



Effect of mobile phone overuse on health of medical students

¹Dr. Madhav Kadam, ²Dr Leena Parihar, ³Dr. Preeti Kori,
⁴Dr. Sohan Singh Mandloi

¹Assistant Professor, Department of Biochemistry, N.S.C, Government Medical College, Khandwa, Madhya Pradesh, India

²Assistant Professor, Department of Community Medicine, N.S.C. Government Medical College, Khandwa, Madhya Pradesh, India

^{3,4}Associate Professor, Department of Medicine, Government Medical College, Ratlam, Madhya Pradesh, India

Corresponding Author: Dr. Sohan Singh Mandloi
Email: drsohans@gmail.com

Abstract

Background: In this modern era of the 21st century, mobile phones have undoubtedly been part and parcel of our lives as it has revolutionized our lifestyle. We can communicate with one another, retrieve information about education, and can use it for entertainment purpose. However, like all other good things, mobile phone also comes with its own demerits such as it causes various health hazards ranging from insomnia, numbness of fingers, and irritability to headache, anxiety and dreadful addiction.

Objectives: The aim and objective of this study were to assess adverse health effects of mobile phone use among medical students in a government & private medical colleges.

Materials and Methods: The study was conducted among the medical students in Medical Colleges of Madhya Pradesh, India. A pre-designed, pre-tested, anonymous questionnaire was used to assess the mobile use pattern among the students.

Results: All the students were using mobile with 28% using it for more than 6 h every day. 43% of student's experienced medical problems with majority complained a lack of concentration. Duration of the use of mobile phones was significantly associated with the development of health problem.

Conclusion: With increased risk of health problems associated with excessive mobile use, one should emphasize on reserving the use of cell phones for shorter conversations and other healthy modes of entertainment.

Keywords: Mobile phone, health, medical students, overuse

Introduction

As of 2015, there were 7.4 billion subscriptions worldwide and the number is increasing every Year [Figure 1] ^{1,2}. Mobile phones use electromagnetic radiation in the microwave range (450-3800 MHz) ².

Mobile phone overuse (mobile-phone addiction or mobile phone dependency) is dependence syndrome seen among certain mobile phone users. Some mobile phone user's exhibit Problematic behaviors related to substance use disorders.

These behaviors can include preoccupation with mobile communication, excessive money or time spent on mobile phones, and use of mobile phones in socially or physically inappropriate situations such as driving an automobile. Increased use can also lead to increased time on mobile communication, adverse effects on relationships, and anxiety if separate from a mobile phone or sufficient signal ³.

A decline in male sperm quality has been observed over several decades among mobile users ²⁻⁶. A 2012 review concluded that "together, the results of these studies have shown that radio frequency electromagnetic radiation (RF-EMR) decreases sperm count and motility and increases oxidative stress" ^{7,8}.

Smartphone addiction can be compared to substance use disorders as they act as a medium to provide the drug of entertainment and connection. While acting as the means by which the drug is consumed. A study conducted at Alabama State University on the effects of smartphones on students defines the issue by stating that we are not only addicted to smartphones themselves but also we "are addicted to the information, entertainment and personal connections (that a smart phone) delivers" ⁹. People have an affinity for constant entertainment, and smartphones provide the quickest, most easily accessible route to it.

In 2011, the World Health Organization (WHO) working group classified cell phone use as "possibly carcinogenic to humans" ². The International Agency for Research on Cancer of the WHO said, in 2011, that radio frequency is a possible human carcinogen, based on heavy usage which increases the risk of developing glioma tumors ¹⁰.

With the increased use of mobile phones among students, the present study was undertaken with the objective to assess the adverse health effects of the use of mobile phones on medical students.

Materials and Methods

A cross-sectional descriptive study was conducted in various Medical Colleges in Madhya Pradesh, India, from March 1 to March 31. The study population included all the medical students who were enrolled at the college during the time of the study from first to final year. A self-administered, pre- designed, pre-tested anonymous interview schedule was used after obtaining informed written consent from each participant. The study protocol was approved by the Institutional Ethical Committee. MS Excel sheet was prepared using the collected data for easy analysis and the charts and tables were made. P value <0.05 considered was statistically significant.

Results

A total of 200 students participated in the study giving a response rate of 94%. The profile of the study sample was predominantly male (81%). The mean age of study participants was 21.54 (standard deviation = 1.988).

Majority students were hostlers (89.5%), belonged to nuclear family (78%), and were only child of their parents (38%). 64% of students belonged to upper class [Table 1].

Table 1: Sociodemographic profile of study participants (n=200)

Variables	Frequency (%) n (200)	
Year of the study*	1 st	72 (36)
	2 nd	56 (28)
	3 rd	38 (19)
	4 th	34 (18)
Gender	Male	162 (81)
	Female	38 (19)
Permanent residence	Corporation	17 (8.5)
	Municipality	90 (45)
	Gram panchayat	93 (46.5)
Present residence	Day scholar	9 (4.5)
	Hostel	179 (89.5)
	Paying guest	12 (6)
Type of family	Joint	44 (22)
	Nuclear	156 (78)
Number of siblings*	Nil	76 (38)
	One	59 (29.5)
	Two	49 (24.5)
	More than two	16 (8)
Socioeconomic status	Upper	128 (64)
	Upper middle	49 (24.5)
	Lower middle	15 (7.5)
	Upper lower	8 (4)
	Lower	0 (0)

As shown in Table 2, most of the students were using mobile phones from the past 2 years and using it at least for 2-3 h per day. 43% of students experienced medical problems.

Table 2: Mobile phone uses pattern among students of MSDMCH

	Variables	Frequency (%)
Using mobile phone	Yes	200 (100)
Duration of using mobile phone (years)	1-2	124 (62)
	3-4	46 (23)
	>5	30 (15)
Duration of daily mobile using* (h)	0-1	28 (14)
	1-2	23 (11.5)
	2-3	47 (23.5)
	3-4	26 (13)
	4-5	20 (10)
	>6	56 (28)

	*P<0.05
--	---------

Most commonly reported problem was lack of concentration in 47.6% of students [Table 3].

On applying binary logistic regression to study the effect of sociodemographic variables and mobile pattern use on the development of medical problems, those variables that were found statistically significant were included in multiple logistic regressions. In multivariate analysis, factors that remained statistically significant with development of medical problems were the duration of using mobile phones that had a positive association with the development of medical problems [Table 4].

Table 3: Problems experienced by the study population as perceived by them

Variables		Frequency (%)
Experienced medical problems	Yes	86 (43)
	No	114 (57)
Medical problems	Tingling sensation, numbness of finger	20 (10)
	Insomnia	5 (2.5)
	Prolonged sleep	26 (13)
	Anxiety	19 (9.5)
	Lack of concentration	41 (47.6)

Table 4: Multivariate analysis showing factors associated with development of medical problems

Variables	AOR	Significance	95% CI (LL UL)
Duration of using mobile phones	0.392	0.010	0.192-0.800
CI: Confidence interval, AOR: Adjusted Odds Ratio			

Discussion

The present study showed that all students were using mobile phones with 28% of them using it for >6 h/day. 43% of the students experienced medical problems [Table 2]. Lack of concentration was the most common problem reported in 47.4% of students. In our study, prolonged sleep (13%), tingling sensations, and numbness of finger (10%) were prevalent [Table 3] (which were not present before their exposure to mobile). Duration of using mobile phones showed a positive association with the development of medical problems.

Similar kind of a study done by Kumar *et al.* of Malaysia in 2011¹⁴, showed that 62% of medical students using mobile phones faced medical problems. Findings were also corroborated by Francisca study¹⁵ where using the phone for >1 h by 90% of subjects meant that relative exposure to harmful radiations results in adverse health effects. Another study done by Acharya showed college students being regularly disturbed by frequent calls/messages from others which stopped them from completing the academic activities¹⁶. A study conducted by Rapacholi (occupational and environmental health WHO) showed that individuals using mobile phones claimed to

have insomnia, tingling and dizziness¹⁷. A study conducted by the WHO Europe, in November 2006, also shown similar result about the association between sleep disorder and mobile over use¹⁸.

Limitation of the study is that it is a cross-sectional study so causation and association cannot be explained and we are not comparing the subjects with any comparison group.

Recommendation

With the increased risk of health problems associated with excessive mobile use, we should emphasize on reserve the use of cell phones for shorter conversations and other healthy modes of entertainment.

Conclusion

Number of mobile phone user is increasing day by day throughout the world as well as in India. The present study showed that Rf-EMR-related medical problems are prevalent in people who are using mobile for years and also spend considerable time daily for the same purpose.

References

1. Available from: https://www.en.m.wikipedia.org/wiki/Mobile_phone_radiation_and_health [Last accessed 2018 Feb 8]
2. Available from: <http://www.ericsson.com/res/docs/2015/mobility-report/ericsson-mobility-report-nov-2015.pdf>. [Last accessed 2018 Feb 9]
3. Available from: https://www.en.m.wikipedia.org/wiki/Mobile_phone_over_use. [Last accessed 1 Mar 2018]
4. Rotondi V, Stanca L, Tomasuolo M. Connecting alone: Smartphone use, quality of social interactions and well-being? *J Econ Psychol.* 2017;63:17-26. Doi: 10.1016/j.joep. 2017.09.001
5. Available from: <http://www.edition.cnn.com/2017/07/25/health/sperm-counts-declining-study/index.html>. [Last accessed 2018 Mar 21]
6. Gladden D. The effects of smartphones on social lives: How they affect our social interactions and attitudes 2018 OTS Master's Level Projects & Papers 586. Available from: https://digitalcommonsoduedu/ots_masters_projects/586
7. La Vignera S, Condorelli RA, Vicari E, D'Agata R, Calogero AE. Effects of the exposure to mobile phones on male reproduction: A review of the literature. *J Androl.* 2012;33:350-6.
8. Johansson A, Nordin S, Heiden M, *et al.* Symptoms, personality traits and stress in people with mobile phone-related symptoms and electromagnetic hypersensitivity. *Journal of Psychosomatic Research.* 2010;68:37-45.
9. Houston BJ, Nixon B, King BV, De Iuliis GN, Aitken RJ. The effects of radiofrequency electromagnetic radiation on sperm function. *Reproduction.* 2016;152:R263-R276.
10. Bragazzi NL, Puenete GD. A proposal for including no mophobia in the new DSM-V. *Psychology Research and Behavior Management.* 2014;7:155-160.

11. De Iuliis GN, Newey RJ, King BV, Aitken RJ. Mobile phone radiation induces reactive oxygen species production and DNA damage in human spermatozoa *in vitro*. PLoS One. 2009;4:e6-446.
12. Richard E. The truth about smartphone addiction. Coll Stud J. 2015;49:291.
13. World Health Organization: International Agency for Research on Cancer. IARC Classifies Radiofrequency Electromagnetic Fields as Possibly Carcinogenic to Humans. Geneva: World Health Organization, 2011.
14. Kumar LR, Chii D, Way LC, Jetly Y, Rajendaran V. Awareness of mobile phone hazards among university students in a Malaysian medical school. Sci Res. 2011;3:406-15.
15. Francisca LT. Mobile Phone Addiction in Teenagers may Cause Severe Psychological Disorders. Granada: University of Granada, 2007.
16. Acharya JP, Acharya I, Waghrey D. A study on some of the common health effects of cell-phones amongst college students. J Community Med Health Educ. 2013;3:214.
17. Repacholi MH. Health risks from the use of mobile phones. Toxicol Lett. 2001;120:323-31.
18. What Effects do Mobile Phones have on People's Health? WHO Regional Office for Europe's Health Evidence Network (HEN), 2006. Available from: <http://www.euro.who.int/data/assets/pdf/0006/74463/E89486.pdf>. [Last accessed 2018 Mar 15]