Original Article

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Correlation of Smart Phone Addiction with Poor Sleep Quality and Low Academic Score in Medical Students of Nishtar Medical University, South Punjab

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A B S T R A C T

Objectives: To correlate smart phone addiction (SPA), poor sleep quality and low academic score in medical students and its association with gender.

Methodology: A Cross- sectional descriptive study was conducted on medical students of 4th and final year MBBS (who were mobile phone addict for more than one year). The percentage of last professional exam was taken as academic score. A proposed SPA diagnostic criterion was used to diagnose smart phone addict students. For SPA severity and sleep quality assessment Problematic Mobile Phone Use Questionnaire (PMPU-Q) and Pittsburgh Sleep Quality Index (PSQI) were used.

Results: A total of 74 subjects having mean (SD) age of 22.24 (1.929) years presented with negative correlation between academic score and PSQI ($p < 0.05$) were included in the study. There was no significant association between academic score and smart phone addiction. The male students had worse score in dependency and dangerous use on PMUQ scale. The female students were worse in dangerous and problematic use of smart phone on PMUQ scale.

Conclusion: The SP dependency and poor subjective sleep quality of male students were negatively associated with their academic score. The female students with low academic score were worse at PSQI score, their academic score was not significantly correlated with their smart phone addiction.

Keywords: Smartphone addiction, Sleep Quality, Academic Score

Introduction

Within few decades, Smart phone (SP) has revolutionized the way how people work, search for knowledge, interact and pass time.[1] SP is not just a source of global connection it has become a portable entertainment source. It has increased shopping experience and constantly attracting businessmen in online marketing.[2] SP has become a crucial way to dissipate awareness and knowledge worldwide.[3]

People are using SP as a study tool in this modern era. Students of different disciplines including medicine, engineering, information technology and business are getting benefits in their studies from different SP applications.[4] SP and social media are providing platforms to encourage knowledge sharing and to improve communication skills.[5]

According to a research in 2019, SP usage was 83% in South Korea, 54% in Japan and 71% in America.[6] The smart phone users of Pakistan have raised from 0.31 million in 2000 to 175.62 million in 2020 and up to 192 million in march 2022. According to PTA 2021 statistics; In Pakistan; people have 50M face book, 45M YouTube, 3.7M Twitter, 31.2M Tik Tok, 20M Snack Video, 3M Likee, 0.5 BIGOLIVE and 117M Google accounts and subscriptions.[7]

SP usage is a productive method of stepping up in medical education and patient care8.Its applications have potential

to improve practice and knowledge in health care professionals and students.[9] Although its benefits, medical students have indulged in smart phone addiction (SPA) which in turn adversely affects their psycho social health. Radio-frequency electro-magnetic field (RF-EMF) is posing mental and psychological health risks which in turn are becoming a subject of great interest for medical researchers.[10] According to proposed diagnostic criteria of SPA, people with SPA present with maladaptive pattern and functional impairment.[11] Dependency problems, role conflict, stress, anxiety and insomnia are some psycho-psychiatric ailments which are rising due to SPA.[12]

Sleep quality plays an essential role in maintaining mental and physical health of people which is disturbed in students due to SPA.[13] Disturbed sleep quality in turn adversely affects their academic performance.[14] According to a contemporary survey, 32.6% USA adults have disturbed sleep quality. 44% south Indians and 97% Iranian university students are vulnerable to poor sleep quality and academic stress due to SPA.[15]

Disturbed sleep quality by SPA can be explained by phenomenon that its blue light acts on Suprachiasmatic nucleus (SCN) through retinohypothalamic tract, SCN decreases melatonin release from pineal gland and suppresses inhibitory effect of melatonin on SCN. Hyperactive SCN disturbs sleep pattern of a person.[16] RF-EMF induced hyperactive SCN trigger paraventricular nucleus (PVN). PVN drives hypothalamus-pituitary-adrenal axis (HPA) by releasing Cortisol releasing factor (CRF). Increased CRF enhances adrenal cortisol secretion by increasing the release of Adrenocorticotrophic releasing hormone (ACTH) from pituitary gland.[17] High blood Cortisol level is one of the potent causes of stress and anxiety.[18]

SPA is causing poor sleep quality and poor academic performance in medical students by disturbing internal clock (SVN) and HPA axis respectively. Our study is supposed to be the pioneer one in South Punjab which is going to link the effect of SPA with sleep quality and academic performance of medical students. It shall help the clinicians, parents and subjects to keep an eye on SP use in their kids and patients so that the mental well-being of their youngsters would be ensured and these problems, in youngsters, can be tackled down in new and novel basis.

Methodology

The study was conducted as per Helsinki declaration of human rights. Approval of research synopsis was obtained from the ethical review committee of Nishtar Medical University (NMU), Multan. Data was collected after obtaining fully informed, understood and voluntary consent of the subject. Data was collected by interviewing study subjects individually. The Secrecy of their data was maintained. In case of SPA students were counseled to seek service of psychiatrist to get rid this SP addiction.

Cross sectional comparative study was conducted within premises of the Nishtar Medical University & Hospital Multan. Study was carried out within one month after approval of the synopsis. Convenience sampling technique was used. Sample size was calculated, with power of 95%, an alpha level of 5%, by WHO Geneva Software

In our research there were two groups of males and females each of 37 participants. The above mentioned values were calculated from (Mobile Phone addiction and Its Relationship to Sleep Quality and Academic Achievement of Medical Students at King Abdul-Aziz University, Jeddah, Saudi Arabia.[19]

74 non-obese, 4th year and final year MBBS students of Nishtar Medical University Multan, between 18-23 years' age were included. All students belonged to Southern Punjab Pakistan. Non-Obese male and female subjects, who are Mobile Phone addicted for more than a year, were taken. Both male and female students with BMI less than 24.9 were included. All students were SPA according to proposed diagnostic criteria of SPA. Those with psychiatric disorders (problems like Stress, Anxiety, depression, Obsessive compulsive disorder and Bipolar disorder) and with metabolic problems (Obesity and Hypertension) were excluded. Those that were already on Psycho-psychiatric drugs or on exogenous hormone therapy were not eligible for study participation. Persons living in a noisy environment were also excluded from study.

To measure weight, portable weighing machine was used, on a firm, flat surface. To measure height, waist and hip circumference, measuring tape was used. For diagnosing Smart Phone Addict students, Proposed Diagnostic Criteria to diagnose SPA was used. For Calculation of the Smart Phone Addiction, Problematic Mobile Phone Use Questionnaire was used. Various aspects of mobile phone addiction (PMPU-Q) for (dependency, assessing problems, prohibited and dangerous use) were included in this study. The questionnaire comprised thirty items for assessment of various aspects of smart phone addiction. [20, 21] Its internal consistency reliability was assessed by Cronbach's alpha and found to range from 0.85 to

0.9015.[20] For Assessing Sleep Quality, Pittsburgh Sleep Quality Index (PSQI) was used. For Assessing Academic Achievement Percentage of Recent professional exam marks were included.

The Data was analyzed by using SPSS version 25. The quantitative variables of the cases were presented as Median (IQR). Data was analyzed first for normality distribution by Shapiro-Wilk's and Kolmogorov Smirnov's test. Data was non-normally distributed so spearman's correlation test was used. Mann-Whitney-U Test was applied to compare [Median (IQR)] to see whether quantitative variables of all groups varied from each other or not.

Results

A total of 74 subjects having mean (SD) age of 22.24 (1.929) years were included in study, they presented with negative correlation between academic score and PSQI (p=0.041). The Academic Sore was positively correlated to PMUQ. When Mann-Whitney-U Test was applied, there was significant difference in AS, Sleep Duration, Habitual Sleep Efficiency, Sleep disturbance, Daytime Disturbance & Total PSQI score among gender with p value 0.20, 0.039, 0.02, 0.033, 0.001, 0.012 respectively. The male students had worse score regarding dependency, dangerous use and PMUQ; their academic score was negatively associated with subjective sleep quality (p< -0.05). The female students had worse score in subjective sleep quality, sleep Duration, sleep disturbance, daytime disturbance, PSQI, problematic and dangerous use of smart phone: their academic score was significantly associated with sleep latency and PSQI (p 0.005).

Discussion

In our research, on medical students of fourth year and final year of Nishtar Medical University, we found no difference between males and females with regard to smart phone usage. In both groups, the sleep quality was equally disturbed and significantly correlated with their academic score. PSQI was aimed to evaluate subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency and sleep disturbances. According to a study among medical students of Jeddah, Saudi Arabia, prohibited mobile phone usage was significantly correlated with subjective sleep quality, sleep latency, sleep disturbance and total PSQI score as high as in line with our study.[19] Another study proves that overall PSQI score and Smart phone addiction score (SAS score) were positively correlated and correlation was highly significant among males residing in hostels.[22]

Moreover, another study shows that total time spent on mobile phone was highly associated with waking time tiredness. And difficulty in waking up was highly associated with decline in study habits ,hence result in low academic performance.[23] In Peru, 30% people with sleep disorders were addict to Facebook than normal people. Nowadays, with gradual increase in apple and android phones, the web social network has been increased by usage of these devices.[24]

Table I: Demography of Study Variables.

Variables	Male Median/IQR	Male Skewness	Male S.E	Female Median/IQR	Female Skewness	Female S.E
Age (years)	22/2	3.427	0.388	22/3	-0.251	0.388
Weight (Kg)	67/12	-0.309	0.388	53/8	-0.154	0.388
Height (m)	1.74/0.10	-0.094	0.388	1.6/0.05	-0.607	0.388
BMI	21.90/3.88	4.333	0.388	20.90/3.20	0.115	0.388
Waist (cm)	81/10	-0.006	0.388	76/8.5	-0.145	0.388
Hip (cm)	91/12.5	0.381	0.388	97/11	0.807	0.388
WHR	0.860	-0.458	0.388	0.72/0.05	-0.179	0.388
Academic Score %	74/6	-0.735	0.388	75/6	-0.227	0.388
Subjective Sleep Quality Score	1/0	0.99	0.388	1/1	0.369	0.388
Sleep Latency	1/1	0.292	0.388	1/2	0.005	0.388
Sleep Duration	2/1	0.124	0.388	2/2	-0.412	0.388
Habitual-Sleep Efficiency	1/1	0.801	0.388	1/1	1.73	0.388
Sleep Disturbance	1/0	-0.935	0.388	1/0	2.643	0.388
Use of Sleep Medication	0/0	4.727	0.388	0/0	6.083	0.388
Daytime Dysfunction	1/3	0.35	0.388	2/2	0.149	0.388
Total PSQI	7/3	0.355	0.759	8/5	0.535	0.388
Dangerous Use	14/4	-0.249	0.388	14/4	0.345	0.388
Prohibited Use	12/3	0.242	0.388	12/2	0.863	0.388
Dependence	18/2	0.259	0.388	17/3	0.211	0.388
Financial Problems	36/5	0.058	0.388	34/7	0.037	0.388
Total PMUQ	80/7	0.207	0.388	78/11	-0.43	0.388

Table II: Correlation coefficients between sleep quality components, academic score and the domains of Problematic Mobile Phone among medical students

PSQI Components	Prohibited Use	Financial Problems	Dangerous Use	Dependency
Subjective Sleep Quality Score	-0.043	-1.74	-1.71	-0.014
Sleep Latency	-0.008	-0.067	0.126	0.003
Sleep Duration	-0.172	-0.372	-0.273	-0.143
Habitual-Sleep Efficiency	-0.057	0.035	-0.023	0.013
Sleep Disturbance	0.086	-0.221	-0.014	-0.044
Use of Sleep Medication	-0.068	0.162	-0.002	0.075
Daytime Dysfunction	0.107	-0.015	-0.148	-0.121
Total PSQI	-0.018	-0.238	-0.134	-0.150
Academic Score	0.036	0.097	1.46	0.009

More than half of the medical students stated that the main reason of their mobile phone usage was texting and talking to their family members.[14] A study proved that females were more addicted to mobile phone because of their habit of talking and sharing personal stuff with their friends and relatives which does not correlate with our study.

In our study, there was no significant effect on academic performance of students addicted to smart phone, as students learnt how to manage their time by using smart phone for their studies because whole curriculum was being taught via online classes. Moreover, a study confirms that there is poor management of time among individuals having smart phone addiction as they ignore other important things of their daily life which also doesn't correlate with our study.[25] In other research, the sleep quality of the students using smart phone for more than 10 hours was more disturbed and poorer than the students who were using phone for hardly 2 to 3 hours.

Conclusion

In our study, the male students with low academic score were worse in subjective sleep quality and smart phone dependency but their academic score was not significantly associated with PMUQ score. The female students were worse in components of PSQI, problematic and dangerous use of smart phone; their academic score was negatively associated with their sleep quality. There was no any significant correlation between female academic score and their smart phone addiction.

Limitations: Our study was not stratified on the basis of academic score. During data collection, students with lowest academic score were busy in supplementary examinations. In our study, we did not collect detailed data regarding usage of different smart phone applications from students. Most of them were using different smart phone applications to help them out in the medical study which in turn improved their academic performance and ultimately limited results of our study.

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