



**REVIEW ON HEALTH HAZARDS OF CELL PHONE
RADIATION - A PROPHYLACTIC WARNING**

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ABSTRACT

Cell phones have become very important communication tool for the reach of common person. Now a situation has come that without cell phone one cannot be comfortable both in domestic and business circle. For the past 15 years scientist started working to screen the harmful effects of cell phone radiation. The resulting reports from the study are quite contradictory because majority of studies published have failed to show an association between exposure to radiofrequency [RF] from a cell phone and health problems. While RF energy doesn't ionize particles, but large amounts can increase body temperatures and cause tissue damage. Two areas of the body, the eyes and the testes, are particularly vulnerable to RF heating because there is relatively little blood flow in them to carry away excess heat. Whereas other reports say that Cell phone users had an increased risk of malignant gliomas, acoustic neuromas. But recent reports enlighten that one hour of cell phone use per day significantly increases tumor risk after ten years or more. Further studies explain about the Gene -toxic effect, reduction in reproductive capacity in animal study. Whereas other report is quite encouraging to note that cell phone radiation has not disturbed sleep and cognitive functions. Since the results are quite contradictory, hence it is necessary to review the study related to electro magnetic effect of cell phone on human health to create awareness among the people to give more emphasis on limited use of cell phone to protect innocent future generation of India.

KEYWORDS: Health hazards, Cell phone, Radiation, Prophylactic warning.



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INTRODUCTION

In the present century it is difficult to imagine routine life without a cell phone- both in domestic and office. Since cell phone cost has been slashed out, all started using cell phone. Business man hold more than one cell phone depending up on the quantum of business they do. Due its extensive use and awareness about radiation pollution, people started showing keen interest in the scientific finding relating to the health hazards caused by cell phones. Various international studies have tried to establish the link between EMFs and some diseases. Doctors believe that constant exposure to high frequency EMFs leads to digestive disorders, fatigue, hypertension, insomnia, irritability, low blood pressure, and infertility in males, cancer, neurological and cardiovascular problems. The other study indicates that exposure to radio frequency (RF) signals generated by the use of cellular phones has increased dramatically resulted in physiological, neurological, cognitive and behavioral changes leading to carcinogenesis. Hence it is high time to focus our self towards the real health hazards caused by the cell phone. Hence the present review has been designed to incorporate various reports relating to health hazards due to cell phones to create awareness among the users. This review also insist on the area where they have to more emphasis to protect the innocent users by promoting research relating to screen, the health hazards of cell phone and identify a cell phone having minimum radiation by encouraging advanced technology.

Electromagnetic radiation of cell phones

A cell phone's SAR, or its Specific Absorption Rate, is a measure of the amount of radio frequency (RF) energy absorbed by the body when using the handset. All cell phones emit RF energy and the SAR varies by handset model. The rate at which radiation is absorbed by the human body is measured by the Specific Absorption Rate (SAR), and its

maximum levels for modern handsets have been set by governmental regulating agencies in many countries. Since all information can be found directly on manufacturers' websites hence these companies claim that it only increases the temperature in normal matter, it does not break molecular bonds or release electrons from their atoms leading to health complications. Hence it is high time to promote research related to health hazards of cell phone.

Cell phone radiation and brain activity

Although there are some changes occurs in the electrical activity of the brain when a subject is exposed to electro magnetic radiation but the research data's are quite insignificant hence it is difficult to arrive to a concrete conclusion on the effect of cell phone on, cognition, sleep and mood in volunteers exposed to low frequency electric and magnetic fields. Hence further screening is required to confirm the effect of electromagnetic radiation on brain activity. Women who used handsets two or three times per day while pregnant were 54 percent more likely to give birth to children who developed behavioral problems by the time they reached school age than women who did not use them. The risk of behavioral problems increased along with the mother's mobile phone use during pregnancy. There is another report enlightens those children when they start using the cell phones they suffer from behavioral difficulties, emotional and some time they become hyper active when compared to the children who never use.

Male sterility

Heavy cell phone use can harm a man's sperm count and quality, says a study by researchers in the United States and India. Among men whose sperm counts were within the normal range, those who used a cell phone for more than four hours a day produced an average of 66 million sperm a day, 23 percent less than

men in the same group who never used cell phones. The findings were presented this week at the annual meeting of the American Society for Reproductive Medicine. A strong correlation was seen between sperm count, motility, viability, normal morphology, and pH; motility and viability were almost perfectly correlated. Semen analysis in the four cell phone user groups showed a decrease in sperm count, motility, viability, and normal morphology with the increase in daily use of cell phone.

Genetic toxicity

Australian research conducted in 2009 by subjecting in vitro samples of human spermatozoa to radio-frequency radiation at 1.8 GHz and specific absorption rates (SAR) of 0.4 to 27.5 W/kg showed a correlation between increasing SAR and decreased motility and vitality in sperm, increased oxidative stress and 8-Oxo-2'-deoxyguanosine markers, stimulating DNA base adduct formation and increased DNA fragmentation. A meta-study (2009) of 101 publications on genotoxicity of RF electromagnetic fields showed that 49 reported a Genotoxic effect and 42 not. The Researchers found ample evidence that RF-EMF can alter the genetic material of exposed cells in vivo and in vitro.

Cell phone radiation effect on heart

The European Research Institute for Electronic Components in Bucharest found that cell phones may lead to heart disease and kidney stones. The study found that cell phones emit radiation, which causes red blood cells to leak hemoglobin which gets accumulated in the body, lead to health complications including heart disease or kidney stones. Researchers at Sweden's Lund University found that exposure to cell phone radiation could cause proteins and toxins to leak into the brain, lead to neurological problems. The Federation of the Electronics Industry claims that there is no conclusive proof that cell phones are a health hazard. Heart pacemakers operate, with a timer, to stimulate the heart muscle to contract by regularly sending a discharge from a battery

pack through a wire with a lead placed into the heart. It is recommended that patients with heart pacemakers NOT place cellular telephones over the pacemaker area. If a patient is carrying a cellular phone, it should not be placed in a pocket near the pacemaker while it is turned "on." . If patients develop symptoms during cellular phone usage, they should be examined by their cardiologist and considered for pacemaker monitoring while using the phone.

Cell phone and brain cancer risk

In recent years, experts have been studying the impact of cell phones and cell phone towers on the human body, and the initial research results have not been too comforting. Recently a research paper published on the link between mobiles and brain cancer. Using mobiles for over 10 years could double the risk of brain cancer. Mobile phone radiation could heat the side of the head or thermoelectrically interact with the brain, while Bluetooth devices and "unshielded" headsets could "convert the user's head into an effective, potentially self-harming antenna".

CONCLUSION

Many countries started screening protection range of the cell phone before marketing basing on the SAR level. Although some reports claim the impact of cell phone radiation on human health but still it is not conclusive or demonstrated evidence as to whether cell phones cause adverse health effects in humans. While some studies have found a possible link between long-term[around 10 years] cell phone use and brain tumors, decreased sperm count, and other ailments, whereas recent studies have showed no such results. Hence it is necessary to go for long term studies on animal model and on human volunteers to bring out the actual hazards of cell phone radiation on human health. As a precautionary measure users can restrict their use of cell phone in emergency and they can

switch over to chord phones to avoid the electromagnetic radiation. Since some of the results show that children are more affected when compare to adults, hence children can be educated about less use of cell phone .Because it is designed exclusively for communication, users can restrict it only for

communication instead of using as MP3 player or as camera to avoid unnecessary exposure to radiation emitted by the cell phone . The science has to continuously monitor the results, but it can take years of exhaustive research before studies actually prove its effect on human health.

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REFERENCES

1. Blank, Martin; Goodman, Reba (2009). "Electromagnetic fields stress living cells". *Pathophysiology* 16 (2–3): 71–8.
2. International Commission on Non-Ionizing Radiation Protection (April 1998). "Guidelines For Limiting Exposure To Time-Varying Electric, Magnetic, And Electromagnetic Fields (up to 300 GHz). *Health Physics* 74 (4): 494–505.
3. Foster, Kenneth R.; Repacholi, Michael H. (2004). "Biological Effects of Radiofrequency Fields: Does Modulation Matter?". *Radiation Research* 162 (2): 219–25.
4. Volkow, Nora D.; Tomasi, Dardo; Wang, Gene-Jack; Vaska, Paul; Fowler, Joanna S.; Telang, Frank; Alexoff, Dave; Logan, Jean et al. (2011). "Effects of Cell Phone Radiofrequency Signal Exposure on Brain Glucose Metabolism". *JAMA* 305 (8).
5. Electromagnetic fields (GSM 1800) do not alter blood–brain barrier permeability to sucrose in models in vitro with high barrier tightness, Franke et al., *Bioelectromagnetics*, 26(7):529-535.
6. Lönn, Stefan; Ahlbom, Anders; Hall, Per; Feychting, Maria; Swedish Interphone Study Group (2005). "Long-Term Mobile Phone Use and Brain Tumor Risk". *American Journal of Epidemiology* 161 (6): 526–35.
7. Interphone Study Group (2010). "Brain tumour risk in relation to mobile telephone use: Results of the INTERPHONE international case-control study". *International Journal of Epidemiology* 39 (3): 675–694
8. Hung, CS; Anderson C; Horne, JA; McEvoy, P (2007-06-21). "Mobile phone 'talk-mode' signal delays EEG-determined sleep onset". *Neuroscience Letters* (East Park, Ireland: Elsevier Science Ireland) 421 (1): 82–6.
9. Agarwal et al. Cell phone usage and male infertility Vol. 89, No. 1, January 2008
10. Santini, R; Santini, P; Danze, JM; LeRuz, P; Seigne, M (January 2003). "Survey Study of People Living in the Vicinity of Cellular Phone Base Stations". *Electromagnetic Biology and Medicine* (London: Informa Healthcare) 22 (1): 41–49.