

Adverse Effects of Cell Phone Radiation on Human Health

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Abstract—The development of cell phone technology has caused biological effects on human. The cell phone is an integral part of our everyday life. It is used for multipurpose like a voice call, video call, browsing (Facebook, WhatsApp, Viber, Twitter, LinkedIn, online shopping etc.), chatting, listening music, meeting games, reading books etc. It implies that the usage of a cell phone is more than 16 hours a day. The purpose of this work is to find out the effects of cell phone on human wellness through this survey from students and docs. The cell phone emits the microwave radiations that are dangerous to different human body functions like the head, male/female organ, heart, eyes, ear damage because the human body holds 70% water. It surveyed from the various staff of medical doctors of various hospitals and Shah Abdul Latif University Khairpur Students. According to the survey, the cell phone is more usable device besides other gadgets and in the result, there are 95%.

Index Terms—Cell Phone, Diseases, DNA, Human Health, Microwave Radiations, Student, Wireless Networking.

1 INTRODUCTION

The word mobile comes from the Latin word "Mobilis", it means to move freely or move well. The mobile phone is a wireless device that is portable device [1]. In 1985 the mobile phone was launched in the United Kingdom, but the nowadays volume of mobile telephones has increased than the people and life is as mystified as the mobile telephone is given importance in our everyday life. With the avail of a mobile phone, you can browse the site, download the apps, receive and post text messages, listening music, find out your location using GPS (Global Positioning System) function, receive and make the claim. The mobile phone works on 1800 to 2100 MHz frequencies and uses the powerful 6 Watts - 2 Watts. The wavelength of frequency is nearly a foot [2]. Cell phone radiations penetrate in our body and damage DNA (it is the inherited material

of the cell) [3].

1.2 Wireless Networking

The wireless communication revolution is transportation, elementary changes to the information, networking, telecommunication, and is creating integrated networks a reality. By freeing the user from the telegram, personal communications networks, wireless Local area network, cellular systems and mobile radio network harbor the promise of absolutely distributed mobile computing and communications, anytime, anywhere [4].

1.3 Radiation

Radiation is energy that initiates from the unstable particle, and the radiation is the phase of particles, wave radiations propagate in the phase of wave or particle or light beams through the place. There are two cases of radiation which are non-ionizing and ionizing irradiation. The non-ionizing radiation area directly transmission of electromagnetic radiation or heat energy and it does not stop the chemical bond [5] but the ionizing radiation is composed of high energy waves that can easily move or transfer the electrons from the particles and corpuscles. Granting to the medical test the low quantity of ionizing irradiation is not much harmful, simply the high amount of ionization of radiation can cause cancer, radiation sickness and so on.

The electromagnetic radiation is separated into some other types of radiations. The wavelength of a wireless wave is from 0.5 centimeters to 30,000 m [6]. Microwave radiation is electromagnetic radiation its frequency is between 0.3GHz to 300GHz. The frequency range is concerned to the

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wavelengths between one millimeter and one meter [7]. The Infrared radiations are in between microwaves and visible light. The Infrared is classified in three categories "near" infrared, "mid" infrared and "far" infrared. The visible light is in between the infrared and ultraviolet in the electromagnetic spectrum. It is the lowest portion of the electromagnetic spectrum that spread from the cosmic rays. The wavelength of visible illumination is visible to the human eyes. The frequency of visible light is 4×10^{14} to 8×10^{14} cycles/Sec or Hz and the wavelength is about 740 NM (nanometers) to 380 NM. The wavelength of Ultraviolet light is shorter than visible light, then this type of waves are not visible to human eyes, but some insects can experience these waves, as the bumblebees can see these waves. The frequency range of ultraviolet light is from 8×10^{14} to 3×10^{16} Hertz. The X-rays are ionizing radiation that delivers enough push to squeeze out the electron from the atom or atom and also alter the chromosomes, gene and some other parts of the cell [8]. The frequency of gamma waves is high, the wavelength of gamma rays is very modest but have more packets of energy, that energy is known as the photons without any commission. The gamma rays are created during the breakdown of atomic nuclei. The wavelength of gamma rays is 100 pm (picometers) it is shorter; the frequency of gamma rays is more than 10 exaHertz [9].

1.4 Diseases

1.4.1 Brain Tumor

It is a volume of tissue that is abnormal or you can state that the body cells die or replaced with other mobile phones and other tumors [10]. There are II cases of Brain Tumor which are a benign tumor and malignant tumor caused by the cell phone radiations [11].

1.4.2. Male Infertility

The reproduction is a lifelike experience for couples. Nevertheless, it is very hard to contrive for the child. Basically, the infertility is a wider problem in the universe due to different causes. The male infertility problem creates due to the sperm production (sperm production in low number) or the transfer process of sperm [12]. The infertility problems are sperm motility, sperm count, sperm morphology, functions of sperm, impaired Leydig cell, Sertoli cell, abnormality of sperms, to stop delivery of sperm, a chronic wellness problem [13].

1.4.3 Ear Impairment

The hearing problem usually develops according to the age and caused due to the loud noise. In that respect are different causes of hearing loss that creates trouble in hearing means the people cannot listen clearly and asking people again and again. The grounds of hearing loss is listening to the music/audio with high volume [14].

1.4.4 Alzheimer's disease

Alzheimer's could be a sort of dementia that causes issues with retention, thinking, and behavior. Symptoms typically develop slowly and get worse over time, changing into severe enough to interfere with daily tasks [15].

1.4.5 Parkinson's disease

Parkinson's disease may be a progressive disorder of the arrangement that affects movement. It builds up step by step, generally starting with a barely noticeable tremor in just one hand. Nonetheless, whereas a tremor is also the foremost well-known sign of shaking palsy, the disorder additionally ordinarily causes stiffness or fastness of movement [16].

1.4.6 Leukemia

A malignant progressive un-wellness within which the bone core and different line-forming organs manufacture accrued numbers of immature or abnormal leukocytes. These inhibit the gathering of traditional blood cells, resulting in anemia and different symptoms [17].

2 LITERATURE REVIEW

Nowadays, a cell phone is being kept very close to the groin area by human, like near the testis such as trouser pocket is commonly used for carrying mobile phone [18]. It is important to note the issue of mobile phone radiations on the male birth rate. Electromagnetic waves have a harmful effect on male sex organs and sperm. These radiations can cause changes in shapes, motility and number of spermatozoa. The major organs which occur below the impairment due to cell phone radiations are Leydig cells and seminiferous tubules. Testosterone biogenesis is affected and DNA sperm damage occurs by radiations due to the cell phone [19]. During the usage of a cell phone near the ear/brain can penetrate inside human brain as deep as 4 to 6 cm. Due to this action of radiations the hippocampus and pineal gland affected by decreasing in their protein kinase C and melatonin action. The tumor formation occurs because the cell phone is used in a very close contact with the psyche, one hour per day continuous exposure

about 10 years or above increase risk of brain tumor. Long term usage of cell phone develop a brain tumor and microwave frequencies produce changes in brain DNA and micronuclei [20]. The danger of microwave frequencies is more to the wits of children than the adult because the bodies of young people are still under development their cells are dividing more; they have a fragile skull and brain [21]. The consequence of electromagnetic waves can be on the hearing damage due to the long-term use of cellular telephone phone. The grounds of hearing loss takes place when the user uses a long time cell phone with the highest frequency. The role of the cell phone has been grown so, the possibility of biological effects because the cell phone emit radiofrequency that consists of magnetic fields and oscillating electric which interact negatively with the cells of plants, human beings, and animal. The radiofrequency electromagnetic radiation that is utilized for the wireless communication devices is more efficacious for the human health, like blood pressure, short-term memory loss, brain tumor, sleep disturbances. The radio frequency focuses on tissue close to the mobile that includes auditory nerve [22]. During the economic consumption of mobile phone, the inner ear and around ear, skin absorbs the microwave energy and radiofrequency that cause hearing impairment [23]. Radiation emits from a cell phone that is harmful to the human mind. The mobile phone user places their mobile near the brain which produces more critical condition due to the exposure of electromagnetic radiation, the heat produces due to the electromagnetic wave that damages the organs and tissues. So these radiations directly connect with the brain cancer, Alzheimer's disease, and tumor [24]. Hematopoietic tissues and organs are delicate to the carcinogenesis effects of ionizing radiations. According to epidemiological studies children and infants are at highest leukemia risk [25]. Referable to the chromosomal modifications and permanent changes that affect normal operation through which myeloid progenitor cells or lymphoid cells differentiate. These damages might be inherited during the evolutions of the fetus and harmful genetical changes occur. Ionizing radiation is a major risk factor for children due to the extremely low-frequency level of electromagnetic radiations that causes leukemia [26]. The free radical in the vascular system and in the brain and in the regulation of oxidative stress, promote the Parkinson's disease, cancer, and nerve disease, exposure of microwave at a thermal level functions as a tumor promoter and leads to tumor formation. [29]

The easily-studied in most usual effect of IR (Ionizing Radiation) is cancer, but in recent year's adverse health effects due to IR (Ionizing Radiation) exposure are recognized. The most common and strongest links currently include heart diseases. Presently this is the agreement literature that cardiovascular effects are associated with IR (Ionizing Radiation) doses greater than 2 Gy, total body irradiation, while the cardiovascular injury is kept at low doses is 0.5 Gy. In that respect are various mechanisms related to heart disease due to the radiation, including macro-vascular injury that accelerates Atherosclerosis that age-related and leading to cardiovascular disease and micro-vascular injury? That reduced the density of capillary and leading to cardiovascular disease. These pathways involve many biological responses such as inflammation, endothelium signaling, anti-oxidative defense and calcium regulation. [30]

The exposure to RF (Radiofrequency) can adversely affect the pace maker of heart, implantable cardiovascular defibrillators and impulse generator. The effect of these radiations is stopping the pacemaker from transferring pulses in a regular way or they may generate some kind of external controlling pulse leading the patient to death. A study has shown the peoples who exposed in the workplace have increased levels of health risk. [31]

Modern electromagnetic radiation source example, cellular phone, wireless, television, and radars have negative effects on the optic lens. Microwave ovens are easily known, they because non-thermal effects on eye cells it is strange. Protein of lens starts aggregating that is the leading cause of vision deterioration in all over the world. The 2.45GHz exerts an increase in heat shock protein, thus the proteins of epithelial cells are modified due to the exposure to microwaves, therefore, lens epithelial cell damage. [32]

Exposure to microwaves causes damage in the lens of the eye and retina. The heat shock protein HSP-70 and HSP-27, of the lens epithelial tissues, are increased due to the exposure of radiations. The heat labile enzyme glutathione peroxidase protects proteins of the lens and membrane lipids but radiofrequency radiation exposure causes deformation of this enzyme. [33]

3 SURVEY AND METHODOLOGY

This work is grounded on the survey and theoretical for getting the resolutions from the various medical doctors and the Shah Abdul Latif University Khairpur students. The secondary data collected through the article, journal, research

papers and textbooks [34]. The study questionnaire was interviewed for data collected from the student and medical doctors/paramedical staff of Civil Hospital Khairpur, City Hospital Khairpur, and different medical health centers.

A questionnaire was designed for taking consultations. It took 18 questions which cover sufficient information about a cell phone that affects human health and causes diseases. Other questions were touched with the doctors that how many peoples affected by the wireless radiation as they observed. In a consequence, each student and doctor have given his own views about the Effects of Cell Phone on Human Health.

4 RESULTS

A total of 200 Medical Doctors including students were surveyed about the contrary effects of cell phone on a human. According to survey 99% students having cell phone device. On the basis of patients under their treatment, 98% medical doctors gave a positive feedback and 2% medical doctors given a negative reply to the topic adverse effects of cell phone human health. The results are shown in the following Figure No. 1.

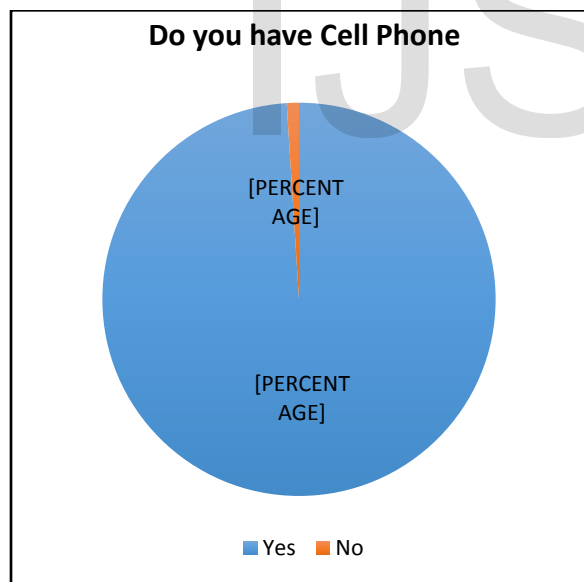


Figure No. 1: The Percentage of students having a cell phone.

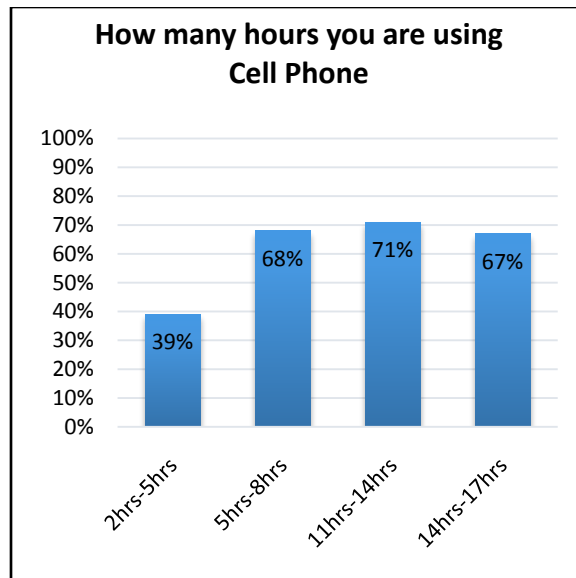


Figure No. 2: The percentage of time of cell phone use in hours.

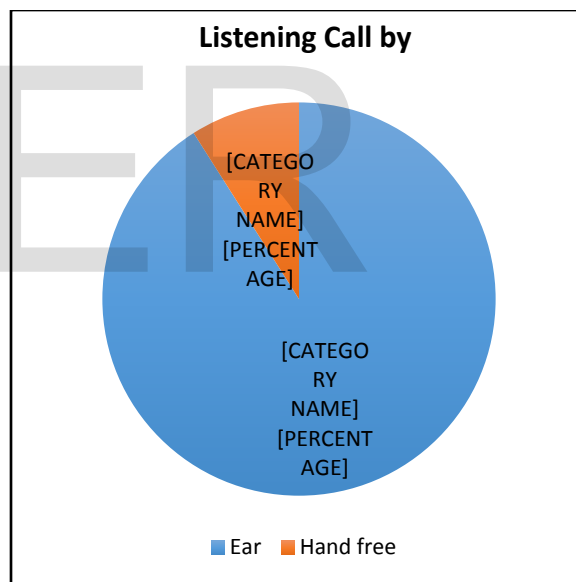


Figure No. 3: The percentage of users using hands-free and ear during the call.

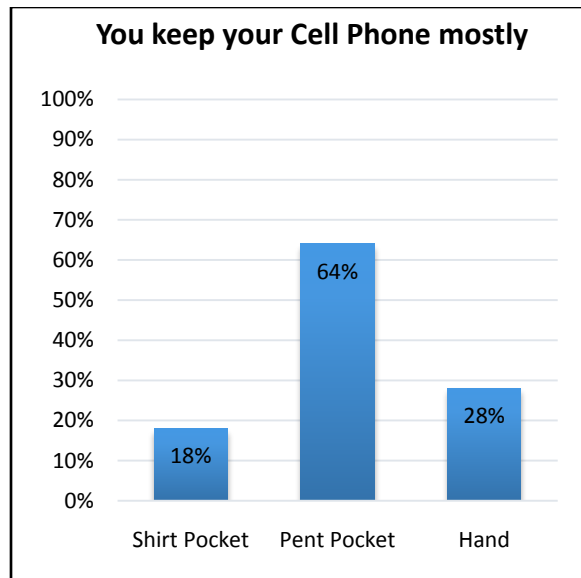


Figure No. 4: The percentage of users who are putting their cell phone.

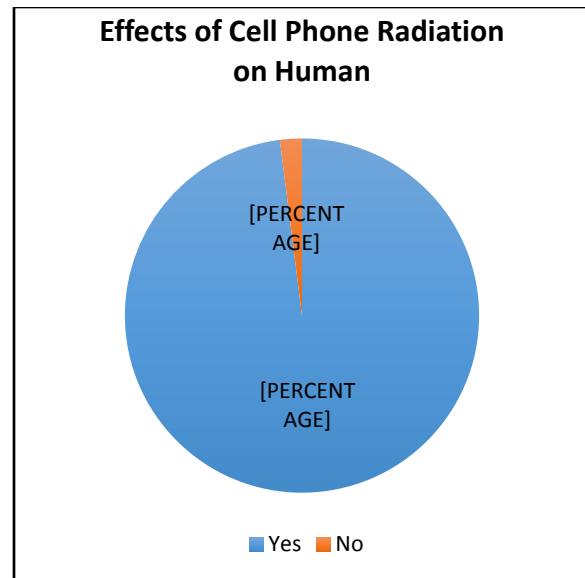


Figure No. 6: The % of positive and negative response of Medical doctors.

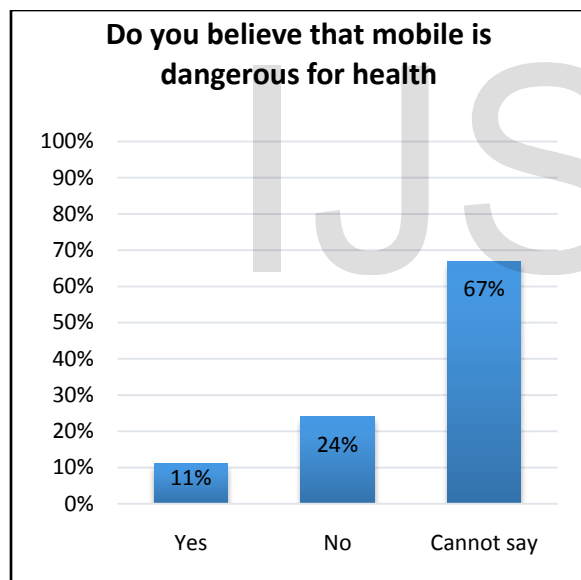


Figure No. 5: The percentage of students who, believing either cell phone is dangerous or not.

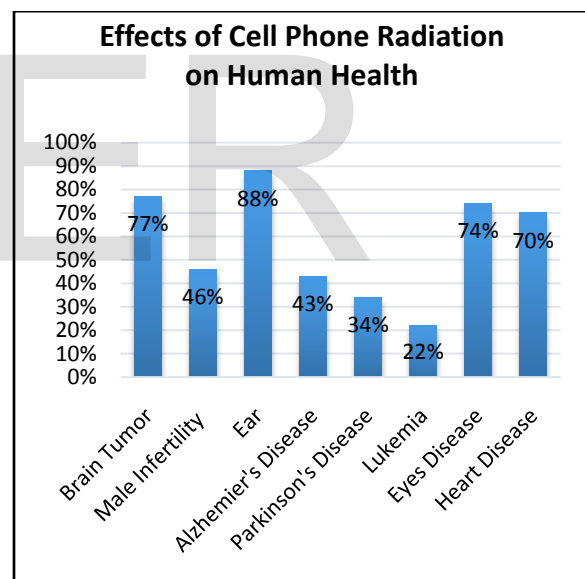


Figure No. 7: The Percentage of diseases caused by cell phone.

5 DISCUSSION

The study obtained from the doctors revealed that there is the harmful effect of cellular telephone phone, on human health because it passes off the radio waves. These radiations penetrate in our body and damage the DNA [35]. 98% doctors claim usage of mobile phone is harmful to such type of patients, but 2% doctors did not comment. The use of cell phone has increased and

also becomes a part of our life, even though these phones emit harmful radiation that is affecting our health. The present study is in agreement with Khudnitskii et al [36] who found that high-frequency radiation has an influence on the part of the central nervous system (CNS) because of phone antenna proximity to the area of the brain that gets severe heating. Kellenyi et al [37] found that deficiency in the hearing system was caused by the exposure to mobile phone radiation; this is in accord with our work. According to the Sultan A. Mao et al [38] about 34.59% of the problems were correlated with impaired hearing, ear warmth and ache on ear, 23.07% effect on the ear were found, 23% hearing problem found due to the cell phone [39] and in our study we found 88% effect on the ear, that is not in accord with current scholars. Sultan A. According to Aanchal Vasudev et al [40] constant use of cell phones can contribute 44.4% drop-off in fertility level, 30% sperm damage was found by the Hungarian Scientists [41] and in the present study the effect was 46%. The result of the heart's function was 50.0%, according to Aanchal Vasudev et al [42] and in the current study, the effects were 70% that is an agreement with a current study due to the placing cell phone in the pouch. 32.3% effects of brain tumor founded by Saad Al-Muhayawi et al [43], according to the world health organization report the cell phone radiation has 40% effect on brain tumor [44] and according to our study, the effect on brain tumor was 77%. Professor Olleohansson found the effect of the cell phone of Alzheimer's disease [45], the disease due to the electromagnetic field is Alzheimer's disease, Parkinson's disease and heart problems [46]. Agreeing to our study the effect of on Alzheimer's and Parkinson's disease is 43% and 34% respectively.

6 CONCLUSION

It is reasoned that the usage of a cell phone is increasing day by day around the macrocosm, the cell phone becomes the part of our aliveness, but many people don't cognize about the adverse effects on the health of cellular telephone phone. The cell phone emits microwave radiations. The current work focused on diseases which are induced by the cell phone which are Brain tumor, Heart disease, male infertility, Alzheimer's disease, Parkinson's disease and hearing function. Granting to the study, it is found that the cell phone is dangerous to health. As medical professionals thought that the cell phone is the ace of the dangerous devices for human health. It is advised that one should obviate the usage of a cell phone as low as possible; its usage as low as possible its use

may cause the passing of liveliness.

7 RECOMMENDATIONS

- Following are few recommendations keeping in view survey results that may be avoided while using a cell telephone.
- Do not put the cellphone phone in a trouser pocket and shirt pocket.
- Thin out the use of cell phones as it becomes dangerous when using 1 hr/day and it will change into brain tumor within 10 years.
- The role of a cell phone for long-term is harmful to health because doctors suggest that if you use the cell phone 1 hour a day, it will cause brain tumor within 10 years.
- Avoid the long duration conversation, use headphone when you have to sing while a long cry.
- Avoid using a cellular phone.

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