ORIGINAL ARTICLE

J Nishtar Med Uni.
Vol. 2, No. 2, 2019

PREVALENCE OF PSYCHO-PSYCHIATRIC DISORDERS WITHIN MEDICAL STUDENTS ADDICTED TO MOBILE PHONE USAGE

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ABSTRACT

BACKGROUND: Mobile phone addiction creates the basis of psycho-psychiatric disorders like depression and anxiety in medical students.

METHODOLOGY: 112 students from all five years of MBBS were selected from Nishtar Medical University, Multan by convenience sampling.

RESULTS: Within Smartphone Non-addict (SNA) subjects, as deciphered on DASS, 85.7% males while 82.1% females were found to be devoid of depressive spectrum. On the sub-scale of anxiety, 82.1% of both males and females had no anxiety. While interpreting stress, 78.6% of both males and females were normal and had no stress at all. Within the Smartphone Addict (SA) populations, 75.0% males and 71.4% females portrayed depression. On the sub-scale of anxiety, 75.0% males and 78.6% females depicted various shades of anxiety. While interpreting stress, 75.0% of both males and females harbored stress.

CONCLUSIONS: Mobile phone addiction leads to stress disorders like depression and anxiety in medical students addicted to mobile phones.

KEY WORDS: mobile phone, addiction, depression, anxiety, stress.

INTRODUCTION

Digital addiction, also referred to as technology associated human-machine dependency, is defined as an irresistible urge to engage in electronic devices in spite of their negative consequences[1] such as a negative impact on everyday habits, social behaviors and family relations of an individual[2] which has emerged as a worldwide epidemic over the past decade. The prevalence of mobile phone usage has risen exponentially in recent decades. In 2017, there were over 5 billion mobile phone subscribers globally which is equal to a penetration rate of 66%. Moreover, these statistics are predicted to reach 6 billion users by 2025 with 5 billion connecting to the internet[3]. The prevalence of mobile phone addiction differs across the globe, with estimates ranging from 2.6% of the population in Northern and Western Europe to 10.9% in the Middle East[4].

Digital addiction has the same functional effects as any substance abuse and an irresistible urge to use

mobile phone is associated with increased levels of dopamine in the neurons of mesocortical and mesolimbic circuitry present in the Ventral Tegmental Area (VTA).

The fibers of these circuits extend via the medial forebrain bundle (MFB) to medial prefrontal cortex (mPFC), nucleus accumbens and amygdala, and a higher concentration and/or extended stay of dopamine within the synapses of this reward circuitry in a mobile phone addict results in the development of incentive-motivational behavior/dependency in the long run[5].

A mobile phone user initially perceives positive reinforcements through access to social applications, immediate replies, etc. because of an increased level of dopamine in his/her mesolimbic brain circuitry, the fall of which during mobile withdrawal leads to negative emotions which in turn leads to development of isolation as well as suicidal ideation in individuals clung to their mobile phones. Also, these deranged levels of dopamine disrupt the normal physiological functioning of serotonin within the primary mood controlling areas that provides a ground for the development of psycho-psychiatric disorders like depression which is a psychological condition characterized by emotional as well as physiological disturbances[6].

Moreover, the continuous use of mobile phone presents itself as a social stressor in the long run because an individual dependent on mobile phone has got access to social forums where one can compare one's own life with that being projected online by the people connected to the user virtually and can create both negative as well as criminal swings once exposed to this virtual projection. These non-pleasant situations lead to increased levels of cortisol within a mobile phone dependent individual which not only inhibits serotonin synthesis through activation of tryptophan 2,3-dioxygenase (TDO) enzyme within the brain macrophages as well as microglial cells but also leads to synthesis of neurotoxins within kynurenine pathway instead of serotonin[7]. Both of these physiological derangements combined together thus lead to a considerable reduction of serotonin within key mood controlling areas and pave way for emergence of mood disorders like stress.

Anxiety, another associated psycho-psychiatric disorder associated with smartphone usage, is defined as a psychosomatic anomaly which manifests itself with stress, recurrent disturbing notions/concerns and physical changes like high blood pressure, sweating, shivering, drowsiness and/or tachycardia[8]. Contemporary researches have projected that blue light from mobile phone screens, through intrinsically photosensitive retinal ganglionic cells (ipRGCs)[9], sends signals to the melatonin secreting pineal gland via the suprachiasmatic nucleus (SCN)[10] which is involved in synchronization of diurnal rhythms. Exposure of this short wavelength light rays at night, even at very low intensities, strongly inhibits melatonin secretion[11] which disrupts the overall synchrony of the central and peripheral clocks especially those dependent on hypothalamic–pituitary– adrenal axis (HPA)[12]. This axis controls the level of major stress hormones i.e. corticotrophins and gonadotrophins which normally affect the anti-stress and metabolic capacity of an individual and suppress the evolution of stress disorders like depression and anxiety[13]. Hence, disruption of HPA ultimately makes a mobile phone addict more prone to the development of stress disorders like anxiety.

Our study shall be the first, in south Punjab, to provide a scientific link between mobile phone use addiction and the frequencies of depression, anxiety and stress in medical students. This, hence, shall provide us with valuable data on the base of which we could advocate the limitation of mobile phone use in our students so that they could be saved from falling into clutches of psycho-psychiatric disorders

MATERIAL AND METHODS

This cross-sectional study was conducted to find out the association of mobile phone addiction with the emergence of psycho-psychiatric disorders among the students of Nishtar Medical University. The study was carried out during the month of August, 2022 under the supervision of Physiology Department of Nishtar Medical University, Multan.

112 students from all five years of MBBS were selected for which sample size was calculated through the following equation which was derived from WHO Geneva issued software "Sample size determination in health studies – a practical manual, version 2.0.21"[14].

$$n = \frac{\sigma^2 (Z_{1-\alpha/2} + Z_{1-\beta})^2}{(\mu_0 - \mu_1)_2}$$

The data was collected through convenience sampling. The questionnaire SAS-SV was distributed to identify the smartphone non-addicted (SNA) and smartphone addicted (SA) populations both of which were then directed to fill DASS in order to identify the degree of depression, anxiety and stress. The volunteers filled the forms anonymously to increase the probability of involvement of students from all the existent strata. The frequencies of various parameters were calculated via SPSS-26 while Chi Square test was applied to compare qualitative data.

RESULTS

Within SNA subjects, as deciphered on DASS, 85.7% males while 82.1% females were found to be devoid of depressive spectrum, 7.1% males and 14.2% females harbored a previously undiagnosed shade of mild depression while 7.1% males and 3.6% females carried an unregistered spectrum of moderate depression. On the sub-scale of anxiety, 82.1% of both males and females had no anxiety, 14.3% males and 7.1% females depicted mild anxiety, 10.7% females had a moderate intensity of anxiety while 3.6% males carried severe levels of anxiety.

While interpreting stress, 78.6% of both males and females had no stress, 14.3% males and 17.9% females were experiencing mild stress while 7.1% males and 3.6% females had moderate levels of stress.

Within the SA populations, 17.8% of the male subjects while 17.8% of female subjects portrayed moderate level of depression, 57.1% of males and 53.6% females harbored mild depression and only 25.0% males and 28.6% females were normal. On the sub-scale of anxiety, 3.6% females portrayed extremely severe levels of anxiety, 14.3% males and 21.5% females had severe anxiety, 28.5% males and 46.4% females depicted moderate anxiety, 32.1% males and 7.1% females had a mild intensity of anxiety while only 25.0% of males and 21.4% females were normal. While interpreting stress, 10.8% females had severe stress. 14.3% males and 28.5% females had moderate levels of stress. 60.7% males and 35.8% females had mild levels of stress but only 25.0% of both males and females were normal on the sub-scale of stress.

Table 1: Chi Square Test Results of SAS-SV and DASS-D

Representative Variable		Depression Scale Combined			
		Without Depression	Mild Depression	Moderate Depression	p
SAS-SV	SNAs	47	6	3	0.00
	SAs	15	31	10	

Table 2: Chi Square Test Results of SAS-SV and DASS-A

Representative Variable		Anxiety Scale Combined				
		Without Anxiety	Mild Anxiety	Moderate Anxiety	Extreme Anxiety	p
SAS-SV	SNAs	46	6	3	1	0.00
	SAs	14	11	20	11	

Table 3: Chi Square Test Results of SAS-SV and DASS-S

Representative Variable		Stress Scale Combined				
		Without Stress	Mild Stress	Moderate Stress	Extreme Stress	p
SAS-SV	SNAs	44	9	3	0	0.00
	SAs	14	27	12	3	

DISCUSSION

Mobile phone addiction has a capacity to disrupt endo-metabolic homeostasis of the human body, and is a rising concern for the communities of the 21st century[15]. The statistics of our results are suggestive that as mobile phone dependency within an individual increases, so does the chance of emergence of psycho-psychiatric disorders like depression, anxiety and stress. This not only makes these individuals prone to develop mood and behavioral changes but also decreases their daily life productivity.

The results of our study indicated that mobile phone dependant subjects, regardless of their gender, had high scores of depression. This finding is in line with the results projected by recent studies which suggest that once mobile phone usage exceeds to enter into the domains of human-machine addiction, it leads to serotonin imbalance not only in the limbic system but also in the neocortex of mobile phone addict individuals thus leading to the emergence of mood disorders like depression[16].

Moreover, our findings indicate that mobile phone addicts are prone to develop stress as well as the spectrum of anxiety associated with it. This finding is not very different from those being presented by contemporary researches[17] where it has been elaborated that the emission of blue light from mobile phone creates an imbalance of melatonin levels in the suprachiasmatic nucleus of individuals having increased screen exposure[18], which in turn, disrupts its control over norepinephrine concentrations within the locus coeruleus. This collectively results in the upregulation of sympathetic outflow and presents itself in the form of stress as well as anxiety[19].

In addition, it was observed that the female participants of this study were prone to develop mobile phone addiction and experienced high intensities of anxiety as well as stress. Contemporary researches[20] have credited this susceptibility to the social as well as domestic stresses faced by our female population. These factors add to the psycho-psychiatric disorders already harboured within our mobile phone addict females who, as a sequalae, become dependent on mobile phones as an escape mechanism and enter the vicious cycle which disrupts their dopaminergic and serotonergic pathways and contributes to high degrees of anxiety and stress within them.

Hence, our study has accomplished a commendable task in interrelating the degree of mobile phone addiction with the indices of depression, anxiety and stress in quantitative terms. As mentioned previously, these findings fall in line with recent credible neuropsychiatric studies and not only endorse the neurophysiology associated with mobile phone addiction but also raises awareness among our medical students about the adverse effects of mobile phone addiction on their mental health. In addition, it opens a new domain of inquiry for medical professionals dealing with patients struggling with the aforementioned psychiatric disorders, and helps them counter the prevalence of mobile phone dependency among individuals.

Nonetheless, it should be duly noted that the limited sample size, financial constraints, as well as a single-time observation account for conducting this study on a larger population and over a span of several observations, to ensure accuracy of this research as well as rendering the findings more applicable over multiple age groups and demographics.

ACKNOWLEDGMENTS

This project could not have been completed without the guidance and supervisorship of Dr. Hamid Hassan (Chairman Department of Physiology, NMU)

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