

A Brief Description on Mobile Phones risks on Health

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ABSTRACT: *Mobile phones are becoming an increasingly essential component of our daily lives. This is one of the most essential forms of communication. Over the last two decades, the exponential growth in mobile phones has increased the quantity of non-ionizing radio waves, making the potential dangers of human body exposure to radio frequency electromagnetic fields a significant worry for society. Although the use of mobile phones is increasing at an alarming pace, the effects of radiation exposure on human health, the influence of blue light on human eyes, and macular degeneration and its consequences have all been addressed and are the topic of heated discussion. The Specific Absorption Rate is a measurement of how quickly the human body absorbs radiation, and government regulatory bodies in many countries have established limit values for contemporary phones. It's worse since the radiation is undetectable and enters and exits our bodies without our awareness. Radiation waves produce a 0.3-degree increase in temperature on the surface of the brain at most. It is unknown whether or not this kind of temperature increase has biological implications. The temperature of the brain varies by approximately one degree on a regular basis, and cells are only destroyed after a five-degree rise in temperature. Men's sperm cells are destroyed by mobile phone radiation, leading them to lose reproductive changes and experience mental health problems, according to a cell phone radiation test.*

KEYWORDS: *Blue Light, Health Risk, Mobile phone, Radiation, Radio frequency, Thermal Effect.*

INTRODUCTION

Modern technology has brought comfort and convenience to human civilization, but these technical and communication instruments are also accompanied by a slew of other unavoidable elements. Electromagnetic radiation is one of these variables that is utilized in mobile phones and wireless devices for signal transmission. EMF radiation has been linked to a variety of negative health, development, reproductive, immune system, growth, sleep, skin, and cognitive impacts, according to a number of studies. The link between mobile phones and memory loss has been investigated in a variety of methods. Due to their smaller heads, thinner skulls, and greater tissue conductivity, children may consume more energy from a given phone than adults. The power levels of wireless devices are restricted by international standards on microwave frequency exposure limits, and exceeding these restrictions is uncommon for wireless equipment. Furthermore, since non-thermal impacts have yet to be shown convincingly, these guidelines only take thermal effects into consideration. The issue of whether microwave radiation produced by mobile phones (radio-frequency modulated electromagnetic fields: RF-EMF) may cause health problems remains unresolved. RF-EMF produces biological impacts, according to many recent evaluations of updated published studies, is substantial and credible scientific evidence. Earlier in vivo and in vitro research suggested that RF-EMF exposure may affect the permeability of the blood-brain barrier [1]–[3].

However, other research indicates that non-thermal RF-EMF radiation levels have no impact on the permeability of the blood-brain barrier. Microwaves have been linked to sleep disturbances, cognitive difficulties, headaches, nausea, and dizziness, among other symptoms. Improvements in blood brain barrier permeability, electroencephalographic activity, and blood pressure were also documented. While mobile phones are intended to function at power levels below a threshold for recognized thermal impacts, radio frequency radiation may have additional, biological consequences. Users of wireless devices have a genuine worry about security, particularly when it comes to possible dangers posed by electromagnetic fields (EM). The possible negative health consequences of radiofrequency radiation (RFR), such as those emitted by mobile communications devices, have been a growing source of worry. The signal is delivered through electromagnetic wave via radio frequency and microwave signals in a mobile contact. This signal emits

electromagnetic radiation in the form of thermal radiation, which contains both hazardous ionizing and non-ionizing radiation. When using a mobile phone, electromagnetic waves are transferred to the body, causing health issues, particularly around the ear skull, where they are known to damage neurons. The electrical impulses that two neurons bind interact with the radiations [4]–[7].

Electromagnetic Radiation:

Electromagnetic radiation (EMR) is a wave-like phenomenon that emits energy as it moves through space. Both electrical and magnetic fields fluctuate perpendicular to each other in phase and perpendicular to the direction of energy transmission in electromagnetic radiation. Depending on whether it is capable of ionizing atoms and breaking chemical bonds, electromagnetic radiation may be classified as ionizing or non-ionizing. Electrical and biological hazards are the two main dangers connected with non-ionizing radiation. When an induced voltage surpasses the ambient medium's breakdown voltage, very high electromagnetic radiation may generate electrical currents strong enough to produce sparks (electrical arcs). The sparks may then ignite combustible objects or gases, potentially causing an explosion. When an induced voltage surpasses the ambient medium's breakdown voltage, very high electromagnetic radiation may generate electrical currents strong enough to produce sparks (electrical arcs).

Specific Absorption Ratio (SAR):

SAR is a watt per kilogram measurement of the amount of radio frequency (RF) energy absorbed by the human body's tissue. This test is performed to see whether a mobile phone complies with the safety standards. The exposure limit is far below the levels known to have biological consequences and takes into consideration the body's capacity to eliminate heat from tissues that receive energy from the mobile phone. The Federal Communications Commission (FCC) of the United States and the International Commission for Non-Ionizing Radiation Protection (ICNIRP). Some of the radio waves emitted by a mobile phone handset are absorbed by the human skull. A GSM handset's radio waves may have a peak power of 2 watts, whereas a US analog phone's average transmission power was 3.6 watts. Other mobile digital technologies, such as CDMA2000 and D-AMPS, require less than 1 watt of output power. The maximum power consumption of a mobile phone is regulated by the mobile phone standard and the regulatory authorities in each nation. The cell phone and base station test the reception quality and signal strength in most systems, and the power level is raised or decreased accordingly.

Impact of Blue Light on Human Eyes:

Light is relayed by smart phones, laptops, and other portable gadgets. However, blue light, in particular, may be harmful to the skin. Macular degeneration is the result of photoreceptor cell loss in the retina. The function of photoreceptor cells is to gather and transmit visual images to the brain through a substance called retinal. The retinal, which is generated by the eye, is stimulated by blue light, which causes many chemical processes. These processes inside the eye may be harmful to the photoreceptor's cell molecules, causing damage. When photoreceptor cells die, they do not regenerate. "The toxicity of blue light to the retina is ubiquitous. It has the ability to kill any kind of cell "Part of this may be due to the fact that blue light has a shorter wavelength than other colors and therefore has greater energy. The additional energy may explain the retinal-generated toxicity that this chemical shift has produced. Phone The color of the light is blue. The combination of blue light and retinal damage may harm cells; however, the tests were performed in a laboratory environment rather than on human eyes. It's uncertain if cell death is triggered by blue light in the eye itself, according to studies.

Hazardous Effect on Human Health:

The impact of radio waves produced by mobile phone contact may be categorized as thermal, non-thermal, or nontoxic in terms of handsets, especially when it comes to human health. The thermal effect occurs when

the electromagnetic field of radio waves induces polar molecules to release dielectric heat, which kills tissues. When processing the message from radio waves, for example, any region of the brain may have injured nerve fibers if the temperature rises. The non-thermal effect, which occurs when the temperature generated by radio waves flows through the cell constantly, is next to the thermal effect (only the electrical current). Membrane, while Trans gets signals, and then the nontoxic effect, which includes chromosomal damage, alterations in the function of certain genes, and a faster rate of cell division. Non-ionizing radiation and ionizing radiation are two kinds of electromagnetic radiation that have different biological consequences. Non-ionizing radiation includes radio waves, microwaves, infrared, and visible light waves, which lack the energy to break apart atoms and molecules and convert them into ions, which are electrically charged particles. This implies that non-ionizing radiation in molecules does not cause cancer or any other illness in people since it does not particularly damage genetic material (DNA).

Ionizing radiation such as X-rays and gamma rays may raise the risk of cancer, birth abnormalities, and genetic disorders by causing DNA mutations as a consequence of atomic and molecule ionization, particularly at high doses. There is no such thing as fully safe ionizing radiation. Dielectric heating is a well-known phenomenon of microwave radiation, in which the rotation of polar molecules caused by the electromagnetic field heats any dielectric substance (such as living tissue). When a person uses a mobile phone, the majority of the heating impact may occur on the head's surface, increasing the temperature by a fraction of a degree. The amount of temperature rise in this instance is an order of magnitude lower than that observed after head exposure to direct sunshine [8]. Due to the apparent stability of thermal equilibrium in their cell cultures, investigations like REFLEX are unable to detect the temperature changes that induce these alterations. Because stress proteins exist for both very low frequencies (ELF) and radio frequencies (RF) with very differing amounts of energy, some researchers think they are unrelated to thermal effects. The researchers used fluoride ox glucose injections and positron emission tomography to discover that radiofrequency signal waves enhanced glucose metabolism in the regions of the brain nearest to the mobile phone antenna, although the therapeutic relevance of this finding is unclear.

Blue Light & Macular Degeneration:

According to early study from the University of Toledo, the blue light emitted by our gadgets may cause macular degeneration. When the photoreceptor cells in our eyes die, macular degeneration occurs. According to a statement from the University of Toledo, blue light from our phones activates a molecule in our eyes called Retinal, which causes chemical processes that damage and destroy photoreceptor cells. Our blue light may not be powerful enough to harm our vision severely. The Sun also produces a lot of blue light and is by far the most common cause of macular degeneration. Smartphone-related health issues may extend beyond eye strain. Spending time on your phone before bed may decrease the synthesis of melatonin, making it more difficult to fall or sleep, according to research. Cell phone usage has also resulted in back and neck issues, as well as regular stress injuries in the hands.

How to Protect Eyes from Mobile Screen's Light:

For many individuals, the benefits of smartphones outweigh the dangers to their health. Taking the proper measures now, on the other hand, would drastically decrease the chance of future smartphone vision issues. If you are not actively avoiding eye strain, consider taking these simple measures to minimize the risk of smartphone-related eye damage: Reduce the amount of glare: The brightness on your smartphone is probably set far higher than it needs to be. Reducing screen glare makes it simpler for eyes to operate the phone while also preserving battery life. Simply go into your phone's settings and reduce the brightness to a lower, more comfortable level. Adjust Text Size: If you have to squint to read on your phone, increase the default font size to make the on-screen text larger and easier to view. Keep in Mind to Blink: It may seem odd, but remembering to blink when using your smartphone reduces the strain on your eyes.

LITERATURE REVIEW

Lennart Hardell discussed a review on effects of Mobile Phones[9]. During the past two decades, the usage of digital technology has exploded. Mobile phones and cordless phones produce radiofrequency (RF) radiation when in use. No preceding generation has been exposed to this level of radiation throughout infancy and adolescence. The brain is the primary organ to which RF radiation from portable wireless phones are directed. In May 2011, the World Health Organization's International Agency for Research on Cancer conducted a review of the scientific data on the risk of brain tumors. The scientific panel concluded that RF radiation from devices emitting nonionizing RF radiation in the frequency range 30 kHz–300 GHz is a Group 2B human carcinogen, meaning it is “possible” to cause cancer. In addition to cancer, it is critical to address neurological disorders, physiological addiction, cognition, sleep, and behavioral issues when considering the health consequences of digital (wireless) technology. The impact of altered behavior in children and teenagers as a result of their interactions with contemporary digital technology has to be carefully assessed.

K Bhargavi et al. discussed a review on Mobile Phone effects on Health [10]. Cell phones are a godsend for improved communication, but they also come with a slew of health risks. Various studies have shown that mobile phone emissions may cause genetic damage, cancers, memory loss, elevated blood pressure, and immune system weakness. Even more frightening is the fact that this radiation is invisible, intangible, and enters and exits our bodies without our awareness. The two most widely used second generation (2G) mobile communication technologies are the Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA). This article describes the experimental work that was done to investigate the impact of electromagnetic radiation from two distinct mobile phone technologies with various frequencies and power levels. The experiment was carried out in a lab with ten human participants. The duration of the procedure is equal to the amount of time spent on the phone, which is 10 minutes. During the experimental study, an electroencephalogram is utilized to monitor and record brain activity during a 10-minute period. The results indicate that a mobile phone that serves GSM has a greater impact on the brain than a mobile phone that serves CDMA. As a consequence of the massive rise in mobile phone use across the globe, the impact of mobile phone radiation on human health has been a topic of current attention and research. Electromagnetic in the microwave range is used by mobile phones.

Other digital wireless systems, such as data communication networks, have been categorized by the WHO as Group 2B (probably carcinogenic) on the IARC scale. That implies there "may be some danger" of carcinogenicity, implying that further study into long-term, intensive mobile phone usage is needed. As a preventive step, several national radiation advisory bodies have advised that people be exposed to as little radiation as possible. The fast developing mobile phone technology has sparked widespread worry about the potential for negative health consequences. Current studies, on the other hand, are hampered by a number of flaws and do not rule out the possibility of an elevated health risk. As a result, more high-quality research is required. Furthermore, it is critical that scientific research findings be conveyed to the general public in a clear and distinct manner.

DISCUSSION

With the passage of time, innovation grows and moves at a quicker rate. The most important and widely used element of technology in our life is mobile phone technology. A mobile phone started as a basic gadget with just numbers and was mostly used for emergencies by most people. Cell phones today contain as many devices as applications, such as phone calls, text messaging, photo capturing, internet access, calculator use, and so on. People get hooked to their mobile phones because they utilize them to access a wide range of services. For example, people can carry the phone outdoors owing to its size, network range, fully charged battery, essay connection, and so on. There is no denying that mobile phones have many benefits. Mobile phones have many advantages, but they also have certain disadvantages. It has become a necessary component for everyone, but it is also becoming an addiction for the younger generation. When it comes to

Bangladesh, nine out of ten young individuals in the city area possess a mobile phone. They utilize it for a variety of reasons. Their popularity with mobile phones is increasing by the day. Mobile phone radiation is harmful to human health, according to medical research.

CONCLUSION

Cell phone use is skyrocketing, yet the majority of the world's population has no idea how cell phones impact human health. Globalization has become the new slogan. In this day and age, it's almost impossible to live without technology. However, as this research demonstrates, any technology created to assist humans comes with some risks. Only a new, better technology will be able to overcome these disadvantages of modern technology. Electromagnetic radiation may be found everywhere. Increasingly wireless communication services are anticipated as artificial electromagnetic radiation becomes more prevalent. There seems to be no way to break this cycle. Scientists and engineers must develop better and safer wireless systems and devices. Future mobile phones would be able to emit considerably less power because to smaller cell sizes, better antennas for base stations, and other sophisticated technologies, making technology a true blessing. Mobile phones emit a lot of near-field microwave radiation since they are so close to the user's head. Never before in history has such a significant percentage of the population been exposed to such high quantities on a regular basis.

As a result, there is worry that exposure may have long-term negative health consequences, including an increase in the risk of cancer. Despite the lack of scientific proof, the state, society, and business are compelled to cope with the relatively new mobile phone technology and its possible health risks in a blameworthy way. The fact that commercial interests are involved further complicates the issue. Any risk assessment and measures, however, should be based on systemic considerations. There is no other option for gaining public acceptance of the resultant policy but to disclose these systemic principles to the public in a completely transparent way. Cell phone use is increasing at an exponential rate, yet most people are unaware of how cell phones impact human health. Cell phone radiation has been linked to a variety of illnesses, including brain tumors, migraines, short-term memory loss, and different kinds of heart disease, according to research. This new technology and human health has become a significant issue for safety due to the existence of different RF sources, such as mobile phone handsets and broadcast antennas that contribute to total ambient exposure. Nonetheless, additional efforts should be made to transform mobile radio communication into an effective, safe, and convenient system that benefits both India and the rest of the world.

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