

The Impact of Electromagnetic Radiations from Mobile Base Stations & Mobile Phones on Human Body

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Abstract

The increasing use of mobile base stations and mobile phones has resulted in a large human exposure, when the radiations exceed the allowed limits. This paper summarizes the effect of the electromagnetic radiations from mobile base stations and mobile phones on a human body, based on available literature.

Keywords: *Electromagnetic Radiations, Human Body and Mobile Base Stations.*

1. Introduction

The human body is always exposed to electromagnetic radiations because of electrical devices that surrounding it such as: microwave ovens, washing machines, fans, mobile phones and mobile base stations...etc. and these have negative effects on the body.

Some studies on health showed that there is increasing in some symptoms and diseases, and this directly related to the exposure of radiations that emit from mobile phones and mobile base stations.

2. Methodology

(uddin, ferdous 2010) determined the impact of cellular phone on human health. The data have been collected from sample survey aided by a structured questionnaire. The collected data survey aided by a structured questionnaire, and found the radiation from cell phone is responsible for many diseases like

brain tumor, headaches, short- term memory loss, different types of heart diseases etc...^[1].

(Aly, Deris, and Zaki 2011) studied the activity and behavior of human leukocytes (white blood cells) upon exposure to radio frequency fields. Human blood Leukocytes were exposed to different temperatures and 1800 MHz RF radiation (SAR of 1.25 W/Kg, Power density of 0.1 mW/cm²) from a mobile phone when placed within a distance of 5 cm from the microscope stage. They placed mobile phone within a distance of 5 cm from the microscope stage, and found the RF radiation caused damage to the leukocytes cells (white blood cells). From specific person's blood the cells expanded and lost its ability to move.^[2]

(Kumar, Pathak 2011) calculated values of SAR inside human body tissues, particularly in fat and muscles due to mobile phone base station frequency (900 MHz) and compared it with standard limits given by international authorities like Federal Communication Commission (FCC). They measured the values of SAR in fat and skeletal muscle on human body, and found the harmful values of SAR for fat up to a distance of 10cm from the base station and for skeletal muscle these values are up to 400cm from the base station.^[3]

(Dhawana, Handa 2012) showed the possible effects of electromagnetic radiations emitted from cellular phones on human and living organisms. They

calculated SAR distribution in an anatomical model of head next to a 125 mW dipole antenna, and found the radiation from the cell phones increase the growth of brain cancer cells, increase the rate of lymphoma, changes in tumor growth, breaks in double and single stranded DNA, more childhood leukemia in children, changes in sleep patterns, headaches caused by RF exposure, neurologic changes in the blood-brain-barrier and changes in cellular morphology.^[4]

(Bhalerao, Zope, Khaire and Tambe 2013) studied the effect of mobile phones on human head with average of 45 minutes talking hour with two different types of mobile phone having internal and external antenna. They used mobile phone with GSM technology, and found that the human head temperature increase significantly as the talking hour increased.^[5]

(Bhargavi K, Balachandrudu and Nageswar P 2013) studied the effect of electromagnetic radiation of two mobile phone technologies (Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA)) with different frequencies and power level via experimental works. They made the test on 4 channels and found the mobile radiations effect on human brain.^[6]

(Bhat, Kumar and Gupta .G.K 2013) studied the effect of electromagnetic radiation that emitted by mobile phone and mobile phone towers that situated

nearby the residential area. They made the test on two GSM towers and one CDMA tower, and found that the radiation from cell towers and mobile phones effect on human skin, children, pregnant women and human brain.^[7]

(Felix, Gabriel, C. Emmanuel 2014) used a cellular mobile network analyzer which can measure power density of a cellular mobile signal to measure the received power density from the BS transmitter in two scenarios: along the express road and residential/commercial area. They made the test on two areas, and found that the people living within 300m distance from the BS transmitter suffered different types of ill health.^[8]

(Pachauu, Pachauu 2014) measured the absolute power densities at different houses which are compared with standard limits given by various authorities, frequency spectrum is analyzed at different sites. They used questionnaire survey, and found that the people who living within 50m from the base station are having more health complaints than those living outside 50m.^[9]

(Ahmed Freabi, Amin Babiker A/Nabi Mustafa 2015) studied the Effect of mobile tower radiations for different service providers in Sudan. They depend on statistics, and found that there is increase in the number of cancer patients is more or less similar to that of increase in the number of subscribers.^[10]

3.Results and Discussion

Table1: The Results of Electromagnetic Radiations Exposure

Researchers		Topic	Contributions	Strengths	Weaknesses
A.S.M. Iftekhar uddin	Jannatul ferdous	Radiation exposure of cell phones and its impact on human health – A case study in South Asia(Bangladesh) and some	SAR value of a particular mobile phone may cause damage to human health to some extent. But it is not the only reason that is responsible for hazards. There might be variety of reasons. It has been observed that a mobile having a low SAR value may cause more damage than a mobile having that	The radiation from cell phone is responsible for many diseases like brain tumor, headaches, short-term memory loss, different types of heart diseases etc.	The data have been collected from sample survey aided by a structured questionnaire.

				recommendations	of higher.		
Ashraf A. Aly	Safaai Bin Deris	Nazar Zaki		The Effects on Cells Mobility Due to Exposure to EMF Radiation	observation of the motion of a life leukocyte cells.	RF radiation caused damage to the leukocytes cells(white blood cells) from specific person's blood the cells expanded and lost its ability to move.	Mobile phone placed within a distance of 5 cm from the microscope stage.
Sandee p Kuma r	P.P.Pathak			Effect of electromagn etic radiation from mobile phones towers on human body	The electric field varies inversely proportional to the distances from the transmission tower. When the radiated field falls on a human body, the penetration depends on the frequency of radiation.	The harmful values of SAR for fat up to a distance of 10cm from the base station and for skeletal muscle these values are up to 400cm from the base station.	Measure the values of SAR in fat and skeletal muscle on human body.
Sanjee v Dhawana	Kulvinder Singh Handa			Effects of Electromagn etic Radiations from Cell Phones: A Critical Study	Calculated SAR distribution in an anatomical model of head next to a 125 mW dipole antenna.	radiation from the cell phones increases cell growth of brain cancer cells, increase the rate of lymphoma.	Calculated SAR distribution in an anatomical model of head next to a 125 mW dipole antenna.
G.A. Bhalerao	Prof. R.G. Zope	G.B. Kha ire	B.P. Tam be	Human Brain with Emr of Cell Phone	Mobile hand phone with external antenna and serving GSM 900 shows high increase after 15 minutes operation compared to mobile phone with internal antenna and serving GSM 1800. Also thermal image camera invented by DARPA, by means of its small size like button of shirt it will possible to make use of it in cell phone to measure temperature inside brain. Then by means of electronic circuit the measure temperature will compare with the standard one and if it is greater than standard then either disconnect the call or switch off cell phone.	the human head temperature increase significantly as the talking hour (period of time using the mobile phone) increased	Used mobile phone with GSM technology

Bhargavi K	KE Balachandru	Nageswar	Mobile Phone Radiation Effects on Human Health	GSM operated mobile phones has the higher effect on brain activity as compared to CDMA operated mobile phones.	Mobile radiations effect on human brain.	Made the test on 4 channels.
Mushtaq Ahmed	Vijay Kumar	Gupta. G.K	Effects of mobile phone and mobile phone tower radiations on human health	electromagnetic radiation emitted by mobile phone and mobile phone towers are harmful for the people who are living nearby the transmission towers	The radiation from cell towers and mobile phones effect on human skin, children, pregnant women and human brain.	Made the test on two GSM towers and one CDMA tower.
Opara K. Felix	Adigwe U. Gabriel	Agbaraji C. Emmanuel	Investigation and Analysis on Electromagnetic Radiation from Cellular Base Station Transmitters and the Implications to Human Body	Study the level of received signal power as the receiver was conveyed away from the base station transmitter on a vehicle. - study the level of received signal strength in the buildings that are very close to the base stations.	The people living within 300m distance from the BS transmitter suffered different types of ill health.	Made test on two areas.
Lalrinthara Pachuau	Zaithanzauva Pachuau		Study of Cell Tower Radiation and its Health Hazards on human body	Power density of the RF radiation from the selected tower was measured at different selected houses.	The people who living within 50m from the base station are having more health complaints than those living outside 50m.	Used questionnaire survey
Ahmed Freabi	Amin Babiker A/N Mustafa		Effects of Base Station Radiations in Sudan	Discusses the Effect of Mobile Tower Radiations for Different Service Providers In Sudan	Increase in the number of cancer patients is more or less similar to that of increase in the number of subscribers.	Depend on statistics.

Table1 shows that the work done by many researchers to show the impact of electromagnetic radiations from mobile phones and mobile base stations on the human health, and they found that:

Mobile phones effect on the human brain by increasing the head temperature, causing Headaches, bad sleep, short-term memory loss, hair loss, burning sensation, blurring of vision, increasing of heat near

by the ear skull, Brain cancer, lymphoma, changes in the tumor, breaks in double and single stranded DNA, Leukocyte cells (white blood cells) damage, Variation of SAR inside fat & skeletal muscle.

Mobile base stations causing weaken bones, Headache, sleep disorder, Skin problems, memory loss, hearing problem, loss of appetite and increasing the number of cancer patients.

4. Conclusion

We conclude that all researchers found that the electromagnetic radiations that emit from mobile base stations and mobile phones have negative effects on human body and the people who are living within the distance near by the BS transmitter suffered different types of illness, also the people who are talking 45 minutes on mobile phones that will increase their brains temperature.

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