

Hazardous Effects of Mobile Phone Radiation to Human Body

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Abstract: Mobile phone emits radiations that can go through semi human body's tissues. These radiations are harmful to health and cause damage to human body in some or another way. The discussion about SAR (Specific Absorption Radiation) value declared by FCC (Federal Communications Commission) is also made which lets us know what radiation is transferred from that particular mobile phone. This paper discusses about the RF radiations, ways by which we can reduce exposure and effect for the same.

Keywords: RF Radiation, SAR value, mobile phone, towers, human head

I. INTRODUCTION

There is always a concern about side effects on health resulting from exposure to radio frequency radiations (RFR) through communication devices. Mobile communication is the Electromagnetic radiation consisting of waves of electric and magnetic energy moving together i.e radiating through space at the speed of light. This sign produces electromagnetic radiation as warm radiation that comprises of harmful ionizing radiation and innocuous non-ionizing radiation. At the point when utilizing cell telephone, electromagnetic wave is exchanged to the body which causes wellbeing issues particularly to the mind.

Mobile phones spill radiation known as EMF which exits in mobiles while making use of calls. So to know the absorption rate of electromagnetic radiation in the human body is also important. The specific absorption rate (SAR) value declared by The US Federal Communications Commission (FCC) is used to measure how much quantity of RF energy is actually absorbed in a body. It is found that according to the SAR distribution if a call duration exceed more than 6min/day it is harmful for human body.

II. RF RADIATION

Communication via mobile now-a-days is increasing greatly in industry of telecommunication. Because of the expanded number of client utilizing the cell phone, the worry is currently concentrating on the electromagnetic wave emitting from the phone. Electromagnetic radiation can be grouped into ionizing and non-ionizing radiation. Ionizing radiation is high energy radiation which breaks the bond between electrons and atoms which results in tissue damage while non-ionizing radiation is the radiation that has adequate energy to vibrate the particles and atom yet do not evacuate the electrons from atom. This radiation is basically happens at low frequency[4].

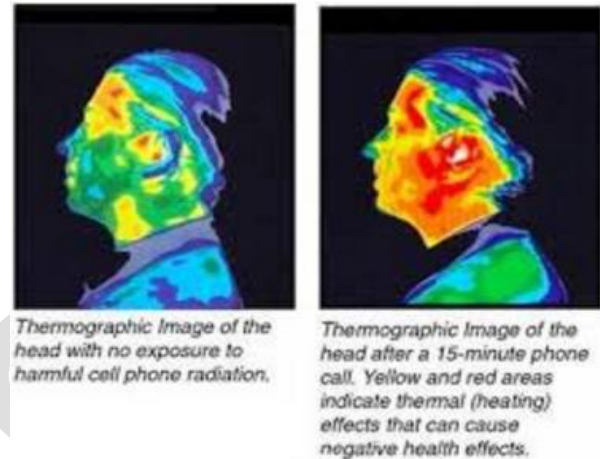


Fig.1 Effect of radiation before and after phone usage[6]

Cell telephone is basically planned with low power handset keeping in mind the end goal to transmit voice and information to a couple of kilometers to where the base station is found. At the point when a call is made, the cell telephone will sends radio signals to the nearest radio base station which is joined with a mobile switch. The RF transmitted from a cell is subject to the signal level from the base station. Signal quality from the base station changed relying upon the separation of cellular telephone from the base station. At the point when a cell telephone is close to the base station, the sign quality is higher and the other way around. Cell telephones and base stations are intended to transmit the most reduced measure of radiation as required to maintain the minimized interference if excessive use is made. Usually phones are not allowed in hospitals and on airplanes because of the RF signals which may interfere with certain electro-medical devices and navigation systems.

Numerous elements can influence the measure of RF radiation to which a man is uncovered, including:

- The measure of time the individual is on the telephone.
- Regardless of whether the individual is utilizing the speaker mode on the telephone or a without hands gadget. Utilizing one of these permits the telephone to be held far from the head.
- The separation and way to the closest mobile phone tower. Mobile phones conform their energy to utilize the base sum for a decent flag. Being

more remote far from the tower requires more vitality to get a decent flag, as does being inside a building.

- The measure of wireless activity in the territory at the time. Higher activity may require more radiation to get a decent flag.
- The model of phone being utilized. Diverse telephones emit distinctive measures of radiation.

III. THE HEALTH RISKS

A survey shows that 91% of American grown-ups and 60% of high schoolers claim that cell phone has upset correspondence in the 21st century. Whether phone is Android, an iPhone, a Blackberry, or an essential flip telephone, odds are you check your telephone for messages, cautions, or calls notwithstanding when your cell phone isn't ringing or vibrating, reports a Pew Internet & American Life Project study. Present day accommodation that phones give is capable to everybody's expanded day by day utilization. As per the Morningside Recovery Rehabilitation Center, the normal American burns through 144 minutes a day utilizing his or her telephone amid a 16-hour period. With an expected six billion memberships overall and numbering, mobile phones have turned into one of the key method for correspondence in the public area[1].

The impact of the cell phone radiation is that an individual has physiological changes apparently when he is under the radiation of his phone yet the temperature of his body doesn't change anything[3]. So non-thermal is named for the same. Symptom are known in recent years like headache, faint, fatigue, memory fading, more sleeping, etc this are subjective symptoms [2].

The usage of mobile phones is very common and so it is necessary to know the adverse effect along with it. Facilitating communication anywhere anytime we also need to know the adverse heating effects which can harm the health. In as early as 1993, a man named David Raynad accused the mobile phone manufacturer claimed saying that her wife died of brain tumor due to usage of mobile phones. From that time onwards the discussion has never ended on the bioeffects of mobile phones.

This is the reason that why natural impact is named as non-thermal impact also. A wide range of manifestations are established in the previous couple of years, e.g. the commonplace tinnitus, cerebral pain, faint, crabbiness, weariness, feeling of warmth, distress of scalp, lose hair, faintness of vision, loss of hankering, memory blurring, tryout blurring, more awful nature of resting and so forth. These indications are characterized as subjective side effect [2].

On the off chance that electromagnetism radiation in the microwave frequencies is the same as the ionizing radiation to influence the DNA, result in crack of the chemical bonds and conduce to the DNA harm, the cell phone radiation

causing cancer will make hypothesis to be reality taking into account the theory about gene mutation inducing cancer[3].

The Federal Communications Commission (FCC) recommends mobile phone clients to keep a base separation of 20 centimetres from their handset to fundamentally lessen radiation presentation. Grown-ups and particularly kids can endure the long haul impacts of radiation waves on the cerebrum. "Youthful kids especially should be watchful," Dr. Devra Davis, chief for natural oncology at the University of Pittsburgh, told CNN.com. "We don't have enough information nor do we have enough time to ensure that cell telephones are shielded, and there's clarification behind stress that they may be hazardous," she said.

So using the cell phone much can lead to high stress level because of its emitting radiations. Excessive cell phone usage can lead to health issues.

IV. SAR VALUE

SAR is a measure of the rate of RF (radiofrequency) energy consumed by the body from the mobile phone which is usually expressed in units of watts per kilogram (W/kg) or milliwatts per gram (mW/g) and the SAR level should be at or below **1.6 watts** per kilogram (W/kg) taken over the volume containing a mass of 1 gram of tissue that is absorbing the most signal. It provides a means for measuring the RF exposure characteristics to ensure that they are within the safety guidelines set by the FCC.

The hypothetical figurings of SAR helps us to know that how the electromagnetic energy from the cell phone radiation to the human head, yet it is difficult to approve the validness by the method for examinations. The SAR rating of every mobile phones is being displayed on all phone packaging, which enable users to make choices while purchasing a particular mobile phone.

V. REDUCE EXPOSURE

There is no proof as of now that RF waves from mobile phones create any destructive impacts. Until then, a few things individuals who are worried about RF waves can do to constrain the exposure. So some of the ways to reduce the exposure is mentioned as under:

- **Make a limitation of making calls when necessary:** avoid unnecessary talking on calls for hour as it will cause harm to human body in some or another way
- **Avoid telephoning with your cell phone directly next to ear:** In the event that you put your phone beside your ear hold up until your reporter has gotten the correspondence. Mobile phones (2G especially) are known not at full power when interfacing with a number. Hold your telephone far from your body until you've got done with dialing and put it to your ear when your reporter answers. While getting an approaching call give yourself a

second or two preceding putting the telephone beside your head once you've acknowledged the call.

- **Avoid calling while driving:** mobile antennas will keep scanning for the good reception so radiation are increased as the vehicle is moving. Abstain from utilizing your mobile phone when the signal is feeble or when moving at fast, for example, in an auto or train, as this consequently expands energy to a greatest.
- **Messaging on the phone may be another alternative to diminish your introduction:** In any case, it may not be a decent alternative in a few circumstances, particularly in the event that you are driving. For security reasons, it is particularly vital to farthest point or stay away from the utilization of mobile phones while driving.
- **Choose a gadget with the lesser SAR value** (SAR = Specific Absorption Rate, which is a measure of the strength of the magnetic field absorbed by the body) [5].

VI. CONCLUSION

A conclusion can be made from this paper that as RF radiations are harmful to human health, so every individual should take some remedial steps to that exposure be as much less as possible through cell phones. Also a SAR rating should be seen declared by FCC to know the reception of radiation from the particular handset. Some of the ways to reduce the exposure has been mentioned which will help human beings for the same.

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