

The Effects of Long Term Use of Mobile Phones on Human Health

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ABSTRACT : A survey study was conducted to investigate the possible effects of mobile phone on headache, dizziness, extreme irritation, shaking in the hands, speaking falteringly, forgetfulness, neuro-psychological discomfort, increase in the carelessness, decrease of the reflex, clicking sound in the ears, obscuration of vision, redness on the eyes, vision disorders, crust round the eyes, inflammation in the eyes and water round the eyes. There is no effect on dizziness, shaking in hands, speaking falteringly, neuro-psychological discomfort, redness on the eyes and vision disorders, but some statistical evidences are found that mobile phone may cause headache, extreme irritation, increase in the carelessness, forgetfulness, decrease of the reflex, clicking sound in the ears, obscuration of vision, crust round the eyes, inflammation in the eyes and water round the eyes.

1. INTRODUCTION

In the recent few years, the extensive use of mobile phones (MP) raises the question of possible health effects of the radio-frequency electromagnetic fields emitted by these phones, in particular on neural functions because of their use in close vicinity to the human brain.

Mobile phones operate on wireless technology, with communication typically occurring via a 900-1800 MHz signal that is pulsed at 217 Hz. This signal carries essentially no power when the user is not talking or receiving, but when the user communicates the power of this pulsed electromagnetic field reaches a maximum of 250 mW (Croft *et al.*, 2002).

The effects of electromagnetic fields on biological systems have been extensively investigated over the last years (Gos *et al.*, 2000; Jech *et al.*, 2002; Braune *et al.*, 2002; Cook *et al.*, 2002). Particular attention has been given to the effects of microwave exposure on the central nervous system (Herman *et al.*, 1997; Croft *et al.*, 2002; Mausset *et al.*, 2001; Beason *et al.*, 2002; Hossmann *et al.*, 2003).

In a survey study, some biological effects of mobile phones on people living or not in vicinity of mobile phone base station were tested in 530 people (Santini *et al.*, 2002 a). In the study, non specific health symptoms such as tiredness, headache, sleep disturbance, discomfort, dizziness, irritability, depression, lose of memory, etc. were detected depending on distance from base station and sex. It was suggested that minimal distance of people from mobile phone base stations should not be < 300 m in view of radioprotection.

One another survey study was conducted in 161 students and workers in a French engineering school on symptoms experienced during use of digital cellular phones (Santini *et al.*, 2002 b). According to the results, concentration difficulties, sleep disturbance, discomfort, warmth,

and pricking of the ear during phone conversation as a function of calling duration per day and number of calls per day were experienced.

No survey study has dealt with the effects of long term (1-4 years and above) use of cellular phones to date. This is the main goal of this study in which a survey study, using questionnaire, was conducted in 695 people living in a city in Turkey, where these phones are extensively used, to detect the possible neural symptoms and sensations experienced by the long term users of mobile phones in order to light the way of further studies.

2. MATERIALS AND METHODS

2.1. Questionnaire

Questionnaire used in this study was composed of two sections. In the first section, general questions were asked to individuals to learn about their general health, use of mobile phone and physical environment to prevent miss leading positives. In the second section questions were asked to directly detect the effects of long term use of mobile phone on each individual's health.

In the survey, questions were asked to investigate the following symptoms and sensations; headache, dizziness, extreme irritation, shaking in the hands, speaking falteringly, neuro-psychological discomfort, increase in the carelessness, forgetfulness, decrease of the reflex, clicking sound in the ears, obscuration of vision, redness on the eyes, vision disorders, crust round the eyes, inflammation in the eyes and water round the eyes.

If an individual gave positive answer to the questions about any above symptoms and sensations, some extra questions were also asked to detect the beginning of the symptoms and sensations. Otherwise the statistical results yielded would be meaningless, unless person has not the symptoms and sensations after he has started to use mobile phone.

2.2 Study Population

The study group was consist of 193 female and 503 male randomly selected from different ages, educations, earnings, locations and occupations in Elazig which is located in the east part of Turkey. Total number of attendant was 695. For simplicity, from now the person who has got a mobile phone and the person who has not got any mobile phone will be named as "mobile phone user" and "non-mobile phone user" respectively.

Among female, 157 women were mobile phone users whereas 36 were non-mobile phone users. 502 male attendant were consist of 392 mobile phone users and 110 non-mobile phone users. Although individuals were selected randomly around 80% of people were mobile phone users. This shows that mobile phone usage is very much common in the selected region and the results yielded from the survey could be valuable.

Since the aim of this survey is to investigate the possible symptoms and sensations experienced by long term usage, attendants were grouped according to time of mobile phone possessions. Time of possessions were divided into four sub-groups. These are one, two, three, four and above years respectively. According to data obtained almost 60% of female have owned their mobile phone for the last two years whereas more then 30% of male have been carrying their MP for at least four years.

3. CONCLUSION

As result of the survey, there were no evidence that the use of mobile phone may cause dizziness, shaking in hands, speaking falteringly, neuro-psychological discomfort, redness on the eyes and vision disorders. These results support (Hietanen *et al.*, 2002; Koivisto *et al.*, 2001) for dizziness and (Hietanen *et al.*, 2002; Cook *et al.*, 2002) for neuro-psychological discomfort. Unfortunately there are nothing available in the literature for the rest of the above symptoms and sensations

The use of mobile phone may cause headache, forgetfulness, increase in the carelessness, decrease of the reflex and clicking sound in the ears as a results of our data. Above results contradicts to (Hietanen *et al.*, 2002; Koivisto *et al.*, 2001) for headache, forgetfulness, clicking sound in the ears. Again there is no paper available to compare with for the rest of the symptoms and sensations. There were no statistical evidence that long term usage might increase above symptoms and sensations.

The use of mobile phone may water round the eyes as a results of our data. In addition talking with mobile phone for longer period may increase. No published date available in the literature about water round the eyes.

The use of mobile phone could cause extreme irritation and long term usage could further increase it. Since there are no publications dealing with long term usage of mobile phones, further experimental studies will be off great value.

Finally there were some evidence that the use of mobile phone may trigger obscuration of vision, crust round the eyes and inflammation in the eyes and water round the eyes. Likely no evidence that the more the mobile phone users talk the more they get the above two symptoms. No published journals concerning above three symptoms are available either.

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