ORIGINAL ARTICLE

The Evaluation of Awareness Level about the Potential Health Hazards of Mobile Phone among the Medical College Students of Northern Border University, Saudi Arabia

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ABSTRACT

Aim: The significant surge in the use of mobile phoneshas raised the concerns about the untoward effects which are associated with their use. The objective of the present study is to evaluate the awareness level about the potential health hazards of mobile phoneamong the students of medical college.

Methods: A total of 300 structured proformas are distributed among the 150 male and 150 female students from the faculty of medicine, Northern Border University, Saudi Arabia by simple random methodduring the study period of January 2018 to May 2018. The structured questionnaire is also translated in Arabic to enhance the understanding of the questions.

Results: Out of three hundred distributed questionnaires, a total of two hundred and nine filled proformashave been received back from the students. The response rate is 69.7%. It included 87 male and 122 female students.The analysis of this data reveals that most of the male and female students do not have the knowledge about thepotential hazardous effects of mobile phone usage.Among the students who are aware about the health hazards of cell phone use, a significant portion of these students are unaware about the methods by which one can reduce the untowardeffect of cell phone usage. Lack of awareness is more pronounced among the male students.

Conclusion: A significant lack of awareness exists among the medical students regarding the potential hazards of mobile phone usage and about the preventable measures for the protection against the adverse effects of cell phones.

Keywords: Mobile phone, Radio waves, Health hazards, Tumor**.**

INTRODUCTION

Recent advances in the telecommunication technology have created a huge impact on the community around the whole globe. One of the very important components of the latest technology is mobile phones which have shrank the world and brought it in the small pocket of mankind. The use of mobile phone has brought a lot of comforts and financial benefits for the users and it has made the life of a person quite easy. Due to large number of beneficial effects of mobile phone, it has penetrated the community and became quite popular among the masses.

Along with the increase in the number and use of mobile phone, certain harmful effects have been noticed which includes its association with the rise of certain cancers. Radio waves (non ionizing radiations) have been emitted by the mobile phones. Since radiation have been a causative agent of mutations in the cellular DNA which may lead to the development of malignancy. In this regards, mobile phones have been considered as a potential carcinogenic instrument which may contribute in the rising frequency of malignant tumor in certain organs of human body.

A study published from France revealed that there is an increased risk of glioma, acousatic neuroma and meningioma among the extensive and prolonged users of mobile phone[1]. Similarly, a higher risk of parotid gland tumor has been observed among the person with use of mobile phone for more than one hour per day[2].

In certain studies, it has been observed that long term use of mobile phone may exert influence on the circulatory system, autonomic system and bones of human body due to the effect of electromegnatic field which is produced by mobile phone[3,4].

The cell phones are very frequently used by health care providers and especially the students. Therefore it would be vital to create awareness among future health care providers regarding the potential harmful effects of these modern devices in order to sensitize this community for the adaption of the possible ways of prevention.

The aims and objective of the present study is to evaluate the awareness level of students of medical college about the potential health hazards of mobile phone use.

MATERIALS AND METHODS

After approval of this study from the scientific committee of Northern Border University, a total of 300 structured proforma pertaining to the research questions are distributed among the 150 male students and 150 female studentsof faculty of medicine, Northern Border University, Saudi Arabia by simple random method during the study period of January 2018 to May 2018.The structured questionnaire is also translated in Arabic to enhance the understanding of the questions. The consent is obtained from the participants and their confidentiality is maintained. The students are asked to submit it back after completing the proforma within one week. A total of 213 proformas are collected back from the students. There are four blank

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proforma which has been deleted from the study and remaining 209 proforma shave been evaluated.

RESULTS

Out of three hundred distributed questionnaires, a total of two hundred and nine filled proforma has been collected back from the students. The response rate is 69.7%. It includes122 (58%) female and 87 (42%) male medical students. All of these students (100%) have been using mobile phones. Among the female students, 92% state that they know about the potential hazardous effects of cell phones while 78%of male students narrate that they are familiar with the potential untoward health effects of mobile phone usage. The most important source of information for them to gather the knowledge regarding the potential hazards of mobile phone is from social media which is followed by parent's advice, watching television and getting information from their friends. The results are shown in Table 1.

There are eight specific questions about the various potential hazards of mobile phone use which have been asked from these students. The analysis of this data shows that most of the students are not actually aware about the potential hazards of mobile phone usage. The results are depicted in table 2.

The knowledge of students about the safety measures which may minimize the unwanted effects of the mobile phone are evaluated by asking them six specifically related question to it. The data analysis of these questions shows that a significant number of students are unfamiliar about themethods by which the unwanted effect of mobile phone usage can be minimized. Lack of awareness is more pronounced among the male students. The results are shown in table 3.

The students who are familiar with the safety measures for the minimization of the undesirable effects of the mobile phone usage have been asked about the practice of these measures in their day today life. The data analysis reveals that majority of students which include 52% male and 55% female students, do not practice these methods in spite of knowledge. The reasons for the lack of practice of the safety measures are laziness, feeling it too difficult to practice and non -availability of gadgets like ear phone and loud speaker mode. Results are shown in table 4& 5.

Table 1: Distribution of sources of knowledge for medical students about the Health Hazards of Mobile Phone

Sources of Knowledge	**Female students (%)**	**Male students (%)**
Social media	56 (46%)	55 (63%)
Parents	22 (18%)	16 (19%)
Television	15 (12%)	8 (9%)
Friends	15 (12%)	5 (6%)
Research article	7 (6%)	2 (2%)
Teachers	7 (6%)	1 (1%)
Total	122 (100%)	87 (100%)

Table 2: Assessment of Knowledge about the Health Hazards of Mobile Phone

	Total	**Female 122**	**(100%)**	**Total**	**Male 87**	**(100%)**
Questions	Responded as Yes	Responded as No	did Not Respond	Responded as Yes	Responded as No	did Not Respond
Do you know that the use of cell phone is associated with increased risk of brain tumors	46(37%)	68(56%)	8(7%)	26(30%)	56(64%)	5(6%)
Do you know that the persons with pacemakers should take certain precautions so that cell phone should not cause problems for them	53(43%)	63(52%)	6(5%)	36(41%)	50(58%)	1(1%)
Do you know that the persons with pacemakers should hold their mobile phone opposite (ear) to the implanted site of pacemaker	41(34%)	76(62%)	5(4%)	28(32%)	57(66%)	2(2%)
Do you know that the persons with pacemakers should not place a turned-on phone close to the implanted pacemaker (don't put the cell phone in a pocket which is just above the pacemaker)	19(16%)	97(79%)	6(5%)	30(34%)	53(61%)	4(5%)
Do you know that bone strength may be affected by electromagnetic radiation from mobile phones	37(31%)	81(66%)	4(3%)	27(31%)	56(64%)	4(5%)
Do you know there is increased risk of parotid gland tumors in persons who have more than 2.5 hours of cell phone use per day	32(26%)	87(71%)	3(3%)	15(17%)	67(77%)	5(6%)
Do you know that excessive use of mobile phone may affect the heart rate and BP	49(40%)	71(58%)	2(2%)	28(32%)	57(66%)	2(2%)

Table 3: Assessment of knowledge about the Safety Measures for the Prevention of Health Hazards of Mobile Phone

	Total	**Female122**	**(100%)**	**Total**	**Male87**	**(100%)**
Safety methods	Responded as Yes	Responded as No	did Not Respond	Responded as Yes	Responded as No	did Not Respond
Did you know that the SAR (Specific absorption rate) value of mobile phone should be low (It must not exceed 1.6 watts per one kilogram of body weight).	30(25%)	85(70%)	7(5%)	18(21%)	66(76%)	3(3%)
Mobile phone should be placed as far away as possible from the body (particular at night, during sleep)	45(37%)	75(61%)	2(2%)	12(14%)	72(83%)	3(3%)
For conversation, the loud speaker mode should be used (particularly of long duration conversation).	25(20%)	96(79%)	1(1%)	31(36%)	55(63%)	1(1%)
Turn off your cell phone when not needed (particularly at night, during driving).	11(9%)	109(89%)	2(2%)	4(5%)	82(94%)	1(1%)
Use earphones as much as possible	19(16%)	99(81%)	4(3%)	18(21%)	68(78%)	1(1%)
Don't use mobile phone very frequently (particularly for unnecessary tasks)	21(17%)	100(82%)	1(1%)	16(18%)	70(81%)	1(1%)

Table 4: The Assessment of Attitude towardsthe Practice of Safety Measures

	Female		**Male**	
Practice of safety measures	**Yes**	**No**	**Yes**	**No**
Do you practice the safety precautions (which you already know) to minimize the harmful effects of cell phones	45%	55%	48%	52%

Table 5: The reasons for the lack of practice of safety measures among the students who already know safety precautions

	Female	**Male**
Laziness	48%	44%
Procedure is too difficult to practice	45%	43%
Lack of gadgets	7%	13%

DISCUSSION

Over the past two decades, there is an exponential growth in terms of mobile phone use all over the world and particularly in the affordable communities. According to the Mobile economy 2018 report by GSM association, there are over five billion subscribers of mobile (5). In kingdom of Saudi Arabia, there are more than 44 million subscribers of mobile at the end of 2017 as reported by ministry of communication and technology[6].

Along with numerous beneficial effects of this latest gadget, there are certain potential health hazardwhich have been associated with the long term use of mobile phone. Radio waves (non- ionizing radiations) that have been emitted by the mobile phones have got certain bad effects on the central nervous system and cardiovascular system of the human body. The radiofrequency energy (non- ionizing electromegnatic radiation) released from the mobile phone devices may lead to increased production of free radicles in the human tissue close to the device and may contribute to the development of untoward effects by exerting their effects on cellular DNA[7,8].

These emitted non ionizing radiations during the mobile phone telecommunication are being considered as a risk factor for the development of certain cancers as well as some psychological and social problems in the long term users of the mobile phone[9].

In the present study, all the students (100%) responded that they are using mobile phone. This figure is a bit higher than the reported figure of 99% (medical residents) by Jamal A et al[10].

Regarding the health hazards of mobile phone, there is emerging evidence that the prolonged use of mobile increases the risk of brain tumors[3]. It has been documented that use of mobile phone in early age group (less than 20 years), the risk of development of astrocytoma is increased[11].

In a response to the question regarding the association of mobile phone with increased risk of brain tumors, only 35% female students and 30% male students are aware of this information. Similarly, regarding the questions about the other health hazards (effects on bone, parotid and cardiovascular system), the awareness among male and female students ranged from 17% to 41%. Similarly, low level of awareness among the students regarding the health hazards of mobile phone has been documented in other series published from other countries but these studies mainly focused their questions on general social and psychological aspects of mobile phone hazards and these do not contain specific questions about brain cancer, parotid tumor, heart rate, blood pressure, effects on bone and pace makers[12,13,14].

In the present series, social media is a very important source of knowledge for the students about the potential health hazards of mobile phone. In contrary to our series, a study published in 2012 from Saudi Arabia revealed that the community discussion was the most important source of knowledge regarding the side effects of mobile phone use[15]. With the passage of time, social media is gaining more importance in the life of human being. Social media may be another power tool for the dissemination of healthy knowledge.

The information available on social media may not be peer reviewed and scrutinized. This non-credible information may create false perception and wrong concepts. In the present study, the majority of students have the perception that they have the knowledge about the hazardous effects of cell phone use. But the data analysis of specific questions asked to them about these hazardous effects reveals contrary results which may be attributed to knowledge from the social media, as the majority of these students acquired their knowledge about unwanted effects of cell phone from the social media.

Certain preventive measures have been recommended to reduce the potential hazardous effects of mobile phone which include less conversation time on mobile phone, selection of the mobile phone with lower SAR(Specific Absorption Rate) value, use of loud speaker, use of ear phones and keeping the mobile phone away from the body[16,17].

The knowledge of students is also evaluated for these safety methods which may be adapted for the prevention of potential health hazards of mobile phone. There are six questions about these measures. The data analysis of these questions shows that most of the students do not have the knowledge about the methods by which one can minimize the unwanted effect of mobile phone. Lack of awareness is more prevalent among the male students. The results of our study regarding the level of awareness about the safety measure among our medical students reflect that they have less awareness as compared to the study published from Malaysia[14].

Regarding the practice of these safety measures, the data analysis shows that majority of these students do not practice these measures in spite of having the knowledge about it. The majority of students state that they do not practice safety measures practices because of laziness and preventive measures are too difficult to practice while few mention that they have lack of the appropriate gadgets. Laziness is also a significant reason for non- practicing attitude of medical students in a study published from Malaysia[14]. The lazy attitude may be attributed to the overwhelming availability of most modern gadget for the human being.

CONCLUSION

There is a significant lack of awareness among the medical students regarding the potential hazards of mobile phone usage and about the safety measures for the prevention of the adverse effects of cell phones.

Recommendations and suggestions: The finding of present study recommends that the learning outcome related to the knowledge about the potential health hazards of mobile phone and safety measures for the prevention of these untoward effects should be included in the curriculum of undergraduate programs and even in the high school teaching programs.

Knowledge about the hazards of mobile phone and the preventive measures may also be disseminated to the community particularly to the youth through seminars and public awareness programs.

Further studies, like research on the cell lines may be performed to evaluate the toxic effects of radiations emitted from the mobile phones and the base transceiver stations.

Conflict of interest: Nil

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REFERENCES

1. Morgan LL, Miller AB, Sasco A, Davis DL. Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen. Int J Oncol. 2015;46(5):1865-71.
2. Al Qahtani K. Mobile Phone Use and the Risk of Parotid Gland Tumors: A Retrospective Case Control Study. Gulf J oncolog 2016; 1(20):71-8
3. Ekici B, Tanindi A, Ekici G, Diker E. The effects of the duration of mobile phone use on heart rate variability parameters in healthy subjects. Anatol J Cardiol. 2016;16(11):833-838
4. Kumar V, Sharma A, Kumar A, Ahmad M, Gupta GK. Interaction of Mobile Phone Waves with Tissues of Skeletal Muscles and Bone of Human Beings. Journal of Pharmacy and Biological Sciences. 2012;1(6): 06-16
5. Mobile Economy 2018. www.gsmaintelligence.com
6. Telecommunication Indicators in the Kingdom of Saudi Arabia by the end of Q3-2017. 7 Dec 2017.
7. Kıvrak EG, Yurt KK, Kaplan AA. Effects of electromagnetic fields exposure on the antioxidant defense system. Journal of Microscopy and Ultrastructure. 2017; 5:167–176
8. Pall ML. Wi-Fi is an important threat to human health. Environmental Research.2018; 164: 405–416
9. Naeem Z. Health risks associated with mobile phones use. International Journal of Health Sciences, 2014; 8(4): V-VI
10. Jamal A, Temsah MH, Khan SA, Al – Eyadhy A, Koppel C, Chiang MF. Mobile Phone Use Among Medical Residents: A Cross-Sectional Multicenter Survey in Saudi Arabia. JMIR Mhealth Uhealth. 2016;4(2): 61.
11. Hardell L, Carlberg M. Mobile phones, cordless phones and rates of brain tumors in different age groups in the Swedish National Inpatient Register and the Swedish Cancer Register during 1998-2015. PLOS ONE.2017; 12(10): e0185461. https://doi.org/10.1371/journal.pone.0185461
12. Pendse N, Zagade T. Knowledge and Attitude Regarding Health Hazards of Mobile Phone Users among the Junior College Students. International Journal of Science and Research (IJSR). 2014;3(5):554-561
13. Hassoy H, Durusoy R, Karababa AO. Adolescents' risk perceptions on mobile phones and their base stations, their trust to authorities and incivility in using mobile phones: a cross-sectional survey on 2240 high school students in Izmir, Turkey. Environmental Health 2013,12:10
14. Kumar LR, Chii KD, Way LC, Jetly Y, Rajendaran V. Awareness of mobile phone hazards among university students in a malaysian medical school.Health. 2011; 3:406.
15. Al-Muhayawi S, Eldeek B, Abubakr H, Kuddah RB, Zahid A, Abukhashabah H. The Impact of Medical Education on Saudi Medical Students' Awareness of Cell Phone Use and its HealthHazards. Life Science Journal. 2012;9(2):1143-1148
16. Kaur S, Kaur J, Sandhu M. Effects of Mobile Radiations and its Prevention. IJCSMC.2016; 5(2):298 – 304
17. Osmena W, Saara AAA. Awareness campaign against cell phone radiation hazard: Case study Oman. Procedia - Social and Behavioral Sciences. 2015; 205: 381 – 386.