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MAGNETIC FIELD EFFECTS ON QUALITY OF HUMAN LIFE

Abstract: *All materials have weak and strong magnetic fields. Now that human being is a matter, he has his own magnetic field. Thus, people are under the influence of both their own magnetic field and magnetic field of the environment in which they live. Besides the benefits to the people, these magnetic fields have same damage such as the deterioration of the natural balance. People are making their lives easier and use the time better quality and faster by mobile phones, computers, and electrical home appliances and high-voltage lines which they produced. On the other hand, the use of this technology lowers the quality of people's lives by the decline in the age of a heart attack, the collapse of the immune system, cerebral hemorrhage, commonly found on cancer, stress, tinnitus, tired feeling etc. We must identify these devices' possible contamination of magnetic field at source and take measures in order not to affect our lives adversely after a long time. For his reason; the studies on the magnetic field and its potential effects on human health and quality of life are emphasized on this study.*

Keywords: *Magnetic Field, Human health, Quality of life, Electromagnetic pollution*

1. INTRODUCTION

Besides many benefits with the use of electricity, it has resulted in some negative effects on all living things. The electrical apparatus that are used spread invisible electromagnetic field around them. The effect of these electromagnetic field on living organism should be known and it is necessary to be conscious users.

The magnetic field is a space which under the influence of moving and electrically charged particles and it occurs as a result of electrons within the atoms rotation around the nucleus and their own axes. Magnetic field can not be seen directly and felt easily but the results of them can be seen and felt. Today, with the development of technology and with the help of measuring devices the measurement has become possible [1].

Besides the internal and external magnetic field in the nature people are under the influence of magnetic field of pollution they produce their own electric devices. Magnetic field of pollution is neglected by the people because it does not

seen and its effect does not perceived directly and seen after a long time.

The source of the magnetic field pollution should be determined and the necessary precautions should be taken in place to prevent. The quality of life can be increased by raising people's awareness for magnetic field pollution besides pollutions such as environment and weather that affect human health.

2. LITERATURE

The electromagnetic (EM) fields have two components as electric field and magnetic field. The intensity of the electric field's voltage per meter is measured with voltmeter, the unit of measurement of the magnetic field is Tesla or another unit is Gauss. The specifications of electronic and magnetic fields are different. Therefore, impacts on the biological structures of living of these areas is different. How these areas affects the people is not yet fully understood. But according to studies; the magnetic fields are more effective than electric field. On the other hand, magnetic fields does not

know obstacle, except some specially manufactured substances. The electric field creates a weak current on the surface of the human body. Magnetic fields lead to the formation of such weak flow in the internal organs by entering into the body. In fact, variable magnetic fields create current in all conductives around them (human body can be considered as a conductor) [2].

As a measure of interaction with living tissue and electromagnetic radiation created by radio, television and radio systems, radar systems, satellite communication systems, microwave ovens, RF frequency in medicine and industry employees and systems such as GSM communication systems (working at 10kHz - 300 GHz frequency range) is defined "specific absorption rate (SAR)". SAR is about the power that absorbed in the tissue and turned into heat. It is a question mark that there is not any warning factors on the devices that indicate SAR value which is important for human life. In the Electromagnetic Fields Organization conducted by World Health Organization for mobile phone SAR values is recommended maximum 0.1 W/kg.

The thermal and non-thermal effects can occur in the living creatures as a result of the influence of non-ionizing electromagnetic waves in the environment. Thermal effects is defined as electromagnetic energy absorbed by the human body is converted to heat and a rise in body temperature. This temperature increase lasts until heat balanced by removing with circulation. The temperature increase caused by radio frequency (RF) such as mobile phone is actually very low and probably can be disabled easily with the normal mechanism of the human body. Depending on the non-thermal effects of RF wave it is claimed to be effective disorders and diseases include changes in brain activity, sleep disorders, attention deficit disorder, a headache. However, these risks are indicated to be effective in experimental high doses and duration [3].

It is generally mentioned two effects of electromagnetic fields. The first is the effect of heat. Because the emitted energy is absorbed as it passes through the human body, kept and a heat accumulation occurs inside. This heat can cause undesirable results [1]. This results the effects are felt as soon as we can say symptoms like headaches, eye irritation, fatigue, weakness and dizziness. Also at night insomnia, daytime

sleepiness circulation, not participation in society due to resentment and constant discomfort has also been reported in the literature [4]. The second one's effect is that it affects and disrupts atoms and molecules linked together in living organisms. The organism can repair, fix itself. But it can be out of control for a moment. When it is out of control, it is suspected that it can cause the death of a simple two cells or a deadly disease like cancer [1]. This second one's effect results only emerge after a long time.

Since everywhere in the world benefit from electricity there are not any people that are not exposed to electromagnetic fields. Natural level was significantly lower values in the atmosphere of the electromagnetic field fifty years ago. Widespread use of electromagnetic energy along with industrialization has created an increase that affect human, animal and electronic system in every frequency of electromagnetic fields. If we consider the use of the electromagnetic field will increase in the future, the importance of this issue is increased. Microwave, radio and mobile phones, alarm devices, automatic doors, TV and radio transmitters and power transmission lines are examples of electromagnetic field energy generating devices. Also lower frequency RF heaters used for heating in industrial processes can be counted. The people whose work is related to this application and maintenance personnel are at primary risk for staying close to the continuous light emitting device [4].

3. MATERIALS AND METHODS

As a result of experiments conducted on animals it has been seen that the electromagnetic field increase the cancer risk. The absence of these effects depends on electromagnetic field frequency, severity, the body size, the electrical properties of the body, the distance of electromagnetic field and its impact time. According to this the people who works high-voltage lines and facilities, in radio and TV transmitters are exposed to danger. When the field level of the electrical equipment in the growing number, TV and radio stations and the mobile phones that everyone has, come up national and international standards it causes electromagnetic pollution like air pollution and it shows harmful effects on humans and equipment.

Therefore, TV, radio and mobile phone services in terms of the level of power the field

level in the environment increases pollution. Also when the field levels exceed the limit values the devices which works with electromagnetic energy becomes incapable.

Two points must be considered in the use of electromagnetic energy: First, the cautions related to devices that are used in homes and offices and second the initiatives that community will make common and the cautions against the electromagnetic pollution of environment [4].

Most of the electric or magnetic field generated by humankind varies quickly and regular. These are alternative areas which characterized by their forces (intensity in varying levels) and frequency (variations in different speed). High-frequency and radio frequency fields are between 10 MHz and 300 GHz. In the highest part of the electromagnetic spectrum, the wide frequency range is used for telecommunication applications: adio waves, television, telecommunications, satellite, vb. Mobile phones and base stations create a level of 900 MHz or 1.8 GHz high frequency fields [5].

Electromagnetic fields are detected only in very strong direct exposure situation by the human body; this situation arises only in a professional environment or carried out on 21 volunteers during experimental studies. The instantaneous effects are well-known in the international scientific community that they are precise and repeatable [5].

Unlike electric fields, the human body is not "sensitive" to magnetic fields. However, because of the body is conductive, when it exposes to magnetic field, it causes flows. But these flows are very low intensity and generally they are not felt in encountered exposure levels. Only exposure to intense magnetic field "snapshot" can bring a sense.

However, as in the electric field perception threshold varies considerably from person to person [5].

The thresholds adopted by World Health Organization (WHO) are as follows [6].

In vivo experiments conducted on experimental animals investigate the influence on the mechanism of the animal health. However, the results of the interpretation in terms of the human body (extrapolation) requires the taken of certain cautions. The carcinogenic mechanisms are quite complex, in some aspects they are not yet clear, and it is known that they follow the two main phases: The

initial stages of cell DNA altered and the proliferate phase of growth of cancerous cells.

Table 1. According to the foregoing effects of the magnetic field intensity acts on ($T=A/m^2$)

1-10 mA/ m ²	Incidental and insignificant non-recurring effects
10-100 mA/ m ²	The reversible insignificant effects in visual and nervous system
100- 1000 mA/ m ²	Stimulation of excitable tissues (excitation) was observed and harmful effects are possible for health.
1000 mA/ m ² <	The severe effects have been reported such as Ventricular fibrillation (cardiac ventricular fibrillation) and extrasystoles (Heart rhythm disorder where abnormal pulses)

The experimental studies of the effects of electromagnetic fields are being conducted on these two phases. Unlike ionizing radiation, 50 to 60 Hz fields can not transfer energy sufficient to impact mutagens (causing genetic mutations) to cells. It was not observed any change or metamorphosis of DNA associated repair mechanisms in vitro studies. This also applies to areas with unusually high values. Thus, the experimental studies performed on cells mainly focused on the increase stage of tumor and emphasised on the effects of immune system and cell growth of electromagnetic fields (EMF).

The other studies that based on "electromagnetic" hypothesis investigated the possible effects on cells that contain molecules sensitive to magnetic fields such as magnetite crystals or electrically charged elements (ions, free radicals).

These studies show that there is no relationship between tumor formation and development by exposure to electromagnetic fields. It is not possible to repeat the results of few studies that show some effects emerging with the values of exceptionally high electromagnetic field (EMF) [5]. The small motors and converters of household appliances constitute much more important sources of magnetic fields than cables of these devices. These are exemplified by the following table [7].

Table 2. Electric and magnetic field values for some household appliances

Electric fields (V/m)	Magnetic fields (μ T)
Shaving Machine Unimportant	Refrigerator 0,30
Laptop Unimportant	The toaster 0,80
Television 60	90 000 V lines(30 meter distance from axis) 1,00
Stereo 90	400 000 V lines(100 meter distance from axis) 1,20
Refrigerator 90	Laptop 1,40
90 000 V lines (30 meter distance from axis) 100	Television 2,00
400 000 V lines (100 meter distance from axis) 200	Electric blanket, 60
Electric blanket 250	Shaving Machine 500

The reason why the astronauts sent into space has fatigue, muscle pain, headache and dizziness could not be understood in the first years. As a result of extensive research carried out in later years it was determined that the lack of Earth's magnetic field caused these symptoms [8]. The magnetic field in human body occurs from the movement of bioelectrical load. According to Biot-Savar theory, the moving electrical charges creates magnetic field. The magnetic field is definitely in any field that consists bio-electric. Thus, organs like heart, muscles, nerves and brain has a certain magnetic field. The signals of magnetic field which is used for communicate with each other substances that make up the human are in harmony with each other. These signals are in harmony with the world's magnetic field [1].

The harmony between the people's internal magnetic field and earth's magnetic field can be broken down because of various reasons. One reason for this is the magnitude of the magnetic field where people live. There is a natural magnetism of the Earth's crust. The whole area contains three variables; frequency, spinner's direction, size or power. When these three variables suit human body the body supports its

own energy [9]. This magnetic interaction makes agents exchange in membrane possible. So, the cell as a factory employee make possible to maintain an appropriate course of function and viability by taking water, nutrients, oxygen and necessary minerals and by removing waste and toxins from the body.

In an experiment conducted on epileptic patients, in case of change of the magnetic field of the subjects, the bioelectric activity of the brain, thus ensuring recreate the effects of pollution in case of illness of synapses [1]. At night the world increases cellular oxygen magnetic field, supports sleep, reduces inflammation supports biological healing, relieve pain. But when the sun rises, the positive magnetic field reduces cellular oxygen, supports alertness prevents the biological healing and increase pain. The pineal gland that manages hormones in the centers of the head, enzymes and immune function is a magnetic body comprising magnetic crystals. It is very sensitive to magnetic energy and the melatonin hormone appears at night when the world's magnetic field is effective. The melatonin level should be high for a good sleep. Growth hormone is associated with melatonin level. When the people get older, they begin to produce these hormones less. The growth hormone keeps hair, skin and muscle under control [10]. Researchers' electromagnetic fields known as electromagnetic pollution or smog made by people that are cumulative and it can create general malaise, stiffness in the neck, chest pain, memory loss, headaches, change in heart rate and blood chemistry, digestive and circulatory problems. The technology that is called electro smog is one of the serious threats to human health factors with the accompanying electromagnetic pollution. The electromagnetic waves which is spread from the high-voltage lines to mobile phone waves, from the radio and TV waves to computer and other electric appliances in homes and businesses the exposure electromagnetic pollution creates an unhealthy atmosphere in the social life environment. Electromagnetic smog damages the body's immune system by blocking signals sent from the brain to the cells [1]. It has been still discussed whether the weak magnetic field is harmful to human health. These weak fields has not any damage apparently. But in experiments on animal cells, it has been judged to be causing biological agents such as changing the level of

hormones and enzymes of weak magnetic fields and blocking the action of chemicals in the tissue [1].

4. CONCLUSION

We are constantly exposed to electric and magnetic fields in our daily lives. When we wake up in the morning, we start the day with the effects of electric and magnetic fields by turning on our lamps. We live in dependence of the electrical and electronic systems that time and speed saving by creating our quality of life at every point in our lives without being aware of in the day. As a result of the development of technology we are trying to live in a magnetic field environment that full of these systems.

There is no place that is not exposed to this areas. All of these are affected our health and our quality of life in the short and long term. Temporary hearing problems, eye redness, tearing, burning, heart rhythm disturbances, intense stress and constant tiredness, the collapse of concentration and attention are the effects which can be seen in a short time. Brain tumor, skin cancer, high blood pressure, permanent hearing loss, deformation of blood cells, heart disease, problems of the immune system are the effects which can be seen in a long time. As a result; any technological developments that improve our quality of life by simplifying our lives, probably accompany with losing something from our health.

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