

Awareness of Cell Phone Hazards among University Students

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Abstract— Public health concerns have been raised about the possibility that exposure to radiofrequency electromagnetic fields from cell phones could affect the overall health.

Objectives: to determine the perception of university students regarding Mobile phone health hazards, and find out their actual practice of usage.

Study design: A cross sectional study was conducted in Minia University.

Methods: The study participants were university students from different faculties. A total of 765 participants answered the questionnaire.

Results: Most of participants (72.1% of males and 86.9% of females have at least one mobile phone, 77.2% of males and 56.5% of females using mobile phone for 5-10 years. Right ear (45.6%) was preferred. (75.5%) of females locate the mobile in the bag while 82.6% of males locate it in their pocket. Majority of males (99.2%) and females (99.5%) were aware about health hazards of mobile phone. Most of participants agreed that mobile phone usage can cause headache (87.8%), sleep disturbance (63%), and loss of mental attention (58.7%).

Conclusions: the authors found that most of the participants used the mobile phone for 5-10 years. Right ear was preferred than left ear. Majority of the students were aware about health hazards of mobile phone. Most of them agreed that the mobile phone usage can cause health hazards.

Keywords: Awareness; Cell Phone; Hazards; University Students; Health

Introduction

In the last few decades, communication technologies have changed dramatically, replacing landline devices with portable cell phones. According to The International Telecommunication Union (2015), the number of cell phone subscribers reached more than 7 billion in 2015 worldwide. Therefore, public has become more concerned about the possible health hazards due to cell phone use¹.

Cell phones emit radiofrequency electromagnetic fields (RF-EMF) when making and receiving calls. They are non-ionizing and do not cause DNA mutations, there are no consistent evidence to demonstrate that non-ionizing radiation increases the risk for cancers. But, they may have thermal effects in contacts with the human body, raising the temperature in the tissues which is the only established mechanism for biological effect of radiofrequency radiation. If there is an effect of mobile phone use at all, then the mechanism would be tumor promotion or advancement rather than commencement².

The International Agency for Research on cancer (IARC) has categorized radiofrequency electromagnetic fields produced by cell phones as ‘a possible carcinogen for humans, although there is no clear evidence³.

In the large prospective study of middle-aged UK women, self-reported cell phone use was not associated with an increased risk of glioma, meningioma or non-central nervous system tumors. However, an increased risk was found for acoustic neuroma among long-term cell phone users (> 5 years) ⁴.

Association with ipsilateral glioma and acoustic neuroma was reported ⁵. The risk of leukemia ^{6,7} and parotid gland tumors in ipsilateral mobile phone users has been suggested and there is also concern that the thyroid gland might be affected ⁸.

Many studies have suggested a possible link between mobile phone RF effects, the incidence of brain tumors, and sleep disturbance. For example, it is generally recommended that mobile phones are not left to charge in the bedroom ⁹.

Research has suggested that radio frequency radiation (RFR) might affect cognitive functioning ¹⁰.

Despite vast number of mobile phone users in Egypt and questionable negative health effects of mobile phone usage, few studies have been conducted. Hence, this study was conducted to measure the prevalence, usage pattern of mobile phone, health effects awareness and the feasibility of utilizing mobile phones for health promotion ¹¹.

Methods

Aim of the study:

The aim of this study was to determine the perception of Minia University students regarding Mobile phone health hazards, and to find out their actual practice of usage.

Study design and population

A cross sectional study was conducted in Minia University, during February 2017 to July 2017. The study participants were university students from different faculties.

Sample size

Using Epi Info 2000 software program, the required sample size was estimated based on the following conditions: assuming that the expected proportion of the population who aware about mobile phone hazards= 50%; tolerated error/margin of error (d) = 0.05; confidence interval (CI) = 95%.

Accordingly, the sample size was estimated and additions of 10% of the sample were added to guard against non-respondents' rate. Inclusion criteria: Finally, a total 765 students were included in the study. Persons who were unable to answer the questions or give incomplete response due to some barriers were excluded from the study. Respondents were selected by multistage random sample; faculties were divided into medical and medical (first stage) then two faculties from each medical (faculty of Medicine and faculty of Nursing) and none medical (faculty of Education and faculty of Engineering) were chosen by simple random technique). The respondents were collected from each faculty by convenient technique.

Data collection:

Face-to-face interviewing was used for data collection using structured questionnaire. The questions included socio-demographic characteristics, mobile phone usage and pattern, awareness about its health hazards and practice to minimize it. Participant perception about mobile phone health problems included headache, earache, tachycardia, restlessness, sleep disturbance and memory loss. Close contact with mobile phone was defined as keeping the mobile phones in shirt/pant pockets, pouches near the hip, hanging around the neck and near the pillows while sleeping.¹²

To determine the reliability of the questionnaire, a pilot study was conducted among 30 individuals in the study population (Cronbach alpha = 0.86).

Ethics approval

All the procedures were reviewed and approved by the ethical committee in faculty of Medicine. Prior to data collection, informed consents were obtained after supplying comprehensive information about the nature and the objectives of the study.

Statistical analysis

Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS version 20, SPSS Inc., Chicago, IL, USA) software. Graphics were done by using excel 2010.

Qualitative data presented as mean and standard deviation while qualitative data presented as frequency distribution. Chi square test was used to test the significant difference. p value of less than 0.05 was used as a cutoff for significance.

Results:

This study included 765 students, their age ranged between 17-26 years with a mean of 20.4 ± 1.3 years; there were 51% males and 49% females, distributed from different faculties; 36.3% from faculty of Nursing, 25.1% from faculty of Medicine, 25.3% from faculty of Education and 13.2% from faculty of Engineering.

The practice of participants toward uses of mobile phone, 72.1% of males and 86.9% of females have at least one mobile phone, nearly one third of participants (67.1%; 77.2% of males and 56.5% of females) using mobile phone for 5-10 years. Majority (85.4%) of students reported to have less than 10 calls per day; near one third (34.1%) using it for 30 min to one hour daily, and this use was higher among males (40.5%) than females (27.5%). 72.5% of females and 84.9% of males use hand free, 31.3% of males and 7.5% of males use mobile phone while driving. (table 1,2).

The most popular used mobile phone brands were Samsung (47.7%), Nokia (17.3%), Hawaii (14.6%) and Sony (6.8%) as shown from figure (1).

Right ear (45.6%) was preferred than left ear (12.7%) for speaking in mobile phone (figure 2).

From figure 3 it was found that about two third (75.5%) of females locate the mobile in the bag while 82.6% of males locate it in their pocket.

Majority of males (99.2%) and females (99.5%) were aware about health hazards, 31.7% did not know the practice which reduce these hazards. (table 3).

As shown from (table 4) majority of participants agreed that mobile phone usage can cause headache (87.8%), sleep disturbance (63%), fatigue (59.9%), and loss of mental attention (58.7%), dizziness (44.8%) and memory loss (40.3%).

Table (1): Distribution of the studied students according to their characters:

Variables		NO	%
Age	Range	17-26	
	Mean \pm SD	20.4 \pm 1.3	
Sex	Male	390	51%
	Female	375	49%
Faculty	Nursing	278	36.3%
	Medicine	192	25.1%
	Education	194	25.3%
	Engineering	101	13.2%
Total		765	100%

Table (2): Practice of participants toward use of mobile phone

Variables		Total No= 765	Male No=390	Female No=375	X ² P
Number of mobile used	Single	607(79.3%)	281(72.1%)	326(86.9%)	25.8 0.001*
	More than one mobile	158(20.7%)	109(27.9%)	49(13.1%)	
Duration of used mobile (years)	<5	242(31.6%)	84(21.5%)	158(42.1%)	37.7 0.001*
	5-10	513(67.1%)	301(77.2%)	212(56.5%)	
	>10	10(1.3%)	5(1.3%)	5(1.3%)	
Number of call per day	<10 calls	653(85.4%)	309(79.2%)	344(91.7%)	23.9 0.001*
	10-20 calls	112(14.6%)	81(20.8%)	31(8.3%)	
Number of SMS per day	<5	478(62.5%)	234(60%)	244(65.1%)	4.1 0.1
	5-10	262(34.2%)	139(35.6%)	123(32.8%)	
	>10	25(3.3%)	17(4.4%)	8(2.1%)	
Daily usage time (minutes)	<30 min	449(58.7%)	195(50%)	254(67.7%)	25.6 0.001*
	30 min-1 hour	261(34.1%)	158(40.5%)	103(27.5%)	
	>1 hour	55(7.2%)	37(9.5%)	18(4.8%)	
Use hand free	Yes	603(78.8%)	331(84.9%)	272(72.5%)	17.4 0.001*
	No	161(21.2%)	59(15.1%)	103(27.5%)	
Use Bluetooth	Yes	378(49.4%)	199(51%)	179(47.7%)	0.8 0.3
	No	387(50.6%)	191(49%)	196(52.3%)	
Use while driving	Yes	150(19.6%)	122(31.3%)	28(7.5%)	70.1 0.001*
	No	615(80.4%)	268(68.7%)	347(92.5%)	

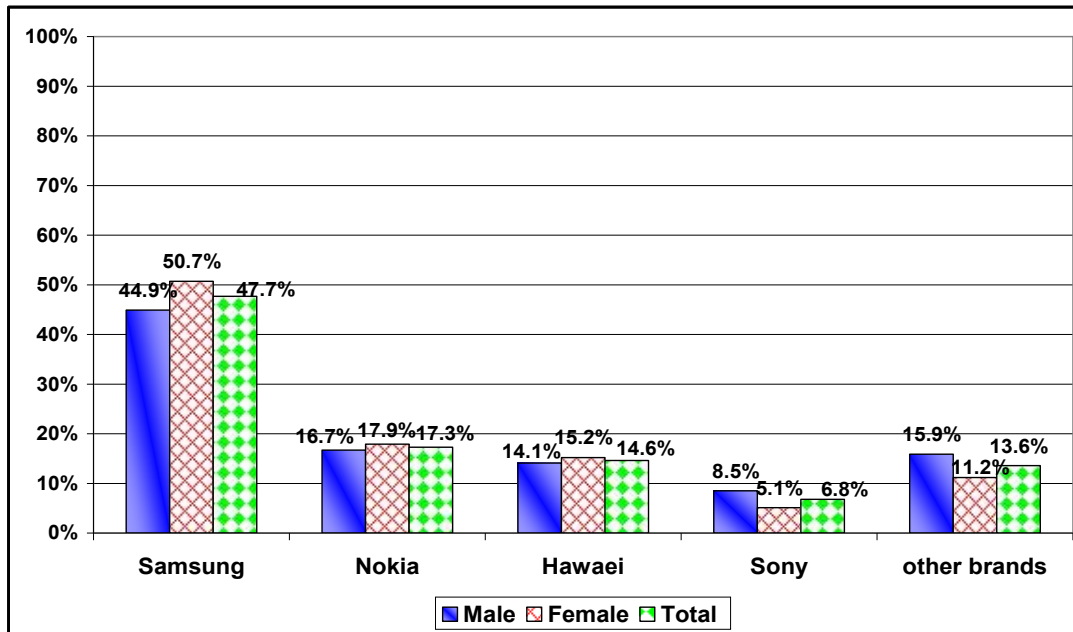


Figure (1): Distribution of the studied students according to the used brand

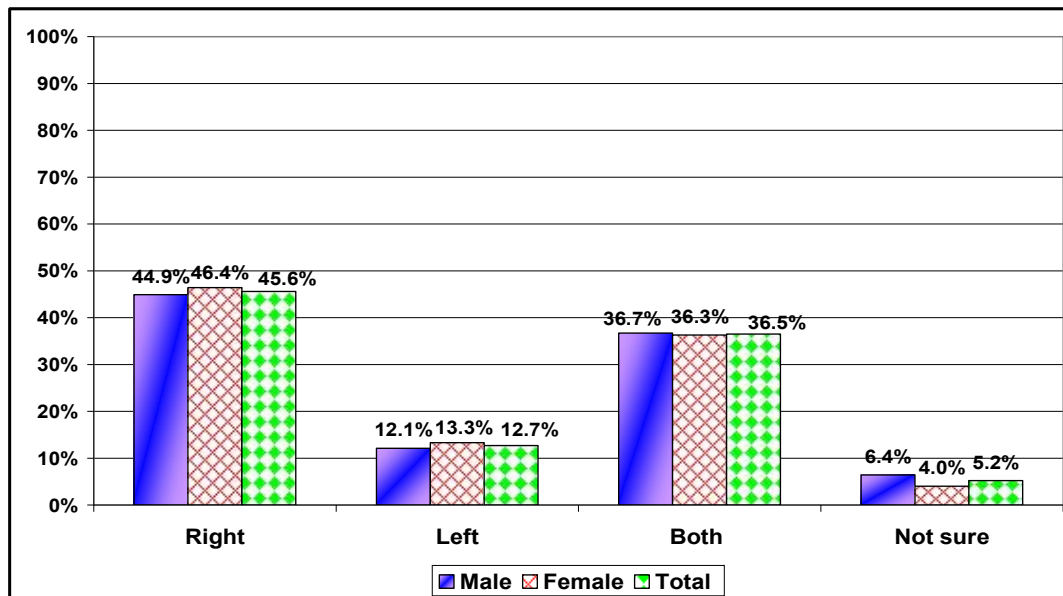


Figure (2): Distribution of the studied students according to the used Ear

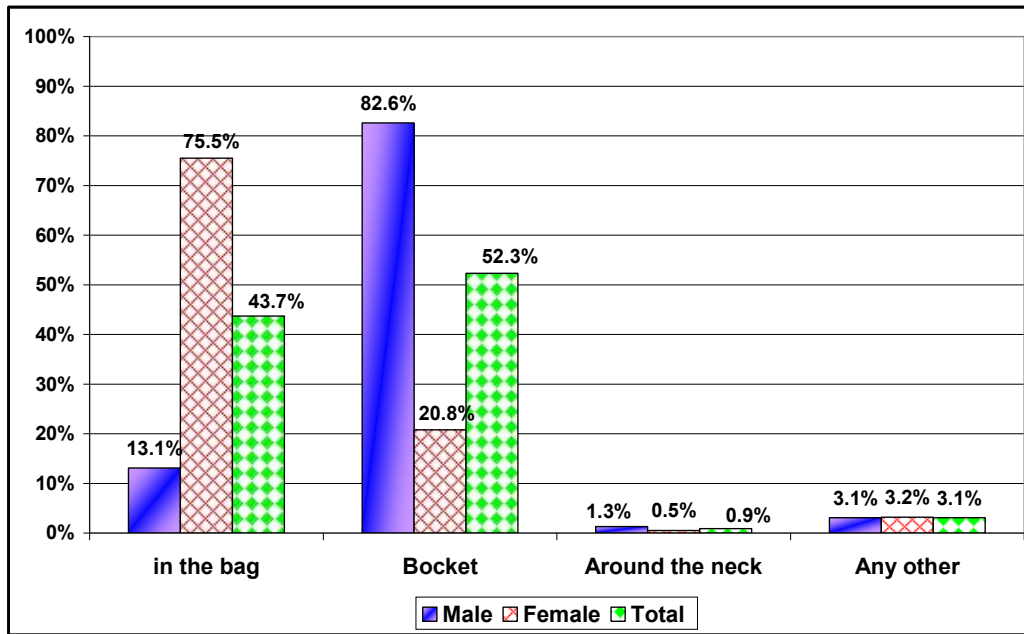


Figure (3): Distribution of the studied students according to location of placing mobile phone

Table (3): Awareness of the studied students regarding hazards of mobile phone and best way to minimize these hazards:

Variables		Total No= 765	Male No=390	Female No=375	X ² P
Awareness about health hazards of mobile phone	Aware	760(99.3%)	387(99.2%)	373(99.5%)	0.2
	Not aware	5(0.7%)	3(0.8%)	1(0.5%)	0.9
Awareness about best way to minimize these hazards	Decrease talking duration	442(57.8%)	244(62.6%)	198(52.8%)	36.6 0.001*
	Increase hand free length	150(29.6%)	92(23.6%)	58(15.5%)	
	Do not know	173(22.6%)	54(13.8%)	119(31.7%)	
Practice to reduce hazards	Yes	732(95.7%)	364(93.3%)	368(98.1%)	10.8 0.001*
	No	33(4.3%)	26(6.7%)	7(1.8%)	
Cause of non practice	Long time of using	33	26	7	7.8 0.02*
	Ignoring its hazards	17(51.5%) 16(48.5%)	10(40%) 16(60%)	7(100%) 0	

Table (4): Perception of the studied students regarding hazards of mobile phone:

Variables		Total No= 765	Male No=390	Female No=375	X ² P
Fatigue	Disagree	307(40.1%)	176(45.1%)	131(34.9%)	8.2 0.004*
	Agree	458(59.9%)	214(54.9%)	244(65.1%)	
Sleep disturbance	Disagree	283(37%)	138(45.3%)	145(38.7%)	0.8 0.3
	Agree	482(63%)	252(64.6%)	230(61.3%)	
Dizziness	Disagree	422(55.2%)	212(54.5%)	210(56%)	0.2 0.6
	Agree	343(44.8%)	178(45.6%)	165(44%)	
Loss of mental attention	Disagree	316(41.3%)	163(41.8%)	153(40.8%)	0.07 0.7
	Agree	449(58.7%)	227(58.2%)	222(59.2%)	
Memory loss	Disagree	457(59.7%)	228(58.5%)	229(61.1%)	0.5 0.4
	Agree	308(40.3%)	162(41.5%)	146(38.9%)	
Headache	Disagree	93(12.2%)	44(11.3%)	49(13.1%)	0.5 0.4
	Agree	672(87.8%)	346(88.7%)	326(86.9%)	
Tachycardia	Disagree	555(72.5%)	290(74.4%)	265(70.7%)	1.3 0.2
	Agree	210(27.5%)	100(25.6%)	110(29.3%)	
Diarrhea	Disagree	758(99.1%)	385(98.7%)	373(99.5%)	1.1 0.2
	Agree	7(0.9%)	5(1.3%)	2(0.5%)	
Constipation	Disagree	751(98.2%)	382(97.9%)	369(98.4%)	0.2 0.6
	Agree	14(1.8%)	8(2.1%)	6(1.6%)	

Discussion:

Radio frequency (RF), an invisible electromagnetic radiation, is emitted by cell phones and is absorbed by the skin, inner ear, cochlear nerve, and the temporal lobe surface of cell phone users ¹³.

The study revealed that out of 765 students, males (51%) and the age ranged between 17-26 years with a mean of 20.4±1.3 years, these finding in agreement with Gautam and Shakya, 2016 ¹⁴ who found that 34.3% of the students belongs to the age of 17 years and majority 64.3% of the students were male, also this finding were supported by study ¹⁵ that found, 38% of the students belongs to the age of 17 years and majority 59% of the students were male.

Regarding practice, 72.1% of males and 86.9% of females have at least one mobile phone, nearly one third of participants (67.1%; 77.2% of males and 56.5% of females) using mobile phone for 5-10 years, these finding similar to what was reported by Kumar et al., 2011 ¹² found that Most subjects have been using their mobile phone for 5 years.

Majority (85.4%) of students reported to have less than 10 calls per day; near one third (34.1%) using it for 30 min to one hour daily, and this use was higher among males (40.5%) than females (27.5%), which was in agreement with Al-Muhayawi, et al., 2012¹³ reported that 48% use it for 30 min to 1 hour and 70.7% had less than 10 calls daily.

The most popular used mobile phone brands were Samsung (47.7%), Nokia (17.3%), Hawaii (14.6%) and Sony (6.8%), Right ear (45.6%) was preferred than left ear

(12.7%) for speaking in mobile phone, about two third (75.5%) of females locate the mobile in the bag while 82.6% of males locate it in their pocket. **Kumar et al., 2011**¹² found that the most favorite mobile phone brand used is Nokia (53.5%), followed by Sony Ericsson (34%). The placement of mobile in the pocket was the most popular choice. However, none of our subjects put their phone around their neck.

Majority of males (99.2%) and females (99.5%) were aware about health hazards of mobile phone which was in agreement with **Al-Muhayawi, et al., 2012**¹³ found that 88% of participant have heard about the side effects of cell phone. GSS, 2014 found that 63% had got information regarding the harmful effects on cell phone use while **Gautam and Shakya, 2016**¹⁴ revealed that 61.4% of students not aware about hazards of mobile phone. The students' awareness has increased mostly via electronic sources, printed media sources, and through social communication in the community. Cell phone use is mainly for social communication, followed by study purposes and other reasons. **Martha and Griffet, 2007**¹⁶ have reported that adolescents appear to be concerned with perception of hazard. **Shaaban and Shaikh, 2018**¹⁷ found that the majority of participants had misconceptions regarding radiation sources and its detriments to health. Socio-demographic variables were associated with the participants' perception.

Nearly 31.7% did not know the practice which reduce these hazards which higher than what reported by **Al-Muhayawi, et al., 2012**¹³ who found only 16% did not know the best way to minimize SE through Phone.

The results of this study showed that majority of participants agreed that mobile phone usage can cause headache (87.8%), sleep disturbance (63%), fatigue (59.9%), and loss of mental attention (58.7%), and memory loss (40.3%). These results were in agreement with **Kumar et al., 2011**¹² who reported that most subjects agreed that mobile phone usage can cause headache, loss of mental attention and sleeping disturbances and most disagree that mobile phone usage can cause constipation and diarrhea.

Conclusion:

The findings revealed that nearly one third of participants using the mobile phone for 5-10 years. The most popular used mobile phone brands were Samsung. Right ear was preferred than left ear for speaking in mobile phone. About seventy-five of females locate the mobile in the bag while eighty-two of males locate it in their pocket. Majority of the students were aware about health hazards of mobile phone. Most of them agreed that the mobile phone usage can cause headache, sleep disturbance, fatigue and other cell phone hazards.

Acknowledgment

The authors are grateful to all students participated in the study for their cooperation.

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