

Impact of Wireless Communication on Human Health: Survey

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Abstract- Due to advancement in wireless technology there has been a significant effect of high radiofrequency radiation on human health. RF and microwave radiation is non-ionizing because the energy levels associated with it are not high enough to cause ionization of atoms and molecules. The most common devices that we often use without even knowing that they are using microwaves are the WiFi routers and cards that we use to connect to our networks wirelessly. RF waves with frequencies 2.4 or 5GHz are used to transmit data to and from various devices. Aside from that, microwave links are also used by internet service providers to transmit data from one point to another. In spite of introducing fiber optic cables for this purpose, microwave transmitters and receivers are still in use today in some areas. Microwaves are also being studied by some scientists today due to its capability to transmit power over the air.[7].

Keywords- Wireless networks, Ionization and Non-ionization radiation, Cellular phone

I. INTRODUCTION

The uses of wireless devices are increasing day by day as these devices do not use the physical cable for the purpose of communication. These devices transmit and receive data in the form of electromagnetic radiation through the air, whether it is sound data or network data both emit harmful radiations affecting the human body and are present everywhere. These radiations penetrate into our body and effect on the cell's DNA (The DNA is genetic material of cell that is sensitive to ionizing radiation. With the ionizing radiation the DNA of cell can be changed) [1].

Radiation originates from an unstable atom in the form of wave particles and spreads in the form of particle or wave or rays through the space. There are two types of radiations ionizing and non-ionizing radiation. The non-ionizing radiations does not break the chemical bond hence it directly transmits or receives sound or heat energy [2] but the ionizing radiation is composition of high energy waves that can easily remove or move the electrons from the molecules, atoms and cause the cell damage also increases the risk of many diseases [3]. According to the medical test the low

amount of ionizing radiation is not much harmful, but the high amount can cause alteration to the DNA of the cell permanently and lead to sicknesses like cancer [4]

Base stations are relatively low-power multi-channel two ways radio system used for mobile communication. This system consists of trans-receiver antennas that radiate radio frequency signals highly exposing the people to electromagnetic radiation. Mobile phone and base station forms low power communication system, hence the exposure levels are generally low. The scientific community strongly agrees that the power from these mobile base stations antennas is far too low. Hence as long as the community is kept away from direct access to these antennas health hazards can be minimized. Human health is more affected by the hand-held mobile phones rather than the base stations as mobile phone antennas gives out more RF energy to very small volumes of the user's body [5]

II. POTENTIAL SIDE EFFECTS OF WIFI

Insomnia

A case study on group of youngsters has revealed that most of them struggled getting sleep with Wi-Fi ON at night. Some of them were exposed to the electromagnetic signals from real phones and the remaining with no signal from fake phones. The one's exposed to the electromagnetic radiation had a significantly more difficult time falling asleep causing a change in brainwave patterns were observed.

Sleeping close to the phone with Wi-Fi ON, or in an apartment building with many Wi-Fi signals can create chronic sleep problems causing a change in sleep patterns. Sleep deprivation is just the start for larger problems. The development of depression and hypertension have also been linked to inadequate sleep [8]

Childhood growth

Radiation from Wi-Fi and cellular phones can disrupt normal cellular development during child growth, especially fetal development. A 2004 animal study reported cases of

delayed kidney development and these findings were further supported by a 2009 Austrian study. The protein synthesis was so severely disrupted that authors specifically noted, “this cell property changes are more noticeable in growing tissues, that is, in children and youth and hence these population groups would be more susceptible than average to the described effects.[8]

Derails Brain Function

Various problems with concentration were noticed in school children that made the scientists to research and investigate the impact of 4G radiations on brain function. Research performed just last year using MRI technology; found that persons exposed to 4G radiation had several areas of reduced brain activity. [8].

According to the figure it is observed that effect of radiation on child’s brain is more than adult as the skull of the child is smaller and thinner due to which the radiation penetrates the child’s brain by 10 to 50 % more than the adult.[9]

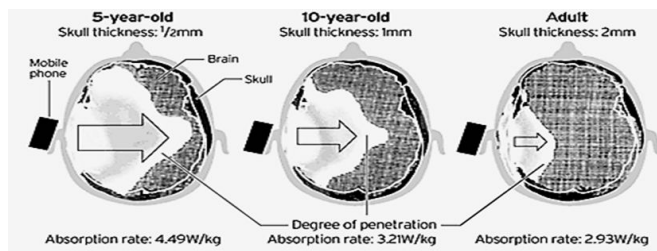


Figure 1: Effect of radiations on brain [9]

Reduces Brain Activity in Females

A memory test was conducted on a group of youngsters. The entire group was first tested without any exposure to Wi-Fi radiation — no problem. They were then exposed to 2.4 GHz Wi-Fi from a wireless access point for about 45 minutes. During the test, brain activity was measured and it was noted that women had a noticeable change in brain activity and energy levels. [8]

Fertility

A test performed on animal suggested that some wireless frequencies may prevent egg implantation. During the test, mice was exposed to radiation for continuous 45 days,2 hours a day and it was observed that there was significant increase in oxidative stress levels having a huge impact on DNA structure. Hence the test suggested a strong possibility of abnormal pregnancy or failure of the egg to implant[8]

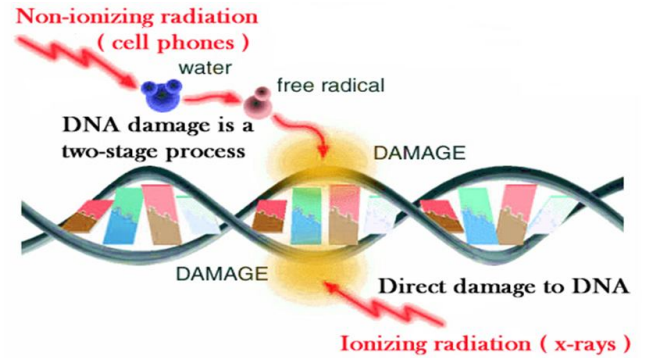


Figure 2: Effect of Ionizing and Non-ionizing radiation on DNA [10]

Provokes cardiac stress

A group of people when surrounded by wireless networks reported that many of them experienced a real physical response to electromagnetic frequencies i.e Increased heart rate similar to the heart rate of an individual under stress [7]

III. CONCLUSION

The uses of wireless devices have been increased throughout the world dominating our lives, but many peoples are unaware about its effect on human health. Radiations emitted from the wireless devices are in the form of electromagnetic field. Among all the devices it was observed that the mobile phone is more dangerous for our health, as doctors believed that wireless devices such as cell phones, laptop, wireless router, wireless headphone, cell phone tower, Bluetooth devices and tablet pc is cause of the disease of autism, fertility, brain tumor,, heart disease, effect on child development, hearing impairment, eye problems, immune system, leukemia, Alzheimer’s disease and Parkinson’s disease. So, one should avoid and minimize the use of wireless devices..[6]

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