 18-24 years were divided into two groups depending upon the scores of Smartphone Addiction Scale: Group 1 (low smartphone users) and Group 2 (high smartphone users). Pittsburgh Sleep Quality Index was used for qualitative assessment of sleep among two groups. Beck Depression Inventory scores and Beck Anxiety Inventory scores reflected the psychological impacts of smartphone overuse on adolescents. The data collected was analyzed using SPSS version 22. Data was first checked for normality of distribution and then Independent T-test and its non-parametric alternate, Mann-Whitney U test were applied for comparison of sample means of two groups. A p-value of ≤ 0.05 was considered statistically significant.

Results: Sleep quality was found to be significantly poorer in males with high smartphone usage as compared to the other group ($p=0.041$). Although Beck Depression Inventory ($p=0.538$) and Beck Anxiety Inventory ($p=0.783$) scores of high smartphone users were generally higher, but with no statistically significant difference among the two groups.

Conclusion: Subjective sleep quality of high smartphone users was significantly impaired than the low smartphone users.

Key Words: Sleep quality, smartphone usage, depression and anxiety.

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INTRODUCTION

In this era of the modern day, technology in the form of laptops, tablets and smartphones have taken over our lives completely.

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Over the last decade, the smartphone industry has taken the world by storm and the use of mobile phones has grown exponentially in Pakistan as well, with Pakistan ranked fifth in list of Asian countries with largest mobile phone markets ^[1].

Adolescence is the age group between 12-24 years, and it has been found that the behaviors developed in this age are likely to continue in adulthood. According to Pakistan Demographic Survey 2020, majority of Pakistani population lies between 15-64 years which comprises of 57.18% males^[2]. Adolescence is a very sensitive period where often overwhelmed with emotions, individuals get into a self-conflict of choosing between reason and desire. Therefore, young people very easily fall a prey to the addictive nature of smartphones. The compact size and user-friendly applications of this gadget have made the consumers vulnerable to its deleterious effects in causing behavioral addiction ^[3]. The thin line between rational and irrational mobile phone usage by the young generation is noticeably being trespassed thus developing physical and cognitive complications. The panic, agitation, frustration, and anxiety that is largely

observed in youngsters when they are away from their mobile phones, referred to as nomophobia is the classical hallmark of cell phone addiction in this generation^[4].

Sleep is a crucial natural and scientific event that is involved in modulation of many other behavioral and emotional responses such as mood, cognition, perception, memory, and others. Therefore, young adults with unhealthy sleep patterns as a result of bedtime use of mobile are more prone to suffer from depression^[5]. Although there are many psychological disorders such as obsessive compulsive disorder, bipolar disorder, schizophrenia, and developmental disorders but smartphone addiction most notoriously causes anxiety and depression in its users. Studies have shown that compared to good sleepers, the poor sleepers show poorer executive functioning and more state and trait anxiety^[6]. Social networking made convenient through Viber and WhatsApp also predisposes users to develop psychological disorders. This is in line with a study conducted on adolescents which linked excessive smartphone usage with depression^[7].

A number of researches conducted over the last few years have found the harmful and negative effects of radiations emitted from electronic devices such as mobiles, television, or computers on the quality of sleep^[8]. The electromagnetic radiations emitted by mobile phones pose yet another threat to human health resulting in headaches, sleep disturbances, alterations in memory and fatigue^[9]. In that specific context, another correlational study has pinpointed a significant negative impact of bedtime use of mobile on a normal sleep-wake cycle^[10]. Thus problematic smartphone usage has been invariably associated with mood disorders and insomnia^[11]. Focusing on the average hours of mobile phone usage each day, the present study was directed towards evaluating the link between mobile phone overuse, sleep problems, depression, and anxiety.

MATERIALS AND METHODS

It is a cross-sectional comparative study which was conducted in the sleep lab of Lahore general hospital from April 2021 till September 2021 using convenient purposive sampling technique. The research was conducted according to the Helsinki declaration of human rights after the approval by the ethical review board of Postgraduate Medical Institute Lahore (PGMI). Thirty healthy male subjects with ages between 18 to 25 years participated. All participants were assessed using the Smartphone Addiction Scale (SAS), Pittsburgh Sleep Quality Index (PSQI), Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI). Using the SAS scale, the study subjects were split up into two groups based on the severity of usage of mobiles- Group 1: Low smartphone users (n=15), SAS-SV cut-off value < 31; Group 2:

High smartphone users (n=15), SAS-SV cut-off value \geq 31. The data was analyzed using SPSS 22. Variables with symmetrical distribution were expressed in terms of mean and standard deviation. Whereas median and inter-quartile range was used to present the variables that did not follow the bell curve. The Independent t-test and Mann Whitney U test were applied to compare the quantitative variables among the two groups. A p-value of \leq 0.05 was considered statistically significant.

RESULTS

In this study, a total of 30 smartphone users were divided into two groups depending upon the scores of Smartphone Addiction Scale: Group 1 (low smartphone users) and Group 2 (high smartphone users).

Pittsburgh Sleep Quality Index (PSQI) questionnaire was used to measure subjective sleep quality in both the groups. The median PSQI score of group 1 was 4.0 (4.0 – 6.0) and PSQI score of group 2 was 6.0 (4.0 – 8.0). Mann Whitney U test was used to compare the median PSQI scores of the two groups. Results revealed that there was a significant difference in the average PSQI scores between the two groups. (Table 1)

Table No. 1: Comparison of PSQI score between both the groups by Mann-Whitney U Test

PSQI score	Group 1 (n=15)	Group 2 (n=15)	p-value
Mean \pm SD	4.4 \pm 1.8	6.6 \pm 2.9	0.041*
Median (IQR)	4.0 (4.0 – 6.0)	6.0 (4.0 – 8.0)	

(IQR = Inter-Quartile Range; PSQI: Pittsburgh Sleep Quantity Index)

(Group 1 = Low smartphone users; Group 2 = High smartphone users)

Values are represented as (mean \pm SD)

* p-value <0.05 was considered statistically Significant
Beck's Depression Inventory (BDI) questionnaire was used to assess the severity of depression in both the groups. The mean BDI score of group 1 was 13.1 \pm 8.2 and BDI score of group 2 was 14.9 \pm 7.6. Independent sample t test was used to compare the mean BDI scores of the two groups. Generally, group 2 had higher BDI scores as compared to group 1 but results revealed that there was no significant difference in the average BDI scores between the groups. (Table 2)

Table No. 2: Comparison of BDI score between both the groups by Independent sample T-test

BDI score	Group 1 (n=15)	Group 2 (n=15)	p-value
Mean \pm SD	13.1 \pm 8.2	14.9 \pm 7.6	0.538
Median (IQR)	13.0 (7.0 – 17.0)	16.0 (7.0 – 19.0)	

IQR = Inter-Quartile Range; BDI: Beck Depression Inventory

Group 1 = Low smartphone users; Group 2 = High smartphone users

Values are represented as (mean \pm SD)

* p-value <0.05 was considered statistically Significant
Beck's Anxiety Inventory (BAI) questionnaire was used to measure anxiety levels in both the groups. The median BAI score of group 1 was 5.0 (1.0 – 8.0) and BAI score of group 2 was 4.0 (2.0 – 11.0). Mann Whitney U test was used to compare the median BAI scores of the two groups. Results revealed that there was no significant difference in the average BAI scores of both groups. (Table 3)

Table No. 3: Comparison of BAI scores between both the groups by Mann-Whitney U Test

BAI score	Group 1 (n=15)	Group 2 (n=15)	p-value
Mean \pm SD	5.1 \pm 4.1	6.8 \pm 6.3	0.783
Median (IQR)	5.0 (1.0 – 8.0)	4.0 (2.0 – 11.0)	

IQR = Inter-Quartile Range; BAI: Beck Anxiety Inventory

Group 1 = Low smartphone users; Group 2 = High smartphone users

Values are represented as (mean \pm SD)

* p-value <0.05 was considered statistically Significant

DISCUSSION

The present study evaluated the impact of smartphone addiction on sleep quality, and also its deleterious effect in causing psychological disorders such as depression and anxiety among male adolescents. We hypothesized that high smartphone users had poor subjective sleep quality than the low smartphone users. Our results revealed that there was a significant difference in the average PSQI scores among the two groups (p value = 0.041). This is line with a study which showed that high smartphone users had higher global PSQI scores than the low smartphone users and non-users [12]. A recent study also found a significant relationship between poor sleep quality and smartphone addiction among male adolescents. The addictive features of smartphones such as browsing, gaming, online shopping, reading, and social networking keep the users indulged for long hours as a result a major proportion of the time is lost which could have been reserved for sleep [13]. These findings are consistent with a Chinese study that suggested indirect effect of increased bed-time procrastination and poor self-regulation as mediators between smartphone addiction and impaired sleep [14]. Another study deduced that bright light emitted from media devices disrupts circadian rhythm and suppresses melatonin secretion from the pineal gland which causes sleep impairment. Some scholars also postulate that there is a bi-directional relationship between adolescent's media usage and sleep problems. Hence adolescents having sleep problems use technology as a means of coping up with sleep deprivation [15].

In the present study, Beck's depression inventory questionnaire revealed that high smartphone users generally had higher BDI scores as compared to low smartphone users but these results were statistically insignificant (p-value 0.538). These findings are in accordance with the results of a study which showed that mobile phone usage for routine internet surfing, video gaming and for watching videos was not related with depression, however long hours spent on the mobile phone for streaming social networking sites such as Facebook, Instagram, Twitter, and online chatting such as Viber, WhatsApp, Line, Tinder led to depression [16]. In our study we did not quantify the time duration that the participants allocated for social networking as compared to that spent on texting and calling. Another study associated individuals with type A personality with a greater likelihood of developing smartphone addiction and depression [17].

Our study showed that the average BAI scores of high smartphone users were not significantly different than those of low smartphone users (p-value 0.783). This could be because we did not quantify whether the smartphone usage was limited for social networking sites (Tinder, Viber, Line) which exacerbate anxiety, or merely used as a tool for day to day communication i-e (telephone, email). Another study found that increased dependence on social networking sites to overcome loneliness, in turn made young population shy away from real time bonding which further augmented their depression and anxiety [18].

An increasing trend of smartphone addiction was found among adolescent females who for the fear of missing out on any update in their group of friends were habitual of staying connected with their fellows [19]. Since our study population comprised entirely of males, lack of anxiety could be ascribed to gender differences rather than technology overuse (p-value > 0.999).

CONCLUSION

The study concluded that the subjective sleep quality determined by the Pittsburgh Sleep Quality Index Questionnaire among the high smartphone users was significantly different than the low smartphone users. There was no significant difference in depression and anxiety among the two groups.

Author's Contribution:

Concept & Design of Study: Madiha Akram
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