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Survey of Ownership and Use of Mobile Phones among Medical Science Students in Yazd

¹S.S. Mazloomi Mahmoodabad, ²A. Barkhordari, ¹H. Nadrian, ¹O. Moshiri and ¹M.T. Yavari

¹Department of Public Health,

²Department of Occupational Health,

Yazd Shaheed Sadoughi University of Medical Sciences, Yazd, Iran

Abstract: As the use of mobile phones is increasing every day, public concern about possible adverse health effects of exposure to radio frequency electromagnetic fields (rf-emf) is also growing. Despite the extensive use of mobile phones, little is known about the pattern of mobile phone ownership and its use by the general population and students. The aim of this study was to assess the pattern of ownership and use of mobile phones in medical science students and their views about any possible negative effects. The current cross-sectional study was conducted on 309 selected Medical Science students who were selected from Yazd Medical Sciences University using a self-administrated questionnaire. The mean talking time and listening to music on the mobile phone was 28.3 ± 50.5 and 51.9 ± 81.5 min day⁻¹, respectively. They also received or sent a mean of 18.8 ± 37 text messages. Participants reported that location wise, the use of cell phones at home was 87.2% followed by street (79.6%), classroom (37.6%), during driving (18.6%) and in the library (17.8%), respectively. Keeping at pace with changes in community and technology, including mobile phones and their effects on university environments, it seems that responsible departments or managers must predict their possible effects and establish new regulations, accordingly.

Key words: Mobile phone use, mobile phone ownership, possible hazard effects, medical students, educational program

INTRODUCTION

The use of mobile phone and the extension of this technology has increased in recent years and most humans are exposed to such radio frequency electromagnetic fields (rf-emf). In parallel, there is growing public concern about possible adverse health effects of exposure to rf-emf (Krewski *et al.*, 2007; Mezei *et al.*, 2007; Rubin *et al.*, 2005; Salama *et al.*, 2004; Soderqvist *et al.*, 2007; Thomas *et al.*, 2008). Though the rf-emf do not fall within the ionizing spectrum, contrary results about negative effects on human being remains a question as to whether exposure to low-intensity rf-emf can negatively affect human health or not. It has therefore recently been relabeled as idiopathic environmental intolerance with attribution to electromagnetic fields (IEI-EMF). High-intensity rf-emf can cause higher levels of heart rate, heart rate spectrum ratio, headache, dizziness, vomiting, fatigue, cold and flu like symptoms, thermal effects with serious implications, lower levels of well-being compared with healthy individuals and may greatly affect their quality of life (Rubin *et al.*, 2005;

Ammari *et al.*, 2008; Riddervold *et al.*, 2008; Eltiti *et al.*, 2007; Franke *et al.*, 2005; Curcio *et al.*, 2005; Karger, 2005; Johansen, 2004; Westerman and Hocking, 2004; French *et al.*, 2001; Repacholi, 2001; Hocking and Westerman, 1998; Hocking, 1998; Regel *et al.*, 2006). Although mobile phones are being used extensively, but the pattern of mobile phone ownership and use by the general population and students is not known perfectly. It is reported that 47% of United States students aged 12 to 19 and 100% of teenagers in Scandinavian countries and Asia carry mobile phone handsets, In 2007, the number of mobile phone users increased to 3.3 billion which is half of the world population (Iranian National Marketing Technology, 2007).

In Iran, nearly, 20 million mobile phones are used by the general population and the country ranks 44th in the world in this respect (Mobile Communication Corporation, 2007). We performed this study to assess the pattern of ownership and use of mobile phones in medical science students and their views about any possible negative effects.

Corresponding Author: Barkhordari Abolfazl, Department of Occupational Health,
Yazd Shaheed Sadoughi University of Medical Sciences, Postal Address 8916188638, Yazd, Iran
Tel: 00983516238556

MATERIALS AND METHODS

In order to assess the pattern of ownership and use of mobile phones in medical science students and their views about any possible negative effects, a research project was carried out from September 2007 to January 2008. This survey was a cross-sectional study that was conducted on 309 medical sciences students selected from various departments (Departments of Health, Medicine, Nursing and Midwifery) of Yazd University of Medical Sciences using a stratified sampling scheme. The purpose of the study, which included their rights as human subjects for a research study, was explained to participants and all signed consent forms. In every department an empty classroom was selected and the respondents were requested to attend there and fill the self-administrated questionnaire.

The self-administrated questionnaire comprising of 4 sections including demographic data, student's age, sex, their field in medical science and the number of semesters attended at the university, ten questions about the student's experience of mobile phone usage, two sections related to student's views about their negative effects on health and the ways of reducing these effects. To investigate the student's practice in mobile phone usage, the 10-item scale that was developed was as follows:

(1) Do you have a mobile phone? (Yes/No). If No, go to question number eight; (2) How long have you had a mobile phone (Years)? (3) How many minutes do you speak on your mobile phone, per day? (4) How many Short Message Services do you receive or send by your mobile phone per day? (5) How many minutes do you listen to music on your mobile phone, per day? (6) Which is the most common place where you use your mobile phone? [(1) house (2) street (3) classroom (4) while driving (5) library (6) other places]; (7) How long do you use your mobile phone in your classroom? (A 3-point Likert-type scaling was used, 1 = none, 2 = moderate and 3 = a lot.); (8) Do you think that using mobile phone in the classroom results in distraction of the attention of students? (Yes/No); (9) How much does your family use mobile phone? (The same 3-point Likert-type scaling was used.) (10) Do you think that mobile phone usage has negative effects on your body? (Yes/No). The student's idea about negative effects of mobile phone on their health was measured with a 7-item scale which included (1) audio vestibular system disorders, (2) headache, (3) eye ache, (4) severe fatigue, (5) mental disorders, (6) sense of face-burning and (7) heart disorders. Again, a 3-point Likert-type scaling was used, 1 = none, 2 = moderate and 3 = a lot. Finally, the students' views about the ways of reduction of the side effects on their health were assessed

by a question whose answers were as follows: (1) less mobile phone usage, (2) holding the cell phone far from the body, (3) using hands free set (4) No idea.

To confirm the internal consistency of the scale, 50 questionnaires were distributed among students and data was analyzed by Statistical Package for Social Sciences (SPSS, 2001) and then Cronbach alpha was computed ($\alpha = 0.7$). Respondents were asked whether they had ever used mobile phone hand set or not. Data were transferred to SPSS (Statistical Package for Social Sciences) for analysis and statistical tests. Statistical analysis was performed with One way ANOVA for quantitative and Chi square test for qualitative variables. $p < 0.05$ was considered as significant.

RESULTS

A total of 309 male and female students were voluntarily interviewed with structured questionnaire. The age of subjects ranged from 18 to 27 years, with a mean and standard deviation of 21.3 and 3.1, respectively. The majority of participants were females (53.1%) and students of the Health faculty (42.7%). A total of 73.5% owned mobile phones for a period of 2.3 ± 1.9 years. Based on defined categories, most of the students (72.6%) spoke with mobile phone less than 20 min day⁻¹ (Table 1), received or sent less than 10 SMS day⁻¹ (63.7%) and listened to music on the mobile phone less than 30 min day⁻¹ (60.6%).

The relationship between curriculum degree and the number of received or sent text messages per day is shown in Table 2. Participants reported that they mostly used cell phones at home (87.2%) followed by the street (79.6%), classroom (37.6%), during driving (18.6%) and in the library (17.8%), respectively (Table 3). The mean time of speaking and listening to music by mobile phone was 28.3 ± 50.5 min day⁻¹ and 51.9 ± 81.5 min day⁻¹,

Table 1: Frequency and accumulated frequency of daily speaking on the mobile phone in the respondents

Daily speaking	Frequency (%)	Accumulated percentage
Under 20 min	164 (72.6)	72.6
20-40 min	28 (12.4)	85.0
40-60 min	14 (6.2)	91.2
More than 60 min	20 (8.8)	100.0
Total	226 (100)	

Table 2: Relationship between curriculum degree and the number of received or sent SMS day⁻¹ in the respondents

Curriculum degree	Frequency	Mean (\pm SD)	F	df	p-value
Technician	63	28.6 \pm 63.30	4.8	2	0.009
Bachelor	110	11.2 \pm 14.30			
Postgraduate	53	23.1 \pm 27.09			
Total	226	18.8 \pm 37.80			

Table 3: Frequency of the places of mobile phone use

Places	Frequency	Percent
House	197	87.2
Street	180	79.6
Classroom	85	37.6
While driving	42	18.6
Library	55	17.8

Table 4: Frequency and accumulated frequency of respondents listening to music on the mobile phone

Listening to music	Frequency (%)	Accumulated frequency (%)
Less than 30 min	137 (60.6)	60.60
30-60 min	47 (20.8)	81.40
60-120 min	21 (9.3)	90.70
More than 120 min	21 (9.3)	100.00
Total	226 (100)	

respectively. They also received or sent 18.8 ± 37 text messages. As results show, the majority of owners (60.6%) listened to music less than 30 min per day with the mean and standard deviation of 51.9 and 81.5 min, respectively (Table 4). In contrast to 11.9% of participants, 45.6% reported that they never used mobile phones in the classroom. About 84% of the students noted that the use of a mobile phone in the classroom distracts the attention of other students. Moderate and high use of mobile phones by 50 and 24.9% of the students' families were also reported, respectively. According to the results, participants reported that audio vestibular system disorders (33.3%), headache (33.3%) and mental disorders (28.8%) could be caused by mobile phones. They also announced that the best ways for reduction of these disorders are less mobile phone usage (48.9%) and keeping the mobile phone far from the body by using a hand free set (27.5%).

DISCUSSION

There are many reports describing the negative health effects of mobile phones, but little is known about the pattern of mobile phone ownership and usage by young persons and students. This study for the first time, therefore, has assessed the ownership and use of mobile phones among medical sciences students and their opinions about any possible negative effects of mobile phones. In this study, 73.5% out of all respondents had a mobile phone. This finding is consistent with the findings of Salama *et al.* (2004) who reported that 68% of respondents were mobile phone owners. Mezei *et al.* (2007) also reported that 76% of all students had a mobile phone. Davidson and Lutman (2007) reported that 94% of their respondents were mobile phone owners and only 2% had never used a mobile phone. Again, in the Davidson and Lutman (2007) study, the duration of mobile phone ownership and mobile phone usage per day ranged from 0-7 years and 0-45 min, respectively, which is close to the findings of the present study which ranged from

0.2-5 years and 1-60 min with the mean of 2.1 years and 28 min, respectively. There was no significant difference between mobile phone use per day in male and female students which is consistent with the findings of other studies (Rees and Noyes, 2007).

Despite a complete ban of mobile phone use during driving in Iran, about one half of students experience this illegal act. The frequent use of mobile phones in the classroom and complaint of a high percentage of students regarding distraction of attention indicates that new regulations at the university should be established. In spite of high knowledge of students about ways of reduction of disorders, 27.4% of users used their mobile phones more than 20 min a day. In the present study, under graduate students used their mobile phones more frequently and it may be due to low motivation for study which of course, needs more investigation. With respect to increasing trend of mobile phone use and its possible hazardous effects, educational programs can be implemented for student's health promotion. This program can be carried out by student consultancy centers. Parental attention to this issue may be also useful. We therefore need to teach young people to be structured, to know when to have the cell phone on and when to switch it off and to avoid becoming the slave of technology, instead of its master.

Keeping in pace with major community and technology changes, including mobile phone usage and their effects on the university environment, it seems that responsible departments or managers must predict their possible effects and establish new regulations, accordingly.

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