

## **Dependency on Mobile Phone Devices and its relations to Sleep Deprivation and Depressive Symptoms an exploratory study**

Prof. Johnston Wong

*Professor in Social Work and Social Administration, Chief Student Affairs Officer, UIC, CHINA  
[johnstonhuang@uic.edu.hk](mailto:johnstonhuang@uic.edu.hk)*

Cindy Lin

*Year 4 student, Social Work and Social Administration Programme*

Kenny Lan

*Assistant Director, Student Affairs Office*

Jay Zhang

*Student Development Assistant, Student Affairs Office*

### **ABSTRACT**

*Using electronic products among college students, its frequency and time spent particularly during bedtime, has a serious impact on their sleep quality. (Chu, Han, & Ai, 2018) Sleep is an important basic physiological requirement of human beings, occupying one third of the length of human life. It is an active process of restoring human spirit and relieving fatigue. Moreover, it is also a basic index of evaluating human health. (Bixler, 2009) Decline of sleep quality may eventually leads to psychological stress, poor concentration and affect academic performances. This study explored phone overuse, measured by the Mobile Phone Dependence Inventory (MPDI), and its effects particularly Sleep Quality employing the Pittsburgh Sleep Quality Index (PSQI), among UIC students. Phone hereby includes all kind of electronic visual devices. Results show that Phone overuse is only mildly related to sleep deprivation (Pearson  $r = 0.121^*$ ), also to depression (Spearman's  $r = 0.134^*$ ), psychotic personality (Pearson  $r = 0.180^{**}$ ) and neurotic personality (Pearson  $r = 0.173^{**}$ ). Results show that quite different from the literature that strong relations with poor physical health, sleep deprivation in this instance, and mental health, depression as measured, are not existing. There are significant but mild relations. Perhaps the functions of mobile devices are changing rapidly moving away from leisure to work. It is also used in teaching and learning. Positive elements of phone use may counteract its negative impact as web based social media may also be used to connect people and promote health.*

**Keywords:** Mobile Phone, Sleep Deprivation, Symptoms, Exploratory Study

### **1. Introduction & Literature review**

#### **1.1 Use of electronic devices and Sleep deprivation**

According to the study by Chu, Han, Ai (2018), the frequency and duration of electronic products used, in college students' bedtime activities have a serious impact on their sleep quality. Using cell phones too frequently before sleeping may make people difficult to fall asleep, awaken frequently all night, or wake up too early. Furthermore sleep deprivation has high correlation with the duration of cell phone usage. Sleep deprivation rate actually exceeded 30% among those continued to use the mobile phone after the lights were off at night, for more than 60 minutes.

Why does use of e-devices affect sleep? Melatonin, a hormone produced by the pineal gland at night, is involved in the regulation of the sleep/wake cycle. Since melatonin will be suppressed by light, expose to the blue Light exposure from various sources, including computers, cell phones, iPad and so on around bedtime, may also impact sleep. (Garfinke, Laudon, & Zisapel, 2008) In other words, the secretion of melatonin has an obvious circadian rhythm, secretion was inhibited during daytime and the secretion of melatonin is very active at night. Moreover, melatonin can improve sleep quality, shorten sleep time and time to fall asleep. (Crowley, Acebo, & Carskadon, 2007)

However, other researchers pointed out that the use of mobile phones is only mildly related to the quality of sleep, not the length of sleep. (Abbey, Walter, & Frank, 2014) Of course, other factors such as learning pressure, dormitory environment and stressful events also affect sleep quality, therefore overuse of phone should not be considered in isolation. Anyway it is worthwhile to find out whether dependency on mobile phone use has a serious impact on sleep quality among college students.

### **1.2 Use of Phone, Sleep deprivation and academic performance**

Sleep deprivation will cause significant changes in mood, alertness and working ability. (Liu, Hu, Chen, & Wu, 2018) Sleep deprivation will cause some negative consequences, such as attention-deficit, lack of concentration, poor memory, and people will feel more and more depressed, moody and anxiety. In other words, overuse of phone which leads to sleep deprivation will consequently leads to poor academic performances and high academic pressure. (Franklin, Walter, & Barlow, 2002)

Sleep deprivation may not be a direct cause of high academic pressure. A study by Huan M. X. (2018), suggested that learning pressure of college students mainly comes from the ambient students who are better than themselves, have high expectations of themselves, the uncertainty of postgraduate exam or guarantee, parents' expectations and the passing rate of the exam. Among them, the high expectations of themselves and the uncertainty of postgraduate exam/guarantee are the two most prominent ones. Sleep deprivation unfortunately will not help to release academic pressure but indirectly make it worse.

### **1.3 Use of Phone and social pressure**

Research also showed that extravert use cell phones more frequently than introverted peers, especially college students, since many college students may sacrifice their academic status, emotional health, physical health and other aspects of life to make sure they won't miss their social life.

## **2. Methodology**

This exploratory study employed convenient sampling and collect data by using an online questionnaire. Altogether 359 UIC students responded to the survey in February 2019. Four scales were included in the questionnaire including:

- Pittsburgh Sleep Quality Index (PSQI),
- Mobile Phone Dependence Inventory (MPDI),
- Eysenck Personality Questionnaire (EPQ), and
- Beck Depression Inventory (BDI).

## **3. Results**

### **3.1 Mobile Phone Dependency**

Scores with 30 points or higher more were classified as dependent on mobile phone. There were 160 students scored 30 points or higher, representing 44.6% of respondents.

### **3.2 Sleep Deprivation**

Scoring 8 points or higher in PSQI is considered having sleeping quality problems. In the UIC sample there were 49.7% of students fell into this category. It is certainly becoming a healthcare concern. The mean score of PSQI for UIC students was 7.6546 ( $SD= 3.83208$ ). It can be compared to another research on College students in HeFei, PSQI:  $5.613 \pm 2.554$ . (Chu, et al., 2018)

### **3.3 Depression**

It is necessary to point out that depression as measured by BDI showed a bi-modal distribution. Close to half (47.6%) or 171 students scored 21 to 60 in BDI. Scoring above 20 is considered to have depressive symptoms according to the Beck's scale.

### 3.4 Personality Traits

Psychotic traits is skewed towards the high side (Mean = 19.4624, SD = 1.86653 & variance = 3.484) while neurotic towards the low side (Mean = 17.5571, SD = 2.49725 & variance = 6.236). The relationships of various factors in relation to Phone Overuse are described in the following table.

Table 1: Phone Use and Sleep Deprivation, Depression and Personality Traits

	Sleep Deprivation	Depression	Psychoticism	Neuroticism	Extraversion
Overuse of Mobile Phone Devices	Pearson $r = 0.121^*$	Spearmen's $r = 0.134^*$	Pearson $r = 0.180^{**}$	Pearson $r = 0.173^{**}$	Spearmen's $r = 0.086$

Furthermore, to find out whether Sleep Deprivation has effected towards Depression and Personality traits, including Psychoticism, Neuroticism and Extraversion, the following statistics are presented in the next table.

Table 2: Sleep Deprivation and Phone Use, Depression and Personality Traits

	Depression	Psychoticism	Neuroticism	Extraversion
Sleep Deprivation	Spearmen's $r = 0.548^{**}$	Spearmen's $r = 0.364^{**}$	Spearmen's $r = 0.251^{**}$	Spearmen's $r = -0.052^*$

Drawing from the above results it showed that Sleep Deprivation indeed has a moderate relation to Depression (Spearmen's  $r = 0.548^{**}$ ) and Psychoticism (Spearmen's  $r = 0.364^{**}$ ).

## 4. Analysis

Data shows that Sleep Deprivation is related to Depression, psychotism and neuroticism, in that order of strength. However, Dependency on Mobile Phone Use is only mildly related to sleep deprivation ( $r = 0.124^*$ ). Actually similar mild relationship was recorded in an US study. (Abbey, Walter, & Frank, 2014;  $r = 0.01$ , ns) Therefore we can confirm that there is no ground to claim that over use of mobile phone can cause severe health problems, sleep deprivation in this regards, and mental health, referring to depression, among students. Extravert personality does not lead to over use of mobile phone at all.

## 5. Conclusion

Findings of this result in a way lessen our negative evaluations of Mobile phone use which is very often called Phone Addiction. It is difficult to explain why the findings are inconsistent with previous literature. One reason may be the functions of mobile devices have transformed recently, moving beyond recreational functions to work and social relationship functions. Therefore the negative effects of overuse in mobile phone facilities have been mitigated. Another reason is perhaps college students are now becoming more health conscious as they spend more time in jogging and other form of exercises. Mobile phones devices todays even have health promotion functions are they monitor your walking and sleeping habits. Nevertheless these explanations remain speculations awaiting for further research to prove.

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## Author's Background



**Prof Johnston WONG** specialized in disaster social work and healthcare social work. He joined the Social Work and Social Administration Programme of UIC since 2006. From 2008 he assumes the position of Chief Student Affairs Officer of the College and supervise major areas of student services. Subjects he has taught include social work skills, Chinese Laws for Social Workers, Human Services Management etc. He is also trained in Critical Incident Stress Management, Cognitive Behavioral Therapy and Emotional Intelligence Education. He has published 4 books and many articles. Latest research focus on social indicators and social integration in the Greater Bay Area, and use of mobile devices and sleep deprivation among university students.