



EFFECT OF SMARTPHONE OVERUSE ON STRESS AND SLEEP QUALITY IN YOUNG ADULTS AMID COVID-19 PANDEMIC

Medical Science

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ABSTRACT

Introduction: Smartphone addiction has emerged as one of the latest technological addictions which is assumed to be a subset of behavioral addiction. Despite the development in conceptualizing smartphone addiction still, there is no official diagnostic criteria for smartphone addiction. Review of literature has established that smartphone overuse has a significant impact on an individual's physical, mental, psychological and social health. Considering the lockdown due to COVID-19 pandemic the utilization of smartphones may have increased as compared to the pre-pandemic period making people more prone to excessive smartphone usage and developing a form of behavioral change regarding various aspects of health like stress and sleep. **Objective:** To determine the prevalence of Smartphone overuse and its relationship with Stress and Sleep quality in young adults amid COVID-19 pandemic. **Methodology:** An online survey was conducted via Google forms containing Smartphone Addiction Scale shorter version(SAS-SV), Perceived Stress Scale-10 (PSS-10) and Pittsburgh Sleep Quality Index (PSQI) among young adult population group (age range 18-25 year). **Result:** The prevalence of Smartphone Overuse was found to be 52.3%. A positive, moderate significant correlation $r = .417$, $p < 0.01$ between SAS-SV and PSS-10 scores and a positive, weak significant correlation $r = .324$, $p < 0.01$ between SAS-SV and PSQI scores were found. Linear Regression imparted that Smartphone overuse explained 17.3% and 10.5% variance, $p < 0.001$ in Stress, and Sleep Quality respectively. **Conclusion:** A higher prevalence of smartphone overuse and its positive relation with stress and impaired sleep quality was found among the subjects in the study.

KEYWORDS

Smartphone Overuse, Stress, Sleep Quality

INTRODUCTION

The COVID-19 is a communicable disease caused by a new strain of Corona virus, SARS-CoV-2 (Severe Acute Respiratory Syndrome corona virus-2) linked to the identical family of virus as SARS (Severe Acute Respiratory Syndrome) causing symptoms of wide selection of respiratory illnesses from common flu to more severe diseases like pneumonia (World Health Organization COVID-19, 2020). Transmission of the virus is through direct contact with respiratory droplets of an infected individual. It has been stated as a Public Health Emergency of international concern and has spread to several countries in the world (WHO, COVID-19). To decrease this risk of transmission of the virus, various national governments have initiated extensive measures like 'Lockdown', 'Social distancing', 'Quarantine of affected individuals' and 'Shielding of individuals at risk' (WHO, COVID-19). The Indian Government initiated a National Lockdown on 25 March 2020 which was extended till 17 May 2020 due to the outbreak of COVID-19 disease (Public Information Board Government of India, 2020).

Lockdown acts have limited movement of individuals in community and outdoors, allowing only essential services to continue. Thus, various sectors like Business, Health, Banking and Education have come up with the measures like 'Work from home'. Business/ Job organizations are conducting online meetings or webinars via app like Zoom, Skype. School and colleges have transferred education to a digital medium. Health sectors have introduced telemedicine services, virtual clinics and health apps for patients. People's social life has fitted into home. All of these above may have driven employment of the internet and social media tremendously thus, increasing the utilization of smartphones as compared to the pre-pandemic period making people more prone to excessive smartphone usage.

Once considered as a luxury of the rich, now smartphones have become an everyday gadget for people across the country. India has become one among the largest and fastest growing markets for digital consumers in World (McKinsey Global Institute, 2019). According to a joint study conducted by ASSOCHAM-PWC, the amount of smartphone ownership in India is anticipated to be up surged to twice to 859 million by 2022 from 468 million ownership in 2017, growing at a compound annual growth rate (CAGR) of 12.9 % (ASSOCHAM-PwC, 2019). Two-thirds of the web users in India were in 12-29 years aged group and 99% of those people both in urban and rural areas used smartphones to access the web compared to the other devices (IAMAI Report, 2019). Thus, the rationale behind this high penetration of smartphone may be accredited to the burgeoning young population

within the country that is desirous to adopt new technology.

For these smartphone users their device is the doorway to their digital lives, and a means of always staying updated and connected with the globe. This increasing reliability on smartphone among this population may signal the evolution of smartphone use from an easy habit practiced out for daily requirements to excessive maladaptive use to addiction. The concept of addiction has multiple definitions. Addiction could be a chronic process that involves complex interactions among brain circuits, genetics, the environment and an individual's life experiences (American Society of Addiction Medicine, 2019). The two major categories of addiction include either Substance addiction or Behavioral addiction (Kim, 2013). Smartphone addiction has emerged as one of the latest technological addictions (Roberts, Yaya & Manolis, 2014). Technological addiction is assumed to be a subset of behavioral addiction (Griffiths, 1995). Griffiths (1995) defined technological addiction as a non-chemical (behavioral) interaction involving human machine interaction which may be either passive (TV) or active (smartphone).

Despite the event in conceptualizing smartphone addiction. There is no official diagnostic criterion for smartphone addiction. In 2016, Lin et al. gave a proposed diagnostic criterion for smartphone addiction. However, a recent study of review of existing literature has suggested use of terms like 'problematic' or 'maladaptive' use of smartphone rather than smartphone addiction because it can misguide the research and treatment efforts for this problem because they are being developed in an addiction frame work when actually a distinct approach could be more applicable and valid (Panova & Carbonell, 2018). The complications emerging from smartphone use are dependent on for what functions and activities the user is involved with the smartphone, the drive for engaging with these activities, and the pleasure and rewards received from them which then induces continued use (Jeong, Kim, Yum & Hwang, 2016; Lopez-Fernandez et al., 2017).

Excessive smartphone use can cause physical health-related problems including musculoskeletal disorders symptoms of which may include pain and stiffness in the neck, shoulder, arms, wrist, fingers, back, poor cervical spine postures, muscular fatigue, carpal tunnel syndrome, weakness in thumb, blurred vision, headaches, and light headedness (Kim, DH & Kim, 2015; Gustafsson, Thomée, Grimby-Ekman & Hagberg, 2017). This problematic overuse incorporates a significant impact on an individual's mental, psychological and social health too. It may cause maladaptive behavioral difficulties, interfere with study

or work, reduce real-life social interactions and lead to relationship disorders (Kuss & Griffiths, 2011).

During this period of major health crisis with regular news of death across the globe and people locked up indoors, subsyndromal mental health issues and psychological stress are common responses which may be associated with disturbed sleep. Hence, understanding and addressing mental health concerns and sleep issues of an individual is important to understand the concept of electronic technology. Thus, the present study is conducted to explore such possibilities.

Aim and Objectives

To determine the prevalence of Smartphone overuse and its relationship with Stress and Sleep quality in young adults amid COVID-19 pandemic.

STATEMENT OF QUESTION

1. Does Smartphone overuse affect stress level of an individual?
2. Does Smartphone overuse affect sleep quality of an individual?

MATERIALS AND METHODS

Study Design: Descriptive Study

Inclusion Criteria

- An individual within the cohort of 18-25 year.
- An individual using smartphone over 1 year and willing to participate in the study.
- An individual who did not have any diagnosed psychological or psychiatric disorders, health related medical issue or sleep related disorders.

Instrumentation

The survey form consisted of:

- **Semi-structured form** that included demographic questions.
- **SAS-SV:** Smartphone Addiction Scale Shorter Version (Kwon, Kim, Cho and Yang, 2013).
- **PSS-10:** Perceived Stress Scale-10 items (Cohen, Kamarck & Mermelstein, 1983).
- **PSQI:** Pittsburgh Sleep Quality Index (Buysse et al., 1989).

Procedure

An online survey was conducted via Google forms among young adult population group (age 18-25 year). A total of 308 subjects responded including students and professionals. Instructions regarding the questionnaires and the way to fill it were well explained within the form. An informed consent was taken along with the survey form, the participants could only continue to fill form if they gave their consents at first. It took approximately 15-20 minutes to complete the questionnaire. The period of data collection was May, 2020 to July, 2020.

Data Analysis

The data were analyzed using Microsoft Excel, 2013 and SPSS version 20. The data spread was prepared by using MS Excel. Chi-Square test, correlation and regression analysis were done using SPSS 20.0 version.

RESULTS

Demographic data: The total no. of respondents in the online survey was 308. The demographic variables included Age, Gender and Occupation (student/professional). Out of 308 participants 185(60.1%) were Females and 123(39.9%) were Males. Age of the respondents ranged between 18-25 years with a mean age of 21.93± (1.649). Regarding occupation 89.6% respondents were Students while 10.4% were Professionals.

Smartphone Overuse: The prevalence of Smartphone overuse was found to be 52.3% i.e. out of 308 participants 161 were excessively using their smartphones. The SAS-SV (Smartphone Addiction Scale Shorter-version) scores ranged from 10 to 60 with a mean score of 31.12± (10.073) and median score of 32.00. Among males 61.8% were Smartphone over-users as compared to 45.9% in females. 65.6% professionals were found to be excessively using their smartphone as compared to 50.7% students. Gender had significant association with smartphone overuse ($p < 0.05$) whereas no significant association was found between Occupation and smartphone overuse ($p > 0.05$) [Table 1].

Table 1: Smartphone Overuse and its association with Gender and Occupation (N = 308)

Variable		Group		Total	Chi-Square Value (χ^2)	df	P-Value
		Normal-user	Over-user				
Gender	Female	100 (54.1%)	85 (45.9%)	185 (100.0%)	7.433	1	.006
	Male	47 (38.2%)	76 (61.8%)	123 (100.0%)			
	Total	147 (47.7%)	161 (52.3%)	308 (100.0%)			
Occupation	Professional	11 (34.4%)	21 (65.6%)	32 (100.0%)	2.522	1	.110
	Student	136 (49.3%)	140 (50.7%)	276 (100.0%)			
	Total	147 (47.7%)	161 (52.3%)	308 (100.0%)			

Smartphone Overuse, Stress and Sleep: The PSS-10 (Perceived Stress Scale) scores ranged from 1 to 37 with a mean score of 19.47± (5.832). The PSQI (Pittsburgh Sleep Quality Index) scores ranged from 0 to 20 with a mean score of 6.24± (3.485). Pearson Correlation analysis revealed a positive, moderate in strength and statistically significant relation [$r(306) = .417, p < 0.01$] between SAS-SV and PSS-10 scores. Between SAS-SV and PSQI scores, a positive, weak in strength and statistically significant relation [$r(306) = .324, p < 0.01$] was established [Table 2].

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2: Correlation between outcome variables.

		PSS-10	PSQI
SAS-SV	Pearson Correlation	.417**	.324**
	Sig. (2-tailed)	.000	.000
	N	308	308

Linear regression was further performed to deduce the extent to which smartphone overuse (measured by SAS-SV) can predict the levels of stress (using PSS-10) and quality of sleep (using PSQI). Smartphone overuse explained 17.3% variance in stress [$F(1,306) = 64.227, p < 0.001$] and 10.5% variance in sleep quality [$F(1,306) = 35.945, p < 0.001$]. Both the models were significant. Thus, this answers the statement of question that smartphone overuse does have effects on stress level and sleep quality of an individual [Table 3].

Table 3: Linear Regression Analysis of Stress and Sleep quality with Smartphone overuse.

Predicted (Dependent Variable)	Predictor (Independent Variable)	Standardized Coefficient Beta	p	Regression results
Stress (PSS-10 Scores)	Smart Overuse (SAS-SV Scores)	.417	.000	$R = .417$ $R^2 = .173$ $Df = 1$ $F = 64.227$
Sleep Quality (PSQI Scores)		.324	.000	$R = .324$ $R^2 = .105$ $Df = 1$ $F = 35.945$

DISCUSSION

The study was undertaken to explore the influence of smartphone overuse in young adults amid COVID-19 pandemic and also to find out the relationship between excessive smartphone usage with variables like stress and sleep quality. In the present study, the prevalence of smartphone overuse is found to be 52.3% which is quite higher than the studies conducted over the past few years including Dixit et al., 2010; Davey & Davey, 2014; Nikhita, Jadhav & Ajinkya, 2015; Samaha & Hawi, 2016; Soni, Upadhyay & Jain, 2017. An increasing trend in smartphone overuse has been noted over the years, which could be attributed to the rapid advancement in technology, better internet facilities, cost effective feature full smartphones available in the market, people spending more and more time on social networking sites and the constant drive to be connected to the world.

Comparing the smartphone overuse prevalence rate of the present study with recent past year studies (Javaid, Yasir & Ahmed, 2019; Choudhury et al., 2019; Bhalerao, Krishnan, Mokal & Latti, 2020)

conducted before the pandemic period, there is again an definite surge in smartphone overuse which could be due to the fact that this study was conducted in the COVID-19 pandemic lockdown period when people were staying indoors unavoidably accompanied by longer time spent online on gaming, entertainment, social networking or doing work from home via online mediums thus, potentially increasing excessive smartphone usage and associated behavioral changes.

A significant association was found between gender and smartphone overuse in which males were found to be more excessively using their smartphones as compared to females. Similar findings were reported by few studies including **Soni et al., 2017; Chen et al., 2017**.

The present study found a positive correlation between SAS-SV scores and PSS-10 scores $r = .417, p < 0.01$. The results were in same line with other previous studies that had explored similar variables (**Thomé, Härenstam & Hagberg, 2011; Samaha and Hawi, 2016**) highlighting a significant association between smartphone overuse and stress. Excessive use of smartphones, over exposure to the cyberspace may lead to the unification of the virtual and real world of an individual leading to self-isolation. Nomophobia (No mobile phone phobia), FOMO (Fear of missing out) could be the possible factors contributing to increased level of stress in relation to smartphone overuse.

During this COVID-19 pandemic, fear of contracting the disease, constant news of accelerating COVID-19 cases and death, associated home quarantine, social distancing and possible job related or financial setbacks have extensively increased stress, anxiety and negativity in society and people may adopt smartphone overuse as one of the coping strategies (**Gao et al., 2020; Wang et al., 2020; Elhai, Yang, McKay & Asmundson, 2020**). **Samaha and Hawi (2016)** in their study had suggested a two-way relationship between smartphone addiction and stress level having reciprocal influences on one other. Similarly in a recent study during COVID-19 pandemic regarding anxiety and problematic smartphone overuse, a model was hypothesized stating that a reciprocal circuit may create in which people try to manage their COVID-19 anxiety by excessively using their smartphones, but unintentionally learn more about COVID-19 from news or social media which in turn may increase their anxiety and stress (**Elhai et al., 2020**).

Based on the results, significant correlation was found between SAS-SV and PSQI scores which was in the same direction of other studies including (**Demirci, Akgönül, & Akpınar, 2015; Soni et al., 2017**) showing positive correlation between excessive smartphone usage and sleep quality. Using the smartphone right before sleeping might create a temptation to check social media, news headlines or interacting with others via chatting applications, thus decreasing and affecting the sleeping hours. Any ringing or beeping from text or calls or even flashing from alerts can jar one in the middle of the night thus, hampering the sleep efficiency of an individual.

Over the time various researches has been conducted to establish the possible relationship of use of electronic media affecting the sleep (**Hamblin & Wood, 2002; Van den Bulck, 2003; Cain & Gradisar, 2010**). **Adams and Kisler (2013)** have recognized sleep quality as a mediator between technology use after the onset of sleep and depression/anxiety. It had been reported that problematic internet use may affect sleep quality such as by reducing Rapid eye movements (REM) sleep, slow wave sleep and sleep efficiency or that bright light of a computer screen may suppress melatonin secretion and delay the onset of sleep (**Higuchi, Motohashi, Liu & Maeda, 2005**).

The study showed a higher prevalence rate of smartphone overuse and its correlation with stress and sleep quality in the young population amid COVID-19 pandemic period thus, indicating that this subject is an issue of concern in the recent time and more researches are needed to be carried out in this field to elaborate predisposing factors, proper diagnostic guidelines and appropriate measures for prevention and early management of excessive harmful use.

LIMITATIONS

- The sample size is small and limited to one population group therefore, cautions needed to be exercised while generalizing the study findings.
- Data was collected by self-reporting questionnaires; there could be chances of biasness.

CONCLUSION

A higher prevalence of smartphone overuse and its positive association

with stress and impaired sleep quality was found in young adult population group amid COVID-19 pandemic in the present study, thus providing insights into excessive smartphone usage and its effects.

CONFLICT OF INTEREST

The authors and planners have disclosed no potential conflicts of interest, financial or otherwise.

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