

Article

A survey based study of public perception towards cell phone use and its association with health complications in an urban setting of Dhaka City

Tarana Sharmin^{1*}, Tasnim Ahmed¹, Abid Al Reza¹ and Rizwan Mahmud²

^{1,2}Department of Genetic Engineering and Biotechnology, University of Dhaka. Dhaka-1000, Bangladesh

¹Department of Genetic Engineering and Biotechnology, East West University, Dhaka-1212, Bangladesh

*Corresponding author: Tarana Sharmin, Department of Genetic Engineering and Biotechnology, University of Dhaka, Dhaka-1000, Bangladesh. Phone: +8801717471062; E-mail: tarana_gcb@yahoo.com

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Abstract: With the advancement of science and technology, the worldwide market of cell phone is growing rapidly and the average lifespan of these equipment is shortening. These electronic equipment, containing toxic elements, imposes high risks leading to health complications. This survey based study is an endeavor to observe public awareness towards cell phone use and its correlation to health complications such as hearing impairment, back pain, problems in eye, headache etc. Remarkably this pilot study implies that adverse health effects for using cell phones are greater in male than in female which can be a great concern for our public health.

Keywords: e-waste; toxic elements; health complications; public health

1. Introduction

The electronic industry is one of the fastest growing industries in recent years. Exponential growth in the innovation of electronic devices has fueled a remarkable change in consumer behavior. Consumers are continuously switching to new devices, to keep up with the current trends, which has led to a noteworthy reduction in the lifespan of such devices. For example, the average lifespan of a personal computer has reduced from 4.5 years in 1992 to 2 years in 2005 (Widmer *et al.*, 2005). The toxic metals associated with these electronic devices can lead to serious health disorders. The toxic chemicals used in electronic equipment include chromium, mercury, lead, polyvinyl chloride (PVC), antimony, brominated flame-retardants etc. Long term exposure to these components can cause critical disorders in the endocrine system, nervous system and reproductive system of humans (Jaibee *et al.*, 2015). Among the electronic equipment, cell phone has contributed the major portion of e-waste because of its short life cycle and increased demand. Several studies have been carried out worldwide for analyzing customers' choice for buying cell phones (Khan *et al.*, 2014). Globally 5 billion subscription of mobile phones has been recorded in a report of International Telecommunication Society (ITU, 2011; Tutkun *et al.*, 2013). The electromagnetic field transmitted from cell phones exerts adverse effect such as headache, heat sensation and so on. Epidemiological studies also reveal that long-term exposure to this electromagnetic radiation can increase the risk of brain tumors, leukemia and breast cancer (WHO, 2002; SCENIHR, 2009; ICNIRP, 2009). The health effects can be severe for the vulnerable population especially pregnant woman and new born baby (Grant *et al.*, 2013). By considering these consequences, this article aims to assess the public attitude towards this problem in association with its detrimental health effects to implement a proper awareness program in Bangladesh.

2. Materials and Methods

This study was a theoretical approach based on primary data assembled from 150 people randomly selected in Dhaka city. These people were asked several questions regarding cell phones. The questionnaire comprised of 10 questions where the first 5 questions were about age, gender, marital status, education level, occupation and

the rest of the 5 questions highlighted the use of cell phones along with health disorder. The extracted data were analyzed using IBM SPSS Statistics 20 software. This assembled group included people in the age range of 18 to 55 years. Age was divided into five categories such as 13-19, 20-25, 26-30, 31-40 and above 40. The survey was conducted in Dhaka, the capital of Bangladesh. Being the capital, it provides more job opportunities. Hence people migrate from all over the country to this city to have a better life. For this reason, the possibility of getting a representative sample in Dhaka is much more higher than any other part of Bangladesh.

3. Results

Among 150 people, 48.7% (n=73) was female and 51.3% (n=77) was male. This study comprised people of every type of education level divided into 5 categories. These included people with no formal education (3%), primary education (8%), secondary education (10%), higher secondary education (17%) and also people passed or pursuing graduation or post graduation degree (62%) (Table-1). About 80.7% participants use one cell phone whereas 16.7% use two cell phones. Three or more than three cell phones were used by 1.3% and 1.3% participants respectively (Table-2). Analyzing the diverse use of cell phones revealed that 100% respondents used cell phones for talking, whereas 50.67% for social media, 43.33% for watching videos, 44% for playing games, 64% for listening music or radio and 34.67% for reading (Figure 1).

While using mobile phones, among those who positively responded for health complications, hearing impairment, eye related problem, backpain, headache, pain in ear after immediate use were faced by 5.36%, 48.21%, 17.86%, 39.29%, 32.14% respondents respectively (Figure 2).

Significant relationship was observed between hours spent per day using mobile phones and occurrence of health complications. 11.11% respondents noticed several health complications after using cell phones less than 1 hour per day. 31.03% and 41.67% also suffer from health complications after talking in cell phones about 1 hour and 2 hours per day respectively. 34.62% respondents talk approximately 3 hours per day but percentage ratio drops down. The reasons can be less talk time with discontinuous interval. About 50% and 80.95% respondents also suffer from different health complications while talking for 4 hours and greater than 4 hours. This analysis was carried out at 1% significance level as p value was tensed to 0. This relationship demonstrated that the higher the hours spent in mobile phone, the higher the occurrence of developing health complications (Simple regression analysis was done where female=0, male=1; no=0, yes=1). The estimated value of B =0.724 which implies that the estimated change in the logit/log-odd (B) for male is 0.724 than female and $\text{Exp}(B) = 0.724$ (Tables 3 and 4) which implies that males are 2.063 times as likely to develop health complications. Consequently, development of health complication in male was 2.063 times higher than female (Figure 3).

Table 1. Frequency and percentage of representative sample.

	Frequency	Percentage
Sex		
Female	73	48.7
Male	77	51.3
Total	150	100
Education level		
No formal education	14	9.3
Primary education	37	24.7
Secondary education	38	25.3
Higher secondary education	33	22.0
Graduation or post graduation	28	18.7
Total	150	100

Table 2. Number of cell phone used by sample population.

Number of cell phones	Frequency	Percent	Valid Percent	Cumulative Percent
1	121	80.7	80.7	80.7
2	25	16.7	16.7	97.3
3	2	1.3	1.3	98.7
>3	2	1.3	1.3	100.0
Total	150	100.0	100.0	

Table 3. Model summary for analyzing ratio of health complications between male & female for using cell phones.

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	193.715 ^a	.030	.040

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Table 4. Variable in the equation for analyzing data.

Variables in the equation							
Step 1 ^a	Gender	B	S.E.	Wald	df	Sig.	Exp(B)
	Constant	-.907	.259	12.298	1	.000	.404

a. Variable(s) entered on step 1: Gender.

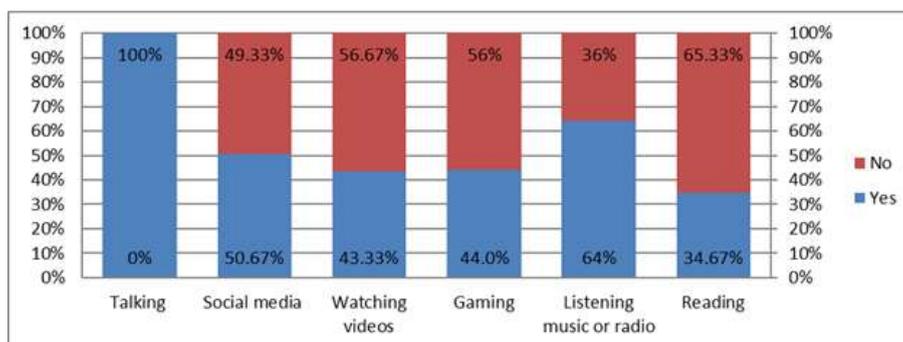


Figure 1. Diverse use of cell phone.

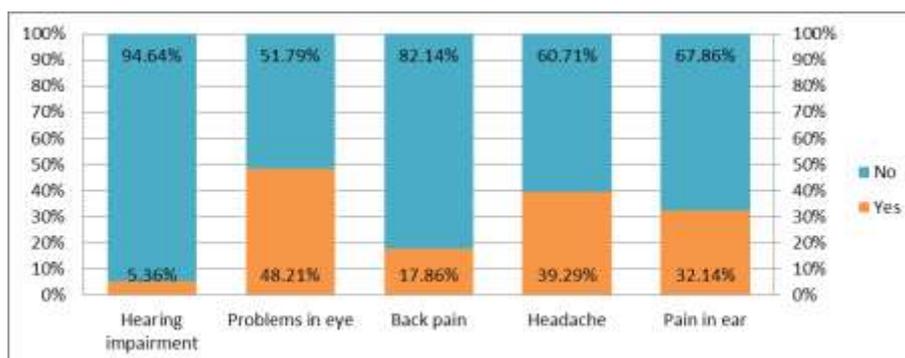


Figure 2. Health complications associated with cell phones.

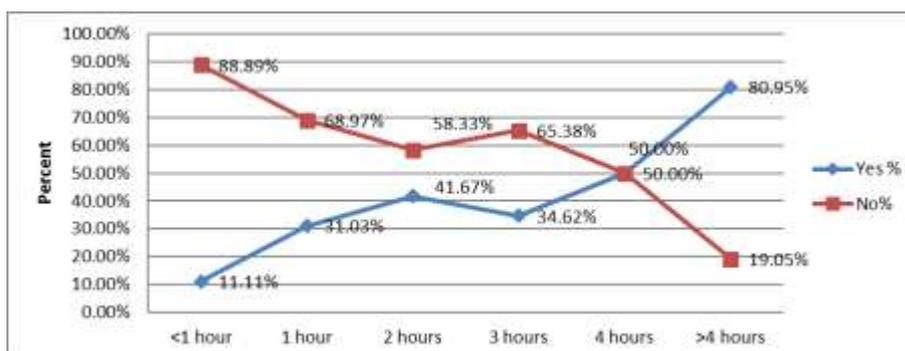


Figure 3. Hours spent per day using cell phones.

4. Discussion

The present study implies that cell phone may have serious effects which can be a serious concern to the public health. From the data it is evident that cell phone has become an indispensable part of our daily life for its various uses. The most common usage is verbal communication. This scenario expresses that people of all ages depend solely on cell phones for long-distance communication. The other secondary use of these equipment is mostly recreational. Due to the rapid growth of internet users, cell phones have also become a medium for browsing social media, watching videos, listening music and reading. By considering these views, it can be predicted that the use of cell phones will increase owing to novel applications in the near future. On the contrary presence of electromagnetic radiation and harmful components in cell phones can create serious health complications. Surprisingly, most of the participants in this survey have not noticed any ill effects after using cell phones. It is an alarming situation as people are not well acquainted with the adverse effects of cell phones. A minority of the participants have noticed the effects and they attributed them to different disorders like hearing impairment, problems in eye, back pain, headache and problems in ear. Consequently, the ratio of disorders is higher in male rather than in female. Another noteworthy outcome of this study is that most participants spend more than 4 hours per day with cell phones for different purposes. The possibility arises from these data that increased hours spent per day in using cell phones can cause more exposure to electromagnetic radiation and subsequently, increases the incidence of health complications. Different experimental data suggest that the various harmful components including electromagnetic radiation from cell phones can create life threatening diseases like cancer (Needhidasan *et al.*, 2014). To analyze the harmful effects, an effective parameter that could be analyzed is Specific Absorption Rate (SAR). SAR is defined as the amount of microwave energy absorbed by the user and its unit is watts per Kg (W/Kg). SAR values were recorded to be changed between 0.3-1.3 after analyzing 16 digital cell phones (Kuster *et al.*, 1997). ICNIRP has declared 0.08W/kg as the tolerance limit for public health (ICNIRP, 2009). Infertility has also been demonstrated in different studies for electromagnetic radiation (Yildirim *et al.*, 2015). From these perspectives of health complications, the main concern is that most of the people in this study were found to be unaware of the critical side effects of cell phones.

5. Conclusions

Analysis of the data reveals that the people's perception towards side effects of using cell phones for long hours is not significant. As a consequence, there is an urgent need for comprehensive promotions that will change people's perception regarding cell phones usage.

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Conflict of interest

None to declare.

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