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A Study of Mobile Phone Usage on Sleep and Stress among First Year Medical Students.

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ABSTRACT

Mobile phone usage has become one of the leading addictions among adolescent students which is considered to be one of the prime dependency gadgets among the teenagers to adults. The use of mobile phones preceeds to day time sleepiness along with late working hours at night. The students are therefore subjected to increased stress which affects the body physically, mentally and emotionally where he/she tries to cope up with day today activities thus leading to sleep deprivation and stress. The aim of the study is to study the effect of mobile phone usage on sleep quality and stress. This study was designed in medical college students of first year (n=100) who were divided into two groups based on the duration of of mobile phone usage and their sleep quality was assessed by using Pittsburg sleep quality index (PSQI) and their stress was assessed using Cohen's perceived stress scale. Statistical analysis was done using paired t test to compare the sleep quality and stress between two groups. Study showed that 57% of the subjects were using mobile phones more than 2hrs and about 43% subjects were using mobile phones for less than 2hrs. The mean PSQI among group 2 (6.70±2.65) was significantly increased with p value<0.001 when compared to group 1 (4.58±1.89) and the Cohen's perceived stress scale among group 2 (20.07±4.80) was significantly increased with p value<0.019 when compared to group 1 (17.65±5.31). Therefore increased usage of mobile phones more than 2hrs/day by students suffer from sleep deprivation which is considered as an important stressor due to poor sleep quality leading to stress affecting the hypothalamo-pituitary axis (HPA).

Keywords: stress, sleep deprivation, hypothalamo-pituitary axis(HPA)

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INTRODUCTION

Urbanisation with life style modification has lead to dependency of human life on gadgets in day today activities. Extensive usage of mobile phones in the recent trends as a mode of communication, social networking, playing games and listening to music has bought about a physical and psychological dependency in life leading to addiction [1].

Various studies have shown that majority of mobile users are adolescents especially students who suffer from sleep deprivation and increased stress affecting their cognitive and learning abilities. Excessive use of mobile phone phones causes increased wakefulness at nights and day time sleepiness thus leading to increased stress which affects the body physically, mentally and emotionally where he/she tries to cope up with day today activities [2]. The students who join as fresher's in the hostels are subjected to lack of privacy as they share the room, are subjected to home sickness, lack of luxuries and comforts for which they have to compromise. Academically they become stressed out due huge curriculum and in preparing for exams. However stress sets in which is the main factor that causes insomnia as shown in various studies as stress and awake status triggers HPA activity [3].

Physiological data suggests that sleep restriction leads to striking alteration in metabolic and endocrine functions like decreased carbohydrate tolerance , increased sympathetic tone and elevated cortisol levels thus causing a novel risk factor for Diabetes Mellitus [4].

This study was thus undertaken in first year MBBS students to know the implications of increased mobile phone usage on sleep parameters and stress.

METHODS AND MATERIALS

This is a descriptive questionnaire based study carried out in volunteers of second year MBBS students in Sri Siddhartha medical college (SSMC), Tumkur. The study population consists of total 100 subjects including both males and females in the age group of 18-25 years. Institutional ethical clearance was obtained.

Students who were willing to participate were given a brief description about the study and its objectives. Students who had sleep disorders or any acute or chronic illness were excluded from the study. After taking their verbal consent, demographic profile of the subject like age, gender, education and life style habits like smoking and alcohol consumption was obtained. The volunteers were screened randomly on questionnaire basis that comprised of questions related to mobile usage which includes number of years of mobile phone usage, time of maximum usage, number of hours spent for calling / texting messages ,number of hours of mobile phone usage/day, number of hours spent in mobile phone after lights out and so on.

Pittsburg sleep quality index (PSQI) questionnaires was distributed among the study volunteers in order to assess their sleep quality, sleep latency, sleep duration, sleep efficiency and day time dysfunction. The score above 5 indicates poor sleep quality.

Perceived stress Questionnaire was utilized to estimate stress levels among the study group .the completed questionnaire was analyzed to obtain the Perceived stress Score Index. It was obtained by calculating the aggregate of all the four factors that is tension, worries, joy and demand with the joy scale reversed. Higher the score index greater the stress levels.

RESULTS

This is an observational study designed to assess the effect of mobile usage on sleep quality index and daytime sleepiness. The study group is divided into two groups based on hours of mobile usage (group 1 <2hrs and group 2 >2hrs).

The subjects of either group were age matched with mean age of group 1 (19.30±0.99 yrs and group 2 19.23±2.28 yrs). Mean hours of usage of mobile among group 1and group 2 is 1.95± 0.21 and4.19±1.17 hrs respectively.

In our study, it was observed about 57% of the subjects were using mobile phones more than 2hrs and about 43% subjects were using mobile phones for less than 2hrs, among these subjects about 54.4% of males and 45.6% of females were using mobile phones more than 2hrs and 37.2% males and 62.8% females were using mobile phones less than 2hrs. The above details is depicted in table No 1.

Table 1: Distribution of study population according to duration of mobile phone usage.

Group	No. of subjects	Percentage (%)
Mobile usage less than 2 hours	43	43.0
Mobile usage more than 2 hours	57	57.0
Total	100	100.0

PSQI index was done to determine the quality of sleep among the two groups. The PSQI < 5 is normal whereas in this study about 82.5% of the individuals who use mobile for more than 2hrs have PSQI more than 5 when compared to individuals who use mobile less than 2hrs (58.1%). The mean PSQI among group 1 (4.58±1.89) and group 2 (6.70±2.65) with p value<0.001, while the sleep latency was significantly(0.001) prolonged in group 2 compared to group 1 with respective mean values (group 1(0.67±0.710) and group 2 (0.95±0.83), interestingly other sleep parameters are comparable between two groups. Thus the individuals using mobile phones more than 2hrs have poor sleep quality index and increased sleep latency when compared to individuals who use mobile phones less than 2hrs.

Perceived stress scale was done among two groups to determine stress levels due to excessive mobile usage before bed time which decreases the sleep quality. In this study about 89.5% of the individuals who use mobile more than 2hrs have PSS between15-30 whereas individuals using mobile phone less than 2hrs have PSS less than 15(74.4%). This mean PSS among group1 (17.65±5.31) and group2 (20.07±4.80) with p value<0.019 Therefore, stress levels were significantly more among the individuals who use mobile phone more than 2hrs when compared its counterpart.

Comparison of PSQI and PSS among two groups is depicted in table No 2. In summary of our results individuals using mobile more than 2hrs have poor sleep quality, increased sleep latency and stress when compared to group with less than 2hrs of mobile usage.

Table 2: Comparison of Age, PSQI and PSS among two groups.

Variables	Mobile usage less than 2 hours	Mobile usage more than 2 hours	Total	P value
Age in years	19.30±0.99	19.23±2.28	19.26±1.83	0.842
PSQI	4.58±1.89	6.70±2.65	5.79±2.57	<0.001**
Sleep Latency	0.67±0.71	0.95±0.83	0.85±0.75	<0.001**
HRS Mobile	1.95±0.21	4.19±1.17	3.23±1.43	<0.001**
PSS	17.65±5.31	20.07±4.80	19.03±5.14	0.019*

DISCUSSION

Mobile phones have drastically influenced the young adolescent life style's by causing increased dependency and addiction. The increased usage of this instrument has lead to exposure of radio-frequency electro-magnetic field (EMF) of 30 KHZ-300 GHZ both during receiving and transmitting the signals to various health hazards like headache, suppressed night melatonin secretion, decreased REM sleep latency along with increased time in stage 2 sleep whenever mobile was used prior to sleeping period. Exposure to low frequency of 60 HZ EMF in males showed impairement of short term memory and lack of concentration among students [5-7].

Many studies have shown that increased usage of mobile phones among the young adolescents suffered from sleep disturbances such as short sleep duration subjective of poor sleep quality, excessive daytime sleepiness and insomnia. Our study consists of young adolescents of first year MBBS students who were host elites and were subjected to condensed medical curriculum, new college environment, hostel stay where they have to get adjusted to roommates, food and compromise on luxuries thus leading to late hours

and extended use of mobile phones for communication which in turn leads to emotional and cognitive arousal in pre sleep period followed by poor sleep quality and insomnia. A study done among 15-19 years adolescents showed that health symptoms such as stress, increased fatiguability, anxiety, symptom of depression, disturbances in concentration and adverse sleep disturbances were seen [8].

Normal sleep decreases sympathetic nervous system and increases the parasympathetic nervous activity, but however in sleep deprieved individuals it has been studied that there will be increased sympathetic hyperactivity. It was also seen that these adolescents also suffered problems regarding attitude as they had developed impulsivity, urgency and restlessness which contributes as a risk factor for stressful mental health [9].

Sleep deprivation for a long time is considered as an important stressor along with day time sleepiness causes increased sympathetic tone and elevates evening cortisol levels which may predispose to insulin resistance causing reduced glucose tolerance. As cortisol is the predominant gluco corticoid secreted by adrenal glands as the final product of the hypothalamus-pituitary-adrenal axis (HPA) [4] follows a particular pattern in the circadian rhythm throughout the day.

Various studies conducted among rats have shown that long term exposure to cell phone radiation results in enhanced serum levels of cortisol indicating the existing of stress in rats exposed to cell phone radiation [10]. Another study shown that it may be concluded that deleterious effects of mobile microwaves can effect on hypothalamic-pituitary-adrenal axis Increased cortisol levels due to increased stress has been related to various chronic diseases and metabolic changes including diabetes, hypertension, dyslipidemia and immune suppression [11]. High concentrations of cortisol can easily cross the blood–brain barrier, where it can influence learning and memory by binding to brain receptors involved with these cognitive domains in specific areas, such as the hippocampus, the amygdala and frontal lobes causing hippocampal atrophy and cognitive decline [12].

However our studies showed similar results in accordance to other studies that increased usage of mobile phones causes sleep deprivation and thus leads to stress that can lead to various health hazards affecting behaviour and cognition of young minds.

CONCLUSION

In the present study sleep disturbances due to increased mobile phone usage leads to a stressful life which was seen among first year medicos that aggravates day time sleepiness and may cause adverse effects on health over a long period of time and can affect their academic performance.

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