

INFLUENCE OF ELECTROMAGNETIC RADIATION ON HUMANS’ HEALTH AND QUALITY OF LIFE

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Abstract: *This paper will discuss the role of the electromagnetic rays from computers and mobile phones on our health. Studies have shown that long-term exposure to radiation increases the risk of all types of tumors, cancer, leukemia, miscarriages, insomnia, anxiety, aging, burns, etc ...*

Television, microwave ovens, mobile phones and computers emit harmful radiation. To preserve your health use electronic devices carefully and in a way that will protect your body from radiation.

Using a computer or LCD does not exclude the negative effects of radiation. One should know that all computer monitors emit low-frequency radiation. However, all monitors emit radiation that damage your health and affect change in your appearance.

Healthy solution is to use a PC filter. This product eliminates part of the harmful radiation of monitors and protects you from them.

The law provides the essential health and safety requirements that manufacturers of electrical products must comply. Many manufacturers improve their products to achieve lower intensity of radiation which, in the last five years, is enabled by technological progress achieved. Be healthy and look for electronic devices that emit low radiation!

Key words: *Harmful radiation emission, health, electronic devices*

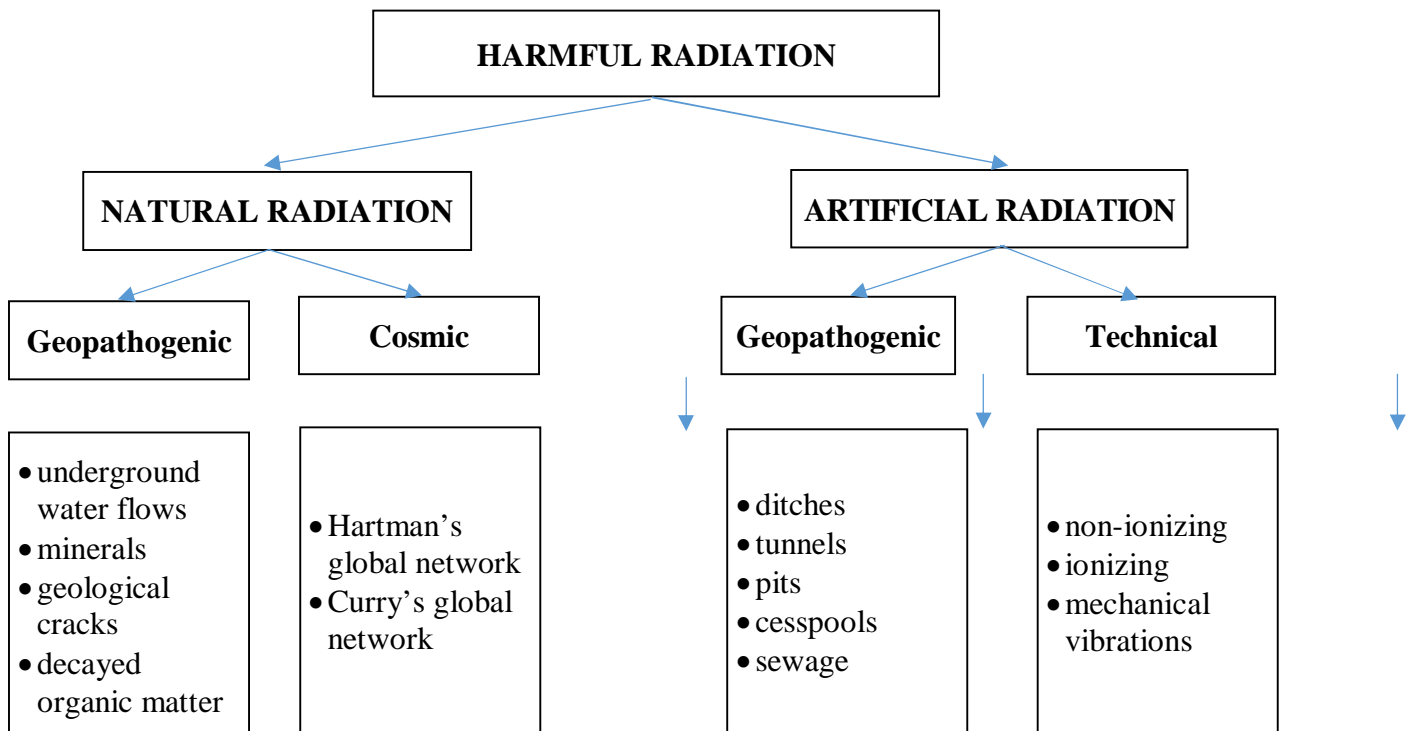
1. INTRODUCTION

Findings on radiation exist from far in the past. Normally, at these times only the effects of natural radiation were taken into account. Although people at the time probably were not even aware of the radiation kinds in question, and they even ascribed some supernatural properties to radiation and called it various names, such as "demonic door", "devil's box" and like, they still were aware of its' negative impact on human health. They tried to protect themselves from radiation by avoiding places with high level of natural radiation, by observing the ratio of animals and plants at the selected sites, and believing to different fortune tellers, seers and talismans. Unfortunately, due to the low technical culture, some groups of citizens have retained part of this tradition to the present days. "When a man is unable to understand the natural phenomena, he tends to give them supernatural properties", said Albert Einstein.

Over time, man increasingly worked on the study of natural phenomena, physical laws, trying to find practical methods of proof. Among the first instruments for "measuring" were lever, plumb line and similar "devices". The disadvantage of these methods is that they are essentially subjective methods and the influence of "measurer" on the results is not negligible. Likewise, the major problem is the incompetence and ignorance of basic physical laws of such "measurers". In many cases, these "measurers" do not know what they are measuring and are not familiar with intensity, nor permitted limits.

With the beginning of industrialization, technical sources of radiation occurred. With technology and consumer electronics progress, the number of technical sources of radiation is increasing every day. Like the enclosed space suffocation, ie. electrosmog, grows, the knowledge of the harmful effects of natural and technical radiation is more expressed, especially nowadays when environmental awareness is rapidly rising. This area has long been neglected and even deliberately ignored by big companies which were the main source of radiation, although the harmful effects of electric and magnetic fields, for example, under the power line, are well known.

French physicist and radiostheliologists Bovis differentiated diverse terrestrial and cosmic radiations, using the various tools. It is known that the Chinese were able to detect cosmic and terrestrial radiation many years ago. This is when the first information about the "dragon lines" occurred. Chinese czar had a specially trained experts, who always investigated construction site before the start of construction of a residential building, in order not to built it on the site where the "evil spirits", who bring misfortune and disease, are coming out from the ground. Persians, Celts, Egyptians and other civilized nations were also familiar with both healthy and harmful radiations.



Picture 1:Division of harmful radiation

2. INFLUENCE OF ELECTROMAGNETIC RADIATION ON THE QUALITY OF LIFE

In the last twenty years, psychologists have defined a new category that determines the behavior of an individual in a family environment, at work, in critical situations, etc. and that category is the quality of life - QL. Quality of life has an impact on the understanding of the environment and helps in overcoming difficult situations such as the crisis at work, illness ... Quality of life is dependent on many factors and, generally, have an affecton enjoymentof an individual in the subjective sense of satisfaction.

When it comes to quality of life, electromagnetic radiations, both ionizing and non-ionizing, can be viewed from two aspects. The first is their impact on the development of human society, and the other is their impact on human health. Today's civilization widely uses electromagnetic waves and fields in a variety of technologies. Thus, communications, radio and television, electricity, transport, medicine, computers, are based on electromagnetic fields and electromagnetic radiation. This progress has enabled a high quality of life to human beings, such was unimaginable only a century ago. The breakthroughinto the universe and its study is unthinkable without the electromagnetic waves, as well as the penetration into the world of microparticles. The contribution of electromagnetic waves to the development of modern civilization is of immense importance.

On the other hand, the negative impact of electromagnetic radiation is that in certain circumstances it can cause health problems to humans (radiation source vicinity, radiation power, waves frequency, ionization). In addition, ionizing radiation is much more dangerous to human health from non-ionizing. The good news are that non-ionizing radiation is in far greater use than ionizing and, therefore, the risk to human health risk is greatly reduced.

2.1. Division of harmful radiation

Geopathogenic radiation is harmful radiation which sources are located below the ground surface. Its' appearance may be caused by everything that intersects, dis-stratifies or in any other way disturbs the natural homogeneity of the Earth's layers. This group of radiations includes:

- radiation of underground water sources
- radiation of ores and minerals
- radiation of geological cracks (fractures)
- radiation emerged from decayed organic matter.

Cosmic radiation is a form of geopathogenic radiation, present at any place of the Earth's surface, in a given geometrical disposition. This networked radiations ensues in the interaction of cosmic forces and Earth's gravitational and magnetic fields. Lines of networked cosmic rays are not harmful themselves, but there is a possibility that a bundle of harmful rays from some other source can be transposed to it, forming a knot. Cosmic rays are forming the following networks:

- Hartman's global network (direction North-South and East-West),
- Curry's global network (direction North-East and South-West).

2.2. Technical radiation

With the beginning of industrialization and the emergence of new technical devices of different origins and purposes, new technical sources of radiation appeared. With the technology and consumer electronics progress, harmful effects of these radiations increases every day, but also the ecological awareness of the people, at the same time. This area has long been neglected and even deliberately ignored by big companies, which were the main source of radiation. Technical radiation can be divided into the following groups:

- a) non-ionizing: electric and electronic radiation. Non-ionizing radiation is the electromagnetic radiation whose energy is below 12.4 eV. This radiation hasn't enough energy to cause ionization in living organisms. Natural sources of non-ionizing radiation are rare and extremely weak. These are the sun, distant pulsars, other cosmic and terrestrial sources (lightning). With development of electric devices, the density of electromagnetic energy around us is much higher than the natural levels.
- b) ionizing: alpha rays (helium nucleus), beta rays (electrons) (-), neutrons (electrically neutral particles), gamma and x-rays (the em energy)
- c) mechanical vibrations: means of transport, the work of the heavy machinery, the ultrasound vibrations, inoperative machines and devices.

3. SOURCES OF NON-IONIZING RADIATION

The sources of non-ionizing radiation include ultraviolet radiation (wavelengths 100-400 nm), visible radiation (wavelengths 400-780 nm), infrared radiation (wavelengths of 780 nm-1 mm), radio-frequency radiation (frequency of 10 kHz-300 GHz), low frequency electromagnetic fields (frequency 0-10 kHz) and laser radiation. Sources of non-ionizing radiation are used and present in everyday life, starting from the space in which we live and work, up to the modern means of communication, and they are all related to human activity. These sources can be classified as:

- (1) Natural sources: electric and magnetic fields created by the magnetism of the Earth, solar activity, atmosphere dynamics (static electricity, lightning), radiation from space (novas and supernovas, synchrotronic fields, radio galaxies, etc.).
- (2) Power plants and electric power devices: in buildings and external facilities - installed equipment and devices where current circuits are closed and currents are greater than 1.000 A, and unisolated parts are exposed to different, very high voltages. In its immediate surroundings, power lines and substations are creating magnetic radiation whose induction is from 5.0 μ T up to more than 100 μ T, and at the distance of (50 - 100) m those values decline rapidly. Electric fields below the power line, at a height of 1 m from the ground, are reaching values from 0.6 kV/m up to more than 10 kV / m. Office buildings - due to the installed electrical devices and electronic circuits, the electromagnetic fields are present.
- (3) Means of transport. Motor vehicles - the electromagnetic field of the devices for the ignition of the fuel mixture in the engine and due to operation of the electric motor (particularly in electric vehicles), the navigation devices (satellite navigation). Aeroplanes, ships - the electromagnetic field due to the operation of the radio and the navigation device and incorporating an electric motor. The strength of the magnetic field in transportation vehicles reaches up to 50 μ T, while the strength of the electric field reaches up to 300 V/m (those amount are much higher when we talk about aeroplanes).
- (4) Household devices. Television and computer screens are creating a static electric fields and alternating electric and magnetic fields of different frequencies. While older technology of these devices are creating field strength of 10 kV/m at a distance of 30-40 cm, and near the device even more, the new devices do not generate fields higher than 700 nT or 10 V/m. Washing Machine: 2 to 8.4 μ T (distance: 1 cm); Electric oven: 40 V / m; Refrigerators: 30 V / m Vacuum cleaner: up to 20 μ T; Coffee machine: 16 W / m. Toaster: 40 V / m; Hair dryer: 40 V/m; Sound system 90 V/m; Halogen table lamp: up to 1.5 μ T, etc.
- (5) Medical devices - laser device, device for magnetic resonance.
- (6) Telecommunication devices, etc.

Of course, this is not the final list of sources of non-ionizing radiation, but largely shows the widespread use of these sources the modern world could not be imagined without.

4. ELECTRO-MAGNETIC RADIATION AND HUMAN HEALTH

Epidemiological studies and experimental researches came to the conclusion that electromagnetic fields and waves (which are present all around us and whose intensity increases over the limit on daily bases) are posing a constant threat to our health even when they are within the allowed limits. Experts have been warning for years that the first symptoms of the disease caused by the harmful effects of radiation are increased irritability and nervousness, insomnia, headaches, feelings of fatigue and chronic fatigue, anxiety, tendency to depression, difficulties with memory and concentration problems, loss of vitality, reducing physical and mental activities, etc. Today's tests clearly indicate that the joint influence of geopathic fields with harmful effect and electromagnetic radiation can lead to a weakening of the body (Figure 2).

There is no space where man works, lives or sleeps without harmful radiation. Long term exposure to a complex influence of harmful radiation disturbs the energy structure of biological systems, and this is reflected through emergence of different diseases, both, psycho-mental and physical once. Long term influence of harmful radiation on weaker persons leads to the most damaging diseases, and even death. The most dangerous places are bed and the workplace, where a man spends most of time. The manner in which the electromagnetic radiation affects people depends on many factors. Of course, the most important one is the power of the radiation source, but radiation frequency also has a significant influence. Considering the intensity of absorption in the human body, the electromagnetic radiation can be divided into four groups: frequencies of 100 kHz to 20 MHz, where absorption decreases with decreasing of frequency, and significant absorption occurs in the neck and legs; frequencies in range from about 20 MHz up to 300 MHz, where relatively high absorption occurs in the whole body, and in resonance significantly higher in the region of the head; frequencies in range from 300 MHz up to several GHz, where substantial local non-uniform absorption occurs; frequencies of more than 10 GHz, where absorption occurs primarily on the body surface. Primary and the simplest damaging impact of electromagnetic radiation is warming. Exposure to radio frequency radiation exceeding 10 mW/cm² may cause serious damage to human tissue due to overheating. In certain conditions, even the radiation between 1 and 10 mW / cm² may cause a measurable heating of the tissue, but this does not necessarily cause a damage to the tissue. A very large and varied number of non-ionizing radiation sources in our environment caused the adoption of corresponding regulations. There are over 130 laws, regulations, standards and recommendations in the field of radio-frequency radiation in European countries. The recommendation of the European Council No. 1999/519 / EC of 12 July 1999 is of particular importance. Serbia has adopted the Law on Protection Against Ionizing Radiation ("Official Gazette of RS", No. 36/09), that regulates the conditions and measures for the protection of human health and environment from the harmful effects of non-ionizing radiation when using the sources of non-ionizing radiation. Sources of non-ionizing radiation of particular interest are defined through by-laws.

5. CONCLUSION

An increasing number of scientific research confirms that, at this moment, the biggest threat to our health and well-being (and this holds true for all other forms of life) is insidious, omnipresent and invisible form of pollution called "electropollution". Electromagnetic fields and radiation are present in the whole matter which surrounds us on all levels of the organization, from the universe to the micro universe. The human body absorbs and emits electromagnetic waves, as well. Information in the brain and at the brain cells level are transmitted by electromagnetic waves. The man is exposed to more or less all forms of electromagnetic radiation since the very beginning. However, the development of technology led to application of a large number of devices and systems whose work is based on usage of electromagnetic fields. In this way, the density and frequency of radiation in the space in which we live have been multiplied. Now the human body is exposed to much higher doses of radiation than in the case of natural sources. Of course, it has a certain influence on the human body and health. In order to maximize the benefits of electromagnetic radiation, and avoid adverse effects on human health, it is necessary to: conduct systematic research of electromagnetic radiation influence on the human body and other living world; regulate the area of electromagnetic radiation (laws, regulations, standards); implement the prescribed measures of protection from radiation and monitor the implementation of these measures; prevent the development of products and systems which operate at the radiation frequency of the human body or its parts (the brain, for example); establish the information system on electromagnetic radiation in order to enable an insight in the state of this field. Of course, the issue of electromagnetic radiation will be even more discussed in the future, when no human activity will be possible without the use of electromagnetic fields. "I have no doubt that the increase of electromagnetic fields, at this point, is an element that mostly pollute the environment on Earth. I think that, at the global level, it is more important than warming ... and then the increase in the amount of chemical elements in the environment" - Robert Becker said. Each of us have the responsibility to take preventive steps to protect ourselves, our families and future generations.

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