

A Critical Review Mobile Radiations Effects: Problems & Remediation

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ABSTRACT

Cellular phone technology has revolutionized the global telecommunication scenario with exponential increase in cell phones and cell towers. There has been a worldwide concern over associated health risk due to radiation. Majority of cell towers are mounted near the residential and office buildings providing good coverage to the users. These transmit radiation 24x7 exposing residents in proximity to 10^4 to 10^7 times stronger signal. The human body, because of high fluid content, absorbs electromagnetic radiation and is heated causing damage to organs including. Human height is much greater than wavelength of cell tower transmitting frequencies causing multiple resonances in the body triggering heating inside the body resulting in boils, drying up of the fluids around eyes, brain, joints, heart, abdomen, etc. High exposure can also instigate Alzheimer's disease, Morgellon's disease, Tinnitus, bone weakening, sleep disorders, Neurodegenerative Diseases and even high cancer risk. In addition to the continuous radiation from cell towers, there is radiation from cell phones, wireless phones, computers, laptops, TV towers, FM towers, AM towers, microwave ovens, etc. We are exposed to all these radiations which are additive in nature. Hence, it is imperative that stricter radiation norms must be enforced by the policy makers. The present paper reviews the current scenario of mobile radiation in India as compared to world. A few case studies of adverse effects of such radiation on human health, ecology and environment have been discussed and innovative suggestions for remediation proposed.

Keywords: mobile radiation, health effects, cancer, mobile tower, electromagnetic radiation

1. INTRODUCTION

Cellular phone technology has made life very convenient. But the problems associated with these towers are a matter of concern. ^{[1], [7]} A GSM900 base station antenna transmits in the frequency range of 935 – 960 MHz. This frequency band of 25 MHz is divided into twenty sub-bands of 1.2 MHz, which are allocated to various operators. There may be several carrier frequencies (1 to 5) allotted to one operator with upper limit of 6.2 MHz bandwidth. Each carrier frequency may transmit 10 to 20W of power. So, one operator may transmit 50 to 100W of power and there may be 3-4 operators on the same roof top or tower, thereby total transmitted power may be 200 to 400W. In addition, directional antennas are used, which typically may have a gain of around 17 dB (numeric value is 50), so effectively, several KW of power may be transmitted in the main beam direction. The choice between having a lesser number of towers with more frequency or more with less frequency is difficult to make as both have their pros and cons.

2. HEALTH PROBLEMS ASSOCIATED WITH MOBILE RADIATION

2.1) Effect on Skin: People who talk often on cell phones have a higher concentration of the transthyretin protein than those who do not. Transthyretin is formed in the liver. It helps transport vitamin A in the body and plays an important role in nervous diseases such as Alzheimers. ^[1]The symptoms of Morgellons disease include those of electromagnetic hypersensitivity (EHS), may be based on how body uses electric currents to repair wounds to the skin. People who suffer from this condition report a range of skin symptoms including crawling, biting and stinging sensations; granules, threads or black speck-like materials on or beneath the skin and or lesions (e.g., rashes or sores).

2.2) Tinnitus and Ear Damage: Tinnitus, popularly known as “Ringxiety”- is the psychological disease of hearing phantom sound and sensation of cell phone ring and it has been reported among millions of cell phone users in the world. People with severe tinnitus may have trouble hearing, working or even sleeping. The radiation emitted by mobile phones may damage the delicate workings of the inner ear, and long-term and intensive mobile phone use for more than four years and for longer periods than 30 minutes in a day are at a higher risk of developing hearing loss, which cannot be reversed.

2.3) Cell phone emission weakens bones: Researchers have measured bone density at the upper rims of the pelvis (iliac wings) in men who were mobile users and carried their phones on their belts. The iliac wings are widely used source of bone for bone grafting, so any reduction in bone density may be of special importance to reconstructive surgery. The results showed reduction in iliac wing bone density on the side where men carried their phones. In general, it is better to keep mobile phones as far as possible from our body during our daily lives.

2.4) Sleep Disorders: Electromagnetic fields have been shown to affect the brain physiology. Use of mobile phones disturbs Stage 4 sleep, the stage important for full recuperation of brain and body. Use of the handsets before bed, delays and reduces sleep, and causes headaches, confusion and depression. The findings are especially alarming for children and teenagers as they use cell phones at night and also keep the phone next to their head; which may lead to mood and personality changes, depression, lack of concentration and poor academic performance.^[2]

2.5) Effect on Birds: When birds are exposed to weak electromagnetic fields, they disorient and begin to fly in all directions, which explain migratory birds undermining navigational abilities. A large number of birds like pigeons, sparrows, swans are getting lost due to interference from the new "unseen enemy", i.e. mobile phone masts. Several million birds of 230 species die each year from collisions with telecommunications masts in the United States during migration. Accidents happen mainly in the night, in fog, or bad weather, when birds might be using the earth's magnetic field for navigation, and could be seriously disoriented by the microwave radiation from telecommunication masts.

2.6) Effect on mammals and amphibians: The study in Germany showed that cows grazing near cell towers are more likely to experience still births, spontaneous abortions, birth deformities, behavioral problems and general declines in overall health. Moving cattle herds away from such towers has reportedly led to immediate health improvements. Exposing dairy cows to magnetic fields can also result in reduction in milk yield, changed milk composition and fertility problems. Similarly, impaired immune system in sheep, reproductive and developmental problems in dogs and cats, anxiety and alarm in rabbits, frequent death of domestic animals such as, hamsters, and guinea pigs living near base stations of mobile telecommunication towers has been observed. Electromagnetic pollution is a possible cause for deformations and decline of some amphibian populations too.

2.7) Neurodegenerative Diseases: Exposure to electromagnetic fields has shown to be in connection with Alzheimer's disease, motor neuron disease and Parkinson's disease.^[1] All these diseases are involved with the death of specific neurons and are classified as neurodegenerative diseases. People living near mobile phone base stations are also at risk for developing neuropsychiatric problems as headache, memory loss, nausea, dizziness, tremors, muscle spasms, numbness, tingling, altered reflexes, muscle and joint pain, leg/foot pain, depression, and sleep disturbance. More severe reactions include seizures, paralysis, psychosis and stroke.

2.8) Increase in Cancer risk: Heavy use of mobile phones can cause cancer. Use of mobile phones for >10 years give a consistent pattern of increased risk for brain cancer glioma (cancer of the glial cells that support the central nervous system) and acoustic neuroma (a benign tumor in the brain on a nerve related to hearing). The risk is highest for ipsilateral (on the same side of the head where the instrument is held) exposure. Children and teenagers, before the age of 20 are five times more likely to

get brain cancer, as their brain is not fully developed and radiation penetration is much deeper. Besides increase in brain tumor and acoustic neuroma, there is an increased risk of several other types of cancers following prolonged exposure to mobile phone/ tower radiation, such as, salivary gland tumors, uveal melanoma, lymphoma, facial nerve tumors, skin, blood, testicular and breast cancer. [2], [3], [6], [7], [8]

3. RECOMMENDATIONS

One of the first steps to be taken is to tighten the radiation norms and yet it should be practical enough to be cost effective without causing too much inconvenience to the users. It is recommended that maximum cumulative power density allowed should be reduced with immediate effect to 0.1 W/m^2 , which should then be subsequently reduced to 0.01 W/m^2 within a year, so that network planning can be carried out in a phased manner. All the operators must be strictly instructed that power density inside residential or office buildings, schools, hospitals, and at common frequently visited places should be within these guidelines. People must be informed about the harmful radiation effects and corrective measures taken by Govt. of India. Solution is to have more numbers of cell towers with lesser transmitted power. When power transmitted is reduced, it will not require power hungry power amplifiers having lower efficiency. Heating effect will also be reduced, so lesser cooling or no cooling will be required; all of these will reduce the power requirement, which can also be met by solar panel. Thus, high power diesel generators will also be not required; it will reduce the carbon emission and we can earn from carbon credits. In addition, repeaters or signal enhancers or boosters may have to be installed where signal is weak.

4. CONCLUSION

The seriousness of the health hazards due to radiation from the cell phones and cell towers has not been realized among the common man. Cell operators continue to claim that there are no health issues. Even organizations like WHO, ICNIRP, FCC, etc. have not recommended stricter safe radiation guidelines, whereas several countries have adopted radiation norms, which are 1/100th to 1/1000th of these values based on their studies. Cell phone industry is becoming another cigarette industry, which kept claiming that smoking is not harmful and now there are millions of people around the world who have suffered from smoking. In fact, cell phone/tower radiation is worse than smoking; as one cannot see it or smell it, and its effect on health is noted after a long period of exposure. Therefore, majority of people tend to have casualness towards personal protection. Unfortunately, ignorance and non-awareness adds to this misery and all of us are absorbing this slow poison unknowingly. Even if people are aware of the radiation hazard, they may not have the choice to move away from it if the tower is installed near their office or residential building.

5. REFERENCES

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