

Effect of Mobile Phone Radiation on Human Health

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Abstract—Cell phone use has been one of the major fast growing communication systems as it was observed in 2013 where over 4.6 billion subscribers were recorded. However the radiations emitted from these devices have also been a major concern to many individuals. The radiation emitted was classified as non-ionizing radiations due to its low transmitting frequencies. Initially the non-ionizing radiation was perceived to be harmless but recent studies concluded that there might be some serious side effect on human health due to long term exposure. This paper goes through some of the related works that has been done on the health effect of electromagnetic (EM) radiations, most of which outcomes are inconclusive. Some possible effects of Global Systems for Mobile Communication (GSM) and EM radiations like memory loss, fatigue, cancer are also discussed.

Keywords—Electromagnetic radiation, GSM, health effect, IARC, ionizing Radiation, non-ionizing Radiation

I. INTRODUCTION

OVER the years we have become used to our cell phones to a point that doing without them is nearly impossible[1]. This trend has been a major concern to health practitioners because most people do not know the adverse effect of Radiofrequency Electromagnetic Fields (RF EMF) emitted by their phones has on their health. Mobile communication is the process in which signal is transferred via electromagnetic waves using radio frequencies and microwaves [2]. This process leads to the emission of electromagnetic radiations in the form of thermal radiations.

Thermal radiations consist of ionizing and non-ionizing radiations. The ionizing radiation contains a high degree of electromagnetic energy that is capable of ionizing atoms and breaking chemical bonds and may likely cause genetic mutation and tissue problems [3]. The non-ionizing radiations are often considered less harmful because it consists of very low frequencies. Most of our mobile phones emit this kind of radiations. The perception that non-ionizing radiations is less harmful to human health is a mistake because long term exposure might result in a serious damage to our body system [3]. When using our mobile phones, electromagnetic radiations are transferred to our body thereby causing some serious side effects.

II. RELATED WORK

The issue of health effects of Radiofrequency Radiations (RFR) emitted from cell phones was first raised in mid-1992 in a U.S court. David Reynard filed a lawsuit in Florida claiming that his wife's fatal brain cancer was as a result of radiations emitted from her cell phone. The suit was dismissed by a federal court in 1995 due to lack of valid scientific evidence [4]. This led to further researches on the health effects of RFR emitted from Global Systems for Mobile Communication (GSM) devices and other electromagnetic fields (EMF) devices. Adverse health effects of EMF are largely based on epidemiological, technological, and environmental studies [3]. Overlooking the combined effects of multiple sources and correlating every effects with its cause, lead to inconclusive outcomes or connection.

Many effects of GSM radiation on human health are exhibited after long term exposure, thereby exceeding the timescale of the technologies causing them and rendering later investigation out of focus. This statement was supported in 2011 by International Agency for Research on Cancer (IARC), who categorized the health effect of GSM radiation as possibly carcinogenic (Group2B), not probably carcinogenic (Group2A) [5]. From the classification above, further researches needs to be conducted based on heavy and long term usage of the cell phone in order to create possible conclusive scientific evidence on the effect of GSM radiation.

In 2000, INTERPHONE conducted a case control study between 13 different countries on the effect of GSM radiation on the most common types of brain tumors (glioma and meningioma) for a period of 10 years. After the study duration, the study group published a combined data analysis and result. It was observed that there was no vivid parallel connection between mobile phones being a causative agent for brain tumor in adults. The result was against the general hypothesis that mobile phones cause brain tumor and other related diseases [6].

In contrary to previous studies, a research carried out in 2014 by CERENAT - a French national case control project; confirmed the possible effect of mobile phone usage and brain tumors. The conclusion was however rejected that same year due to a review carried out which stated that the results detracted from the hypothesis that mobile phones only affect the intracranial tumor [7].

Despite the fact that a valid conclusion has not been found on the adverse effect of GSM radiation on health, some guidelines have been put in place to reduce its adverse effect. International Commission for Non-ionizing Radiation Protection (ICNRP)

proposed two safety measures: one for occupational exposure limit and the other for the general public exposure limit [8]. Specific Absorption Rate (SAR) is the mechanism used to check if the manufacturers comply with this limits [9]. Most countries have adopted different SAR limit, in United States, the Federal Communication Commission (FCC) limit is 1.6 watts per kilogram. These limits are placed to reduce the adverse effect of body heating as a result of long term exposure. The amount of heat increases with the intensity of the radiation; the guidelines limit the intensity to ensure that the level of heating does not exceed the body's thermoregulatory mechanism [8]. There are also some efforts to harmonize the various precautionary measures.

III. POSSIBLE EFFECTS OF GSM RADIATIONS

Although it has not being proven that there is an adverse effect from the radiations emitted from our cell phones. This does not guarantee that there are no effects at all. EM energy interferes with our body system especially in places around the ear skull where it affects the electrical impulses joining the neurons, thereby resulting to deafness and migraines [2]. Also some researches have established a possible link between cell phone radiation and memory loss [10]. According to [2] children are also more susceptible to these radiations because of their thinner skull and higher tissue conductivity. Other possible effects include headaches and fatigue, high blood pressure, hot ears and burning skin.

IV. CONCLUSION

Despite the fact that it has not been scientifically proven that there is an adverse effect of the radiations emitted by our phone on health. However, this does not mean that there are no possible effects like- fatigue, migraines, and headache. Long term researches need to be conducted in areas where combined effects of multiple sources need to be considered and correlating every effect with its cause. Phone users require personal safety measures in order to protect themselves from the EM energy emitted by our cell phones. Measures such as placing the phone not too close to the body need to be adopted by users of mobile phones. Another measure is to avoid staying or living close to devices emitting powerful EM radiations.

V. REFERENCES

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