

Correlation Between Sleep Quality & Use of Mobile Phone

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Abstract

Mobile phone use (PMPU) is a risk factor for both adolescents' sleep quality and mental health. It is important to examine the potential negative health effects of PMPU exposure. This study aims to evaluate PMPU and its association with mental health in college students. Furthermore, we investigated how sleep quality influences this association. Data regarding participants' PMPU, sleep quality, and mental health (psychopathological symptoms, anxiety, and depressive symptoms) was collected by standardized questionnaires in 100 college students. Multivariate logistic regression analysis was applied to assess independent effects and interactions of PMPU and sleep quality with mental health. PMPU and poor sleep quality were observed in 28.2% and 9.8% of participants, respectively. Adjusted logistic regression models suggested independent associations of PMPU and sleep quality with mental health ($p < 0.001$). Further regression analyses suggested a significant interaction between these measures ($p < 0.001$). The study highlights that poor sleep quality may play a more significant role in increasing the risk of mental health problems in students with PMPU than in those without PMPU.

Keywords: cellular phone; cross-sectional studies; sleep; anxiety; depression.

Introduction

1.1. Problematic Mobile Phone Use

There has been rapid development and increasingly widespread use of mobile phones. Despite its advantages of convenience and practicability, excessive use has been associated with potential risks in people's life. Problematic mobile phone use (PMPU) is not a new term and it is defined as an inability to regulate one's use of the mobile phone, which involves negative consequences in daily life. The prevalence of PMPU is fastly increasing in all ages

1.2. Mental Health & Problematic Mobile Phone Use

The incidence of mental health problems has increased worldwide. These observations have raised concerns about the adverse effects of excessive mobile phone use on the physical and mental health of college students. Researchers have reported a prospective relationship between mobile phone use and psychological symptoms in college students, and a possible model for this association has been proposed, which suggested that depression and sleep disorders were the consequences of high rates of information and communication technology use. It has proved that PMPU was correlated to anxiety or insomnia, depression psychological distress in adolescents or college students. Halayem, S (2010)

1.3. Sleep & Problematic Mobile Phone Use

Sleep disturbances (e.g., delayed sleep phase, sleep duration, sleep patterns, chronotype, sleep quality) among adolescents are closely associated with mobile phone use. Short sleep duration during the week showed higher problematic usage. Those who used their mobile phones more frequently after lights out reported a significantly poorer sleep quality, more fatigue and insomnia symptoms. Mobile phone use for calling and texting after lights out was associated with sleep disturbances (short sleep duration,

subjective poor sleep quality, excessive daytime sleepiness, and insomnia symptoms) Jenaro, C. (2007). Results showed that Composite Scale of Morningness (as a measure of chronotype) scores were the best predictor for problematic mobile phone usage, and as a consequence, evening-oriented university students scored higher on the Mobile Phone Problem Usage Scale. The sleep quality worsened with an increasing level of excessive mobile phone use. As an unstructured leisure activity, mobile phone use with no fixed starting and stopping point may increase the risk of extending and taking up more time, and thus other possible activities and sleep were displaced.

1.4. The Possible Role of Sleep for Mental Health

Sleep is recognized as necessary for health and overall growth. Sleep deprivation was associated with psychological symptoms, such as negative emotions and depressive symptoms. A large population-based study suggested that higher levels of depression and anxiety were more common in Norway adolescents with a delayed sleep phase. Furthermore, a longitudinal survey suggested there may be a causality between sleep pattern and mental health in adolescents, which indicated that a late bedtime and short sleep duration predicted consequential anxiety and depression. As such, it was effective to develop adolescent health education programs or interventions focusing on sleep quality to improve mental health. A survey based on a national sample showed that US adolescents with insomnia were more at risk for having mental disorders, including mood and anxiety disorders, and poor perceived mental health. Evening chronotype was reported to be associated with depression. The mechanism through which short sleep has an impact on emotional and behavioral functioning in adolescents may involve an increase in negative mood and a decrease in the ability to regulate emotions Schulte-Korne, G (2016).

Methods

Participants:

A cross-sectional survey was conducted to examine the health and well-being of college students. Self-completion questionnaires were administered in the classrooms of each participating college major. Cluster sampling was used, with the school department as the primary sampling unit. Between November and December 2013, 4915 questionnaires were distributed. However, we received 4858 completed questionnaires (response rate: 98.8%), as some students were absent. Owing to some responses, a total of 4747 respondents (58.4% female) with a mean age of 19.24 (Standard Deviation (SD) = 1.41) were recruited in the final analysis.

Procedure

Data collection was completed between October and December 2013. Teachers and professional investigators distributed questionnaires to the students and instructed them to complete the questionnaires anonymously within

20–30 min in classroom settings. Voluntary cooperation principles were obtained from all participants before the survey

Results

Characteristics of the Sample

Sample characteristics were displayed in Table I. There were responses from 4747 students (41.6% male, $n = 1973$). We observed PMPU in 28.2% and poor sleep quality in 9.8% of participants. Psychopathological symptoms were more common in male individuals (16.2% of female individuals vs. 18.9% of male individuals, $p < 0.05$). However, there was a near sex-based significance for anxiety ($p = 0.065$) and the results were not being significantly different for depressive symptoms ($p = 0.594$).

Students reporting low family income showed higher rates of poor mental health. Higher rates of psychopathological, depression and anxiety symptoms were also seen in those with Internet addiction (IA), PMPU, and poor sleep quality (all $p < 0.001$).

Table-I Sample characteristics

s.no	Total	Psychopathological symptoms	Pv	Anxiety symptoms	Pv	Depression symp	pv
Age	19.24± 1.41	19.20±1.42	0.016	19.52±1.44	0.065	19.34±1.46	0.594
Internet addiction (yes)	543 (11.4)	270 (49.7)	<0.001	209	<0.001	242 (44.6 [^])	<0.001
no	4204 (88.6)	553 (13.2)	<0.001	563	<0.001	512 (12.2)	<0.001
Pmpu (yes)	1340	447 (33.4)	<0.001	378(28.2)		415(31.0)	<0.001
(no)	3407	376(11.0)	<0.001	394(11.6)		339 (10.0)	< 0.001
Sleep quality (poor)	464 (9.8)	197 (42.5)	<0.001	196 (42.2)		218(47.0)	< 0.001
good	4283 (90.2)	626(14.6)	<0.001	576 (13.20)		536 (12.5)	<0.001

n: sample size, M – mean; SD; Standard deviation

Table -2 –Relationship of problematic mobile use with sleep symptoms & mental health.

Variables	Psychopathological symptoms		Aggressive symptoms		Depressive symptoms	
	Crude OR	Adjusted OR	Crude OR	Adjusted OR	Crude OR	AdjustedOR
PMPU (Yes)	3-.69(3.15-4.33)	2.46(2.06-2.94)	2.69 (2.28-3.16)	2.02 (1.68-2.43)	3.64(3.10-4.33)	2.53 (2.10- 3.05)
No	1.00	1.00	1.00	1.00	1.00	1.00
Sleep quality (poor)	3.61 (2.92- 4.47)	3.34(2.67-4.16)	4.06 (3.29-5.01)	3.72 (2.99-4.62)	5.35 (4.32-6.62)	4.97 (3.99-6.19)
(good)	1.00	1.00	1.00	1.00	1.00	1.00

There was a positive association of PMPU and sleep quality with mental health symptoms (Table 2). Logistic regression showed that both PMPU and sleep quality are independently associated with mental health symptoms. There was a significant interaction of PMPU and sleep quality with mental health symptoms ($p < 0.001$). Table 3 presents crude and adjusted OR (95% CI) for psychopathological symptoms, anxiety symptoms, and depressive symptoms in those with PMPU or poor quality sleep compared with the

reference group.

Discussion

This study was one of few to investigate PMPU in college students. The results provided evidence of the association between PMPU and poor mental health among college students. The results suggested that PMPU was positively related to psychopathological symptoms, anxiety, and depression. In addition, our results indicated that sleep quality was also positively correlated with mental health.

Furthermore, we confirmed interactions of PMPU and poor sleep quality with mental health among college students. We observed PMPU in 28.2% of participants, which was higher than in previous studies Demirhan et al (2016). This may be because our sample was college students, whereas the other study investigated high school students. Furthermore, the evaluation criterion for PMPU differed. Sánchez-Martínez and Otero used two forced choice (yes/no) questions, reporting an estimated prevalence of mobile phone dependence of 20%. They used direct judgment methods, whereas we considered total scores and percentiles. We might therefore expect our results to differ. To our knowledge, several studies supported the existence of the relationship between PMPU and psychological symptoms. An explorative prospective study reported women with high combined use of computers and mobile phones at baseline showed an increased risk of depression in a one-year follow-up. Furthermore, text message use was also related to depressive symptoms in men. Billieux, J (2012) reported that scores of depression were positively correlated with PMPU scores. The association between depression symptoms and intensive cell phone use has been confirmed elsewhere. Mobile phone use has also been reported as a diversion to kill time or avoid some other activity by anxious individuals, whilst it has been proven that excessive mobile phone use was connected with a high risk of anxiety and insomnia.

General psychological distress has been shown to be related to abnormal use of both the internet and mobile phones. Another study indicated that those with excessive mobile phone use not only experienced higher levels of depression and interpersonal anxiety. In addition, depressed adolescents are at higher risk of PMPU after controlling for the confounding effects of sex, age, and residential area Exelmans, et al [2016].

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