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Assessment of mobile phone usage and self-perceived effects among students of a dental college in Chennai.

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Abstract: Mobile phone addiction is a type of technological addiction or non substance addiction. The present study was conducted with the objectives of assessing an existing Mobile Phone Dependence Questionnaire scale among dental students and to assess the pattern and factors associated with mobile phone addiction-like behaviour. Nomophobia literally means no mobile phobia that is the fear of being out of mobile phone contact. A cross-sectional study with 177 participants was conducted with Mobile Phone Dependence Questionnaire self administered questionnaire among students of a dental college in Chennai. The questionnaire had demographic details and questions assessing their mobile phone pattern use and self perceived effects of mobile usage on health. Data was collected using a questionnaire. Descriptive statistics were used to analyze the data**.** Among the study participants, 64% were above the age of 20. Around 59.3% used their phones for more than 4 hours, however no statistically significant association was observed between gender and duration of phone usage ($p < 0.05$). About 45.8% reported they used their phones during class hours too. Eye strain was the most perceived effect among the participants. The present study results showed that the usage of mobile phones among the study participants was high, which is consistent with the rising trend of usage of mobile phones. . Mass media efforts should be made to raise awareness among people regarding the health effects of mobile phones and regulatory guidelines to reduce its exposure and using mobiles judiciously to avoid becoming independent of technology.

Keywords: mobile phone, addiction, dental students, effect, technology

INTRODUCTION

The mobile phone developed in the year 1917 is perhaps among the most prominent kind of information and communication technology that has achieved tremendous popularity with regard to social impact, general use by the human population. The fascination along with the usefulness of the device makes it an object of desire for the adolescent age group (Chóliz, 2012). As the number of people that have cell phones is rapidly growing, so is the number of people that are becoming addicted to their phones. Overuse is often defined as a "dependence syndrome" which is the term used by the World Health Organization (WHO) and has been categorized under ICD-10 (Fung, Xu and Bodenreider, 2020). Mobile phone overuse can be accounted as a form of technological addiction and mental impairment due to modern technology (Babadi-Akashe *et al*., 2014). Addictive mobile phone use has been considered a public health concern emphasising the need for more research concerning risk factors (Kuss *et al.*, 2018). Behavioural addiction for mobile phones has many synonyms like Mobile Phone Dependence, Mobile Phone Problematic Use, Nomophobia (No mobile phobia), etc and the symptoms varies from excessive loss of control, use in inappropriate or dangerous situations (driving), and researches show that it has led to functional impairments like poor achievements, social isolation, adverse effects on relationships and the results have proven to be parallel to substance dependence syndrome (Nayak, 2018). Studies by Ha et al (Ha *et al.*, 2008), Hong et al (Hong, Chiu and Huang, 2012) have shown that excessive use of mobile phones have led to cases of anxiety, depression and distress among individuals. In one hand, mobile phones brings us closer to communication and

has social benefits but again on the other hand it is proven to cause behavioural and social harms too. The mechanism by which mobile phone dependence affects our brain is that when people who spend vast amounts of time on their mobile phone are without their devices, it leads to release of a neurotransmitter GABA which is the cause for anxious behaviour, irritability and insomnia. Also it has been found that it tends to decrease gray matter which is responsible for our ability to focus attention for an extended period causing a condition called ADHD (Attention Deficit Hyperactivity Disorder). The harmful effects of mobile radiation on human body have also been on the rise since the past few decades. The radiations are in the range of 300 MHz to 300 GHz, and parts of the radiations are absorbed by the human body which carries risk of carcinogenicity. It has both thermal and non-thermal effects; the heating caused by talking for long hours on the phone might have adverse effects on the head and neck region(Dagli and Hans, 2015). Various studies have been conducted to know the effect of mobile radiation on oral health too. Hintzsche and Stopper (Hintzsche and Stopper, 2010) carried out a study to investigate the effect of mobile phone use on genomic instability of the human oral mucosa's cells. Evaluation of biochemical status of saliva after mobile phone usage had shown that the electromagnetic radiations have an oxidative stress on human cells (Abu Khadra *et al.*, 2015) . It was also found out that there was a significant increase in the salivary flow rate and blood flow, especially on the side where the mobile phone was placed, a significant enlargement in the parotid gland volume was also seen on the affected side (Bhargava, Motwani and Patni, 2012)[1]. Characteristics like extraversion and self esteem have also been observed in individuals with mobile phone addiction. Sleep disturbances have also been found to be deeply rooted in excess mobile phone usage people (Tao *et al.*, 2017). A combination of all these effects plays a negative role in the lives of adolescents, hampering their academic performances, lifestyle behaviours, communication measures.Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J *et al.*, 2018; Menon *et al.*, 2018; Prabakar, John, Arumugham, Kumar and Srisakthi, 2018; Rajeshkumar *et al.*, 2018, 2019; Vishnu Prasad *et al.*, 2018; Wahab *et al.*, 2018; Dua *et al.*, 2019; Duraisamy *et al.*, 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran *et al.*, 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma *et al.*, 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi *et al.*, 2020; Samuel, Acharya and Rao, 2020) We have successfully completed numerous epidemiological studies/ in vitro studies/ in vivo studies for the betterment of our community (Prabakar, John, Arumugham, Kumar and Sakthi, 2018a, 2018b; Prabakar, John, Arumugham, Kumar and Srisakthi, 2018; Vishnu Prasad *et al.*, 2018; Khatri *et al.*, 2019; Manchery *et al.*, 2019; Shenoy, Salam and Varghese, 2019)(Kannan *et al.*, 2017; Kumar and Preethi, 2017; Prabakar, John, Arumugham, Kumar and Sakthi, 2018b; Leelavathi and Others, 2019; Mohapatra *et al.*, 2019; Neralla *et al.*, 2019; Pavithra, Preethi Pavithra and Jayashri, 2019; Pratha and Prabakar, 2019; Mathew *et al.*, 2020; Samuel, Acharya and Rao, 2020) therefore through this study we aim to evaluate the effect of mobile phone dependence and self perceived effects among students of a dental college in Chennai.

MATERIALS AND METHOD

A cross sectional study was conducted among the undergraduate and postgraduate students of a dental college in Chennai. Participants doing their internships, post graduation, willing to take part in the study were included. Prior to the start of the study, ethical clearance was obtained from Scientific Review Board, Saveetha University. The anonymity of the participants was maintained. Informed consent was taken from the participants. The sample size was calculated to be 205 manually based on a study by Nikhita C et al (Nikhita, 2015), using the formula :$Z\alpha^2pq/L^2$ Out of 205, only 177 study participants had filled the questionnaire completely and returned it back therefore data was analysed for 177 study participants. Data collection was scheduled in the month of January 2019. A pre-tested, self administered MPDQ questionnaire was used. The questionnaire consisted of demographic data like age, gender and year of study. The second part of the questionnaire assessed the mobile phone dependence, questions on duration of phone use, amount of time spent on the phone, reasons to check phone frequently, their perceived problems due to excessive use of phone.

Statistical Analysis

The data was entered into excel spreadsheet and exported to SPSS Version 23.0 for analysis. Descriptive statistics were used. Chi square test was used to analyse the variables.

RESULTS AND DISCUSSION

Figure 1 depicts the distribution of the participants according to their age, 64.4% were above the age of 20 and 35.6% were below 20 years of age. According to gender, 39% males and 61% females responded to the questionnaire (Figure 2). The responses for assessing the pattern of the study participants according to their phone usage was recorded in Table 1. 59.3% were using their phone for more than 4 hours a day, and 40.7% were using it less than 4 hours.Around 84% of the participants had an habit of keeping their phone with

themselves at all times, and 61.1% felt unsettled if their phone was not with them, 85.9% charged their phone daily, but only 36.7% talked for more than an hour on the phone, 74% had an habit of checking their phone even without a text/call, 60.5% of the participants spent more time on the phone after 10 pm, there wasn't much difference found when asked if the study participants used their phones during class hours where 45.8% reported yes and 54.2% reported no (Table 1). The effects of their perceived effects on health has been shown in Table 2, where 47.5% reported that they had faced eye strain due to use of mobile phone, followed by 44.1% reporting headache as a perceived effect, lack of concentration was faced by 40.7% of the study participants, 28.2% reported irritability, 27.7% anxiety and 24.4% reported insomnia. Figure 3 shows the reasons for mostly using mobile among the study participants, it was observed maximum use was for entertainment 46.3%. No statistically significant association was observed between gender and duration of phone use ($p = <0.05$), however, more numbers of females reported their duration of phone usage to be more than 4 hours as compared to the males (Figure 4). Similarly, no statistically significant association was seen between gender and reason for mostly using mobile phone (Figure 5).

Technological addiction is a form of non substance addiction that has been previously defined as the compulsion by an individual to engage in some specific activity despite harmful consequences as deemed by the user himself/herself to his/her individual health, mental state, or social life (Young, 1998). Several studies assessing mobile phone dependence has been done in India. The current study consisted of 61% female participants which was found consistent with the study done by *Sethia S et al (Sethia et al., 2018)* . In this study, 84.2% of the study participants reported that they kept their phone with themselves at all time which was found to be higher when compared with the study done by *Dixit et al (Dixit et al., 2010)* where 73% responded that they kept their phone with them at all times. In the same comparative study, only 18.5% reported using their phone during class hours, but in the current study 45.8% reported to be using their phone even during class hours. Around 59.3% reported using their phones for more than 4 hours in the present study, which was found to be higher compared with the study done by *Dilip B et al* (Dilip and Javalkar, 2018) . The results perceived effects of mobile phone use were consistent with the study done by *Acharya JP et al* (Acharya, 2013) which showed 51.5%, 50.8% ,47.4% ,38.5% reported headache, irritability, lack of concentration, anxiety respectively and also with the study done by *Sarada V et al (Vadlamani, Devi Madhavi and Vallepalli, 2017)* which showed 59.8%, 38.3%, 58.9%, 39.3%, 29.1%, 52.9%. The present study showed that 60.5% had the habit of using their phone after 10 pm that is nightly hours, in the study done by *R Haripriya et al (Haripriya, Preetha and Gayatri Devi, 2018)* (2018), 39% had the habit of using their phone at night. In the current study, no statistical significance was observed between gender and duration of phone usage, however contrasting results have been shown in other studies (Habuchi *et al*., 2005). The ill effects of excessive usage of mobile phones causes risk of carcinogenicity . Therefore, care should be taken to avoid over use of mobiles and prevent harmful effects to our health. Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; Vijayashree Priyadharsini, Smiline Girija and Paramasivam, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; Vijayashree Priyadharsini, 2019; Chandrasekar *et al.*, 2020; Mathew *et al.*, 2020; R *et al.*, 2020; Samuel, 2021)

CONCLUSION

The present study results showed that the usage of mobile phones among the study participants was high, which is consistent with the rising trend of usage of mobile phones. Many of them felt unsettled when their phone was not around them. Thus there is an increasing need concerning the impact of mobile phones on health as well as on the environment. Proper guidelines should be regulated regarding the usage of mobiles in work places. Mass media efforts should be made to raise awareness among people regarding the health effects of mobile phones and regulatory guidelines to reduce its exposure and using mobiles judiciously to avoid becoming independent of technology.

CONFLICT OF INTEREST

Nil

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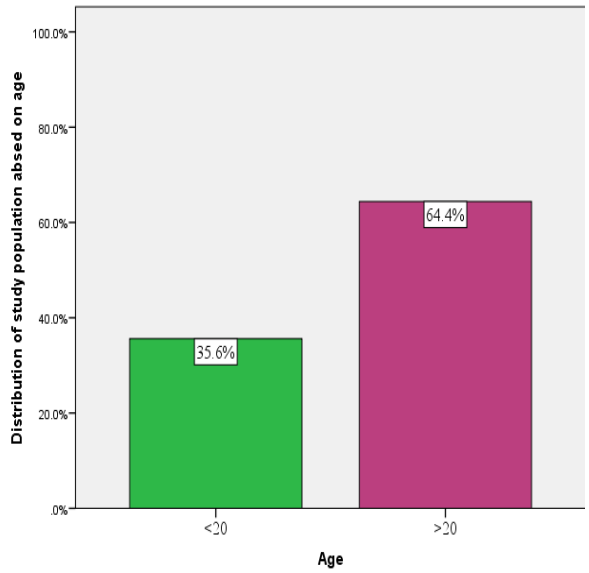

Fig.1: The bar chart represents the distribution of study population based on age. X axis represents the age, Y axis represents the distribution of the study population based on age. About 64.4% of the participants were above 20 years of age (denoted by purple).

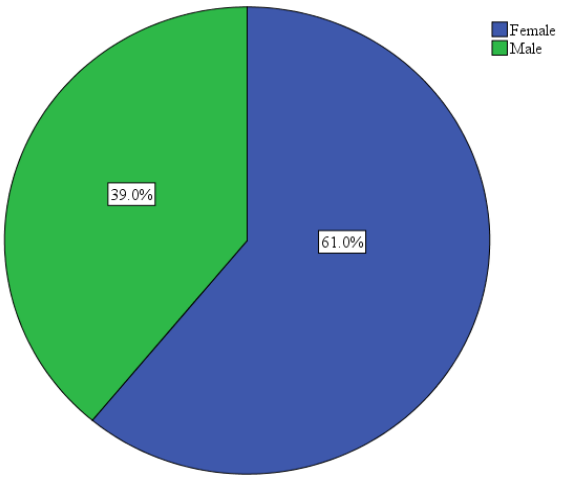

Fig.2: The pie chart represents the distribution of the study population based on gender. About 61% were females (denoted by blue), 39% were males (denoted by green).

Table 1: Distribution of study population based to pattern of mobile phone usage.

Questions	Responses	N(%)
1. Duration of phone use	- > 4 hours - < 4 hours	- 105 (59.3) - 72 (40.7)
2. Academic performance affected	- Yes - No	- 94(53.1) - 83 (46.9)
3. Keep phone with self at all times	- Yes - No	- 149 (84.2) - 28 (15.8)
4. Feel unsettled without phone	- Yes - No	- 117 (61.1) - 60 (33.9)
5. Charge phone everyday	- Yes - No	- 152 (85.9) - 25 (14.1)
6. Talk on phone more than 1 hour/day	- Yes - No	- 65 (36.7) - 112 (63.3)
7. Keep checking phone even without a call/text	- Yes - No	- 131 (74) - 46 (26)
8. Spend more time on phone after 10 pm	- Yes - No	- 107 (60.5) - 70 (39.5)
9. Use phone during class hours.	- Yes - No	- 81 (45.8) - 96 (54.2)

Table 2: Distribution of study participants based on self perceived effects of excessive mobile phone usage.

Effects	N(%)
Headache	78 (44.1)
Eye strain	84 (47.5)
Irritability	50 (28.2)
Anxiety	49 (27.7)
Insomnia	43 (24.4)
Lack of concentration	72 (40.7)

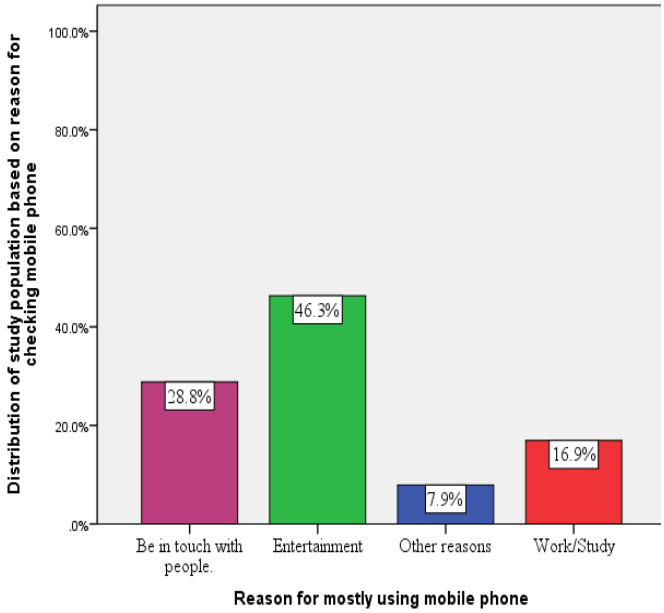

Fig.3: The bar chart represents the distribution of study population based on reason for mostly using mobile phone. X axis represents the reason for mostly using mobile phone, Y axis represents the distribution of study population based on the reasons. Majority of the participants (46.3%) cited entertainment (denoted by green) to be one of the primary reasons for mostly using mobile phone.

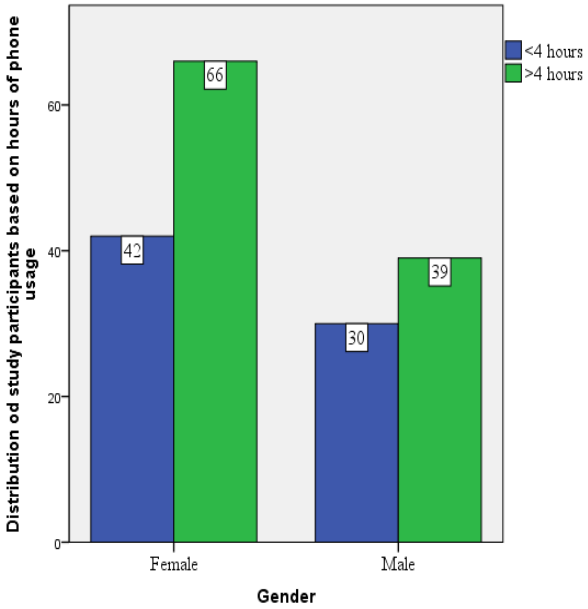

Fig.4: The clustered bar chart represents the association between gender and duration of phone use. X axis represents the gender of the participants and Y axis represents the distribution of study participants based on hours of phone usage. Chi square test was used. X^2 value = .367; df = 1; p value = 0.544, hence statistically not significant.

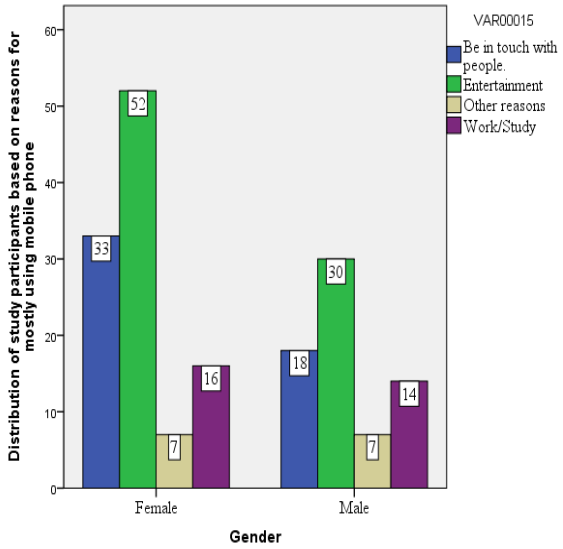

Fig.5: The clustered bar chart represents the association between gender and reason for mostly using mobile phones. X axis represents the gender, Y axis represents the distribution of the study participants based on reasons for mostly using mobile phones. Chi square test was used. X^2 value = 1.949; df = 3, p value = 0.583; hence statistically not significant.