Posibles efectos provenientes del uso excesivo de la comunicación inalámbrica

Possible effects of the excessive use of wireless communication

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RESUMEN

En la actualidad es indudable que la población está expuesta a mayores dosis de radiaciones, de los tipos no ionizantes e ionizantes, volviendo inevitables sus posibles repercusiones en la salud humana; las radiaciones de los celulares pueden provocar futuras enfermedades.

Se encuestó a 200 jóvenes del Colegio de Bachilleres de Baja California (Cobach), de entre 14 y 19 años, para que seleccionaran de entre 18 síntomas a los que han tenido con cierta frecuencia. Los síntomas que se les presentaron para que eligieran fueron los que numerosos investigadores afirman aparecen como resultado del uso frecuente del celular: dolores de cabeza, nerviosismo, problemas para conciliar el sueño, vértigo, náuseas, fatiga, debilidad, pérdida momentánea de la memoria, falta de concentración, depresión, malestar en el pecho, zumbido en el oído, infecciones respiratorias, cansancio, infecciones respiratorias, irritabilidad, desesperación o ansiedad, enrojecimiento y lagrimeo de los ojos, y vista borrosa momentánea.

El objetivo de la investigación es saber si las radiaciones de los celulares provocan la sintomatología mencionada, y si tiene que ver con la cantidad de tiempo que son utilizados.

Palabras clave: síntomas corporales, efectos en salud, radiación electromagnética, campos electromagnéticos, teléfonos celulares, usuario, cáncer, daño neurológico, efectos no térmicos.

Abstract

Currently there is no doubt that the population is exposed to higher doses of radiation, of types ionizing and not ionizing, becoming inevitable their potential impact on human health; radiation from cell phones can cause future illnesses. We surveyed 200 young people from the Colegio de Bachilleres of Baja California (Cobach), aged between 14 and 19 years, so they selected from among 18 symptoms who have had with certain frequency. The symptoms that were presented to them so they chose were the ones many researchers say appear as a result of the frequent use of the cell phone: headaches, nervousness, trouble sleeping, dizziness, nausea, fatigue, weakness, momentary memory, lack of concentration, depression, discomfort in the chest, ringing in the ear, respiratory infections, fatigue, respiratory infections, irritability, despair or anxiety, redness and watery eyes, and momentary blurred view.

The objective of the research is to know whether radiation from cell phones cause the symptoms mentioned, and if it has to do with the amount of time that they are used.

Key Words: body symptoms, effects on health, electromagnetic radiation, electromagnetic fields, cellular phones, cell phones, user, cancer, neurological damage, non-thermal effects.

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Introduction

Today the population in general is involved in ELECTROMAGNETIC RADIATION whose origin are, for example, antennas and cellular receptors. These radiations are probably causing disorders to health; therefore, it is necessary to conduct research that will help to confirm this. Every day cell phones are used and brings them to the ears, causing a warming in the brain by the emitting radiation device.

The research was conducted within the context of electromagnetic fields, specifically microwaves produced by cellular receptors. These, in turn, receive them antennas placed specially for that purpose, which are also recipients of antennas of greater power. Electromagnetic waves are distributed in the whole space, i.e., are classified according to their frequency. Many bands and sub defined bands, among which the best known are: medium wave (AM radio), VHF (FM radio), UHF (television), and microwave (mobile phones, satellite TV).

The objective of the research is to deduce whether radiation from cell phones, depending on the time used, relate to the following symptoms: headaches, nervousness, trouble sleeping, dizziness, nausea, fatigue, momentary memory, lack of concentration, depression, discomfort in the chest, ringing in the ear, respiratory infections, respiratory infections, irritability, despair or anxiety, redness and tearing of eyes, momentary blurred view.

These symptoms were selected from articles published on the internet by people claiming that these were produced by the use of cell phones.

Significance of the study

Although the cell phone companies deny the negative effects of their product, they offer the user equipment to protect against radiation emitted by cell. Among these companies are Nokia, Ericsson and Motorola. Therefore, knowing the harm that can bring the excessive cell phone use would benefit all humanity, especially those children and young people at an early age begin to use this phone.

The first aim is to establish the correlation between these symptoms and the time that the cell is used. To achieve 200 young Cobach, Baja California, between 14 and 19 years old were surveyed. They were asked to select the symptoms or they have with some frequency.

The health of millions of users of this kind of technology around the world and all ages, justify the conduct of this study. It is vital to take preventive measures, since each call received or made, the phone emits a low dose of radiation or radioactive energy, which the body absorbs and assimilates probably without much effort, but if calls are made or They are very frequent, the dose or intensity increases and the body will make a greater effort to assimilate and tolerate radiation. After a while, these eventually break the resistance and tolerance of the body, leading to the top manifest certain symptoms to later chronic diseases, and even the dreaded cancer.

Mexican neuroscientist Nora Volkow, director of the Institute on Drug Abuse in the United States says latency is about 20 years brain cancer, so a 10-year study can not provide reliable answers because it is not a sufficient time for the development of cancer. But the body itself can send signals that something is wrong through certain symptoms.

Therefore, the cancer does not come spontaneously but warns the manifestation of certain physical symptoms. This study seeks to collaborate with experts in the field to prove that radiation from cell phones are a significant factor in the onset of various symptoms contrary to health, which are related to the time the device is used; that is, symptoms appear depending on the time of use. It also seeks to alert all users of the harmful potential of radiation cell.

The questions asked of students were based symptoms that experts are presented as a possible prelude to the cancer disease. They selected the one or more conditions as long as you have to use the phone.

The format in question is:

SÍNTOMA	*1 AÑO*	*2 AÑOS*	*3 AÑOS*	*4 AÑOS*	*5 AÑOS*	*6 AÑOS*	*7 AÑOS*	*8 AÑOS*	*9 AÑOS*	*10 AÑOS*
DOLORES DE CABEZA										
NERVIOSISMO										
PROBLEMAS PARA CONCILIAR EL SUEÑO										
VÉRTIGO										
NÁUSEAS										
FATIGA O DEBILIDAD										
PÉRDIDA MOMENTÁNEA DE LA MEMORIA										
FALTA DE CONCENTRACIÓN										
DEPRESIÓN										
MALESTAR EN EL PECHO										
ZUMBIDO EN EL OÍDO										
INFECCIONES RESPIRATORIAS										
CANSANCIO										
IRRITABILIDAD										
DESESPERACIÓN O ANSIEDAD										
ENROJECIMIENTO DE OJOS										
LAGRIMEO DE OJOS										
VISTA BORROSA MOMENTÁNEA										
Suma total columnas										

BACKGROUND

Features of an electromagnetic wave

Electromagnetic waves can be defined by their length, frequency or energy. The frequency of an electromagnetic wave is the number of oscillations that pass a point in a unit time. It is measured in cycles per second or hertz. One cycle per second equals one hertz (Hz). Typically, the RF fields are designated with upper units: Kilohertz (kHz), thousand cycles per second; megahertz (MHz), one million cycles per second; and the gigahertz (GHz), one billion cycles per second.

The shorter the wavelength, the higher the frequency and the wave energy has. An electromagnetic wave consists of very small packets of energy called photons. The energy of each photon is directly proportional to the frequency of the wave: The higher the frequency the greater the amount of energy in each photon. Electromagnetic fields that are among the 10 MHz and 300 GHz are emitted by antennas radio, television, cell phones or microwave.

The strength of the electric field depends on the voltage and distance from the source that generates it. Like electric fields, magnetic are stronger in the source and decrease rapidly with distance.

In the human body there are tiny electric currents; Thus, the electromagnetic fields of high intensity (or density) affect bodily functions of all living beings.

The mobile or cell phone is a controversial topic due to electromagnetic waves produced. It is not advisable to talk through it more than 20 minutes as it approaches the brain, one of the most sensitive organs of the body. Even some experts advise not to put it in his pocket, next to the breast, liver, kidney, testes or matrix.

Not all mobile phones emit microwave equal proportion of these, some can issue them more intensely than others.

WHO has established some recommendations about the use of mobile phones, which are related to: keep them away from children and vital organs, as we can use the speakerphone, avoid carry in pockets of clothing and avoid leaving close when you go to sleep because it constitutes an unnecessary exposure.

Health Effects

Irradiation * Overall, if intense enough for mechanisms for restoration of thermal equilibrium outweighed will produce a state of health corresponding altered with

hyperthermia and present signs and symptoms of such feverish, and the consequences that entails if unduly prolonged in time (Garaj-Vrhovac et al., 1991).

A partial radiation produces a temperature rise of the irradiated area, which will implement mechanisms restoring heat balance, although an injury occurs it needs to be for a long time and very sensitive tissues temperature such as the ear, just the body part that goes into greater contact with radiation during cell communication.

The thermal effects of RF can produce alterations to health if they are sufficiently strong so that the energy transmitted to the body raise the temperature reaches general or locally. Therefore it is necessary to set limits to irradiation for this threshold is not transferred, being careful not to show the thermal effects.

By contrast, the radio frequencies with wavelengths much larger, penetrate deep into the body, giving energy throughout the body mass and causing problems.

* Irradiation: radiant energy per unit time incident on the unit area of any surface that is in the interior of another.

Another example is microwave. A cell phone, like a microwave oven and unlike a hot shower, heats the brain from the inside out, not the outside in. There are no nerve endings in the brain to warn that is warming because we have not evolved with microwave radiation and, therefore, nature has not created in the brain nerve endings that detect heat. Worse, the structure of the head and brain is so complex and not even that hot spots are generated; one of these points may be tens or hundreds of times hotter than an adjacent point. Hot spots can be close to the skull surface or deep inside the brain, as well as the molecular level.

Cell phones are regulated by the Federal Communications Commission (FCC) and may be found on the packaging of most new phones, a number called the Specific Absorption Rate, or SAR, which serves to indicate the rate of energy being absorbed by the brain with mobile phone use. One problem, however, is the arbitrary assumption upon which the

FCC regulations, that the brain can safely dissipate heat rising at a rate of up to 1 degree per hour are based. This is the scandalous procedure used to demonstrate that it is within these limits and give each cell phone its SAR rating. The standard way to measure SAR (absorbed energy) is a ghost method consisting, incredibly, in a homogeneous liquid stuck in a Plexiglas bag (a plastic) shaped head. But in that bag, and head, no hot spots! It heats all alike. People who use mobile phones for hours every day are chronically heating certain places or points of their brains. The security standard established by the FCC, by the way, was developed by electrical engineers, not doctors.

Physical and technical characteristics of mobile (Alfonso Balmori)

Electromagnetic radiation transmit small packets of energy called photons (Aguilar, 2001). Radio frequencies occupy the range between 10 MHz and 300 GHz frequency. The mobile phone antennas launch electromagnetic waves with a carrier frequency of 900 MHz for analogue and 900 MHz and 1800 MHz for the digital system system, generally known as microwaves (approximate range between 1GHz and 300 GHz) pulsed at audio frequencies . Microwaves carry sound information through bursts or pulses of short duration with small frequency modulations that are transferred between mobile phones and base stations.

A mobile phone antenna radiates in all directions, while a base station antenna produces a directional emission lobe shaped. In addition, several side lobes, lower power, which are directed sideways and the back in the vicinity of the antenna are formed. The telephone base stations usually have three sectors, with three antennas covering an angle of 120 degrees each (Santini et al., 2000; Hyland, 2000; Navarro et al., 2003). The frequency used in household alternating current (50-60 Hz) creates an electromagnetic induced static (unwanted effect) field that is projected in space, fades few feet away from the source and the source of energy (everyday household appliances, cables and transformers) is

disconnected. On the contrary, phone masts emit microwave radiation traveling away from the source, continue to exist even if the source is disconnected (Aguilar, 2001) and can reach up to thirty kilometers away. For a particular direction relative to the antenna, the power density at a point varies inversely with the square of the distance to the emitting source. At a distance of 50 meters from a phone mast, the power density is about 10 μW / cm2 (Santini et al., 2000). 150 to 200 meters, the power density of the main lobe near the ground is typically a few tenths of μW / cm2 (Hyland, 2000). Above 0.1 μW / cm2 biological effects have been suggested. The power density far exceeds this value in areas within 300 meters from the antennas (Haumann et al., 2002).

The variables used to measure these radiation are power density (measured in Watts per square meter: W / m2, or μW / cm2), which expresses the radiant power incident perpendicular to a surface, divided by the surface area . The electric field strength at a point (measured in volts per meter V / m), which is proportional to the force exerted on a charged particle, depending on its position in space vector quantity. Resistance magnetic field intensity, measured in amperes per meter (A / m) and the magnetic flux density, measured in Tesla (T) is also used. To measure the effects of electromagnetic emissions on fabrics Rate or Specific Absorption Rate, known as SAR (Specific Energy Absorption Rate), defined as the rate at which energy is absorbed per unit mass of tissue is used body and is measured in watts per kilogram (W / kg). The SAR unit has been standardized from the heating that occurs in an artificial model (a spherical mass of plastic filled with a saline solution) and inanimate homogeneous, lacking the properties that characterize living beings.

Prior to the deployment of wireless telephony, existing wave emissions in the range of radio frequencies originated in the radio and television antennas, typically installed at high altitude or far from population centers. Since the second half of the nineties of the past century has made the deployment of basic telephone network, which has increased by several orders of magnitude electromagnetic pollution, especially in cities stations.

Mechanisms of action on biological systems

One of the best known effects of microwaves is their ability to make resonate water molecules (dipoles) and other components of food, causing a rise in temperature. The resulting degree of warming depends on the radiation intensity and the exposure time. For radiant powers above 500 μW / cm2 478 BALMORI, A. Ardeola 51 (2), 2004, 477-490 measurable effects of tissue heating (microwave ovens) occur, while below that level the effects are called "non-thermal".

The response of a biological system to an electromagnetic field depends on the intrinsic properties of the system, the characteristics of the incident external field (especially their radiant power and frequency), and the medium in which the phenomenon (Lin, 1994 occurs). Animals are very sensitive electrochemical complex, which communicate with their environment through electrical impulses. They are ionic currents and differences of electric potential across cell membranes and body fluids, both intra- and extracellular (Heredia-Rojas et al., 2003). The electromagnetic fields generated in biological structures are characterized by certain specific frequencies, which may be interfered by the incident electromagnetic radiation, leading to induction and modifying its response (Smith, 1989; Hyland, 2000-2001). Some organ systems such as the brain, heart and nervous system are particularly sensitive to these inductions. For example, several authors have reported that the low frequency of the pulses of the GSM system interferes with the brain waves Delta waves causing pathological in wake people (Kramarenko., 2003; Marino et al, 2003). The wave systems have properties such as frequency, which can affect the resonance effect the ability of a living body to absorb the energy of a radiant electromagnetic field (Hyland, 2000). Biological structures can resonate with specific frequencies, if their size approaches the mid-length of the incident wave. Pulsed microwave radiation of low intensity, such as those used in wireless telephony, can exert influence on living organisms, because the wavelengths of cellular telephone systems (12 to 37 cm) fall in the size range of biological structures and thus are capable of eliciting responses.

The absorbed energy may be sufficient to cause subtle conformational changes of the molecular architecture, resulting in biochemical changes by alteration of enzyme activity (Daniells et al., 1998). There are "frequency windows" in which electromagnetic fields can induce biological effects (Adey, 1981). Even some effects can be manifested exclusively at a particular frequency in a range of intensities, or after a certain duration of irradiation (Hyland, 1998).

Living beings are exposed to varying levels of radio frequency electromagnetic fields, according to the distance from the transmitting antennas, the presence of passive relay transmitters capable of reflecting waves (metal structures) or damping, (buildings), the number of station communications and its position relative to the orientation of the antenna (Santini et al., 2000). We must also take into account the technical characteristics of the antenna, power and gain, the height above the ground, the main beam steering transmitter (vertical and horizontal width), the location of the side lobes, the height to which is a living being and the local topography.

There are strict regulations for specific domestic workers performing maintenance work of phone masts, who can not stay more than six minutes in the vicinity of an antenna in operation. In the areas of public use thermal influence of radiation (heating of tissues) by microwaves it can be discarded, but not so with non-thermal effects. Freedom of movement of birds and their habit of perching nearby and even on their own base stations makes them potentially vulnerable to both thermal and non-thermal effects.

Microwaves have the potential to induce adverse health reactions people (Hyland, 2000, 2001;. Santini et al, 2002, 2003a, 2003b;. Navarro et al, 2003) and for the wildlife that lives in the vicinity of the transmitting antennas (Balmori, 2003). Smaller organisms are particularly sensitive therefore its size approaching the resonance frequency to, for the lesser thickness of the skull, which facilitates greater penetration of the radiation into the brain (Santini, 2000; Hyland, 2001; Maisch, 2003 ; Balmori, 2003). It is not yet known with certainty what aspect of electromagnetic radiation is the most important in causing an effect on the health of a living thing in nature, if the average level of daily exposure RADIO WAVES OF MOBILE AND 479 BIRDS Ardeola 51 (2), 2004, 477-490 exposures above a

certain threshold, or simply variations of the fields to which it is subjected (Bardasano & Elorrieta, 2000). For power levels below those recommended in the conference in Salzburg (0.1 µW / cm2) have not yet been reported adverse health effects. Moving away more than 300 meters away from the transmitting antennas diminish or disappear most of the symptoms reported in people (Santini, 2003b). Legal status The European Union in its Recommendation 1999/519 / EC (OJ 1999), adopted reference levels proposed by the International Commission for the Protection of Non-Ionizing Radiation (ICNIRP) (accepted exposure limit for human beings) which they are 450 µW / cm2 for the GSM system (900 MHz) and 900 µW / cm2 for DCS (1800 MHz) (ICNIRP, 1998). The existing rule in Spain (Royal Decree 1066/2001 Ministry Presidency) (BOE, 2001), adopted the criteria of the European Recommendation.

Despite the experimental evidence for the existence of biological responses at lower levels, the restrictions proposed by the ICNIRP (1998) protects only the thermal effects in the short term. For this reason some countries have adopted their own benchmarks, invoking the "precautionary principle". Italy, a decree in 1998 adopted a power limit exposure of 10 µW / cm2 for GSM (900 MHz) as well as Hungary, Bulgaria and Poland. China has a limit of 6.6 µW / cm2. Russia, Switzerland, Luxembourg and Wallonia (Belgium) 2.4 µW / cm2. Salzburg (Austria) 0.1 µW / cm2 and New South Wales (New Zealand) 0.001 µW / cm2 (Santini, 2000; Balmori, 2003).

It is worth mentioning here that at levels of 0.1 pW / cm2 successful communication, suitable for the requirements of system coverage officially gets (Haumann et al., 2002). This means that levels of power density (exposure) 4.5 billion times lower than those currently authorized in Spain, there is sufficient cover for a mobile phone to work.

REVIEW OF THE EFFECTS OF MICROWAVE ON LIVING

For over 30 years, there is growing evidence of the existence of biological effects on living organisms below legal levels (effects at power levels where it has no place heating tissue). In the field of research bioelectromagnetics, experiments are performed on animals or

living tissues undergoing radiation emitted by a mobile phone or other source of microwave radiation for a time, taking note of the possible effects. After the radiation exposure and necropsy analysis of tissues, cells or molecules are performed.

There are studies that have found no observable effects in living organisms, but many studies warn of the danger of this type of radiation, and which can interfere with the nervous system and alter many biological processes (Hyland, 2000, 2001). Studies show how animals exposed suffer a deterioration in their health in the vicinity of transmitting antennas (eg Marks et al., 1995) and some of the non-thermal effects of microwaves on birds have been known for more than 35 years (Tanner, 1966; Tanner et al., 1967).

In invertebrates microwaved it has reported an increased synthesis of so-called "stress proteins" which are generally synthesized when cells are exposed to adverse environmental conditions. This effect of electromagnetic fields has been called non-thermal shock and was obtained by exposing nematodes overnight at radiation levels below the legally authorized in Spain (SAR = 0.001 W / kg) (De Pomerai et al., 2000) and Drosophyla exposure for 10 days to radiation from a mobile phone (SAR = 1.4 W / Kg) (Weisbrot et al., 2003). Therefore the authors suggest that the legal limits of exposure of living beings should be reconsidered.

Other reports find stress protein induction exposing cells for 2 hours at 2450 MHz. (SAR = 25 W / Kg) and 27,480 BALMORI, A. Ardeola 51 (2), 2004, 477-490 MHz. (SAR = 100 W / Kg; Cleary et al, 1997).. Oscillation of the three dimensional conformation of enzymes, subjected to this radiation in living organisms, can affect the rate of biochemical processes. For example, described an increased activity of Ornithine Decarboxylase (Paulraj et al., 1999), after exposing rats to a frequency of 112 MHz, modulated at 16 Hz, with a power of 1 mW / cm2 (SAR = 0.75 W / kg.) for 35 days.

Electromagnetic waves from the radio frequency range can affect intercellular communication and functioning of calcium channels (Dutta et al., 1989) producing, for example, increased flow of calcium in the brain of rats exposed to a frequency of 112 MHz, modulated at 16 Hz with a power of 1 mW / cm2 (SAR = 0.75 W / kg.) for 35 days (Paulraj et al., 1999).

They have also been described interference with immune processes in mice exposed to microwave frequencies in the range of 8,15- 18 GHz with a power density of 1 microW / cm2 (Novoselova & Fesenko, 1998). Damage have been reported on chromosomes and aneuploidy in human lymphocytes exposed to signals from cellular telephones (Mashevich et al., 2003). Some authors have found effects on lymphocytes (Antonopoulos et al., 1997) and in mammalian cells exposed to radiation of frequency 2450 MHz (SAR = 0.7 to 1.9 W / kg.) For 2, 4 and 24 hours (Malyapa et al., 1997). Other studies have found genetic effects of microwaves on hamsters subjected to microwave radiation at a frequency of 7.7 GHz and 0.5 mW / cm2 power, for 15, 30 and 60 minutes (Garaj-Vrhovac et al., 1991).

The significant increase of micronuclei in erythrocytes of cattle grazing near the transmitters has been interpreted as an indication of genotoxic effects of exposure (Balode, 1996). Micronuclei have also been observed and altered mitotic division in workers exposed to microwave (Garaj-Vrhovac, 1999).

There is wide disparity in presenting radio frequencies used in mobile telephony as causal agents of the development of tumors. While some studies have reported an increased risk of brain tumors for mobile phone users (Hardell et al., 2002), other authors found no effects of RF in tumor promotion (Higashikubo et al., 1999). There were changes in cell proliferation as an effect of exposure to the GSM signal at 960 MHz (Velizarov et al., 1999). It has been reported a decrease in the survival of children with leukemia about TV antennas (Hocking & Gordon, 2000), and a significant reduction in the risk of leukemia with increasing distance to television antennas (Hocking et al., 1996) or Radio (Michelozzi et al., 1998). Today researchers opt for the view that electromagnetic fields could act as advocates rather than as initiators of cancer; favoring its development rather than directly inducing (Heredia-Rojas et al., 2003). Recently (June 2001), the committee of experts convened by the International Agency for Research on Cancer included electromagnetic fields of extremely low frequency (the everyday 50-60 Hz) in the Classification of carcinogenic substances in category "possibly carcinogenic to humans" (Group 2B).

The high frequency electromagnetic fields can affect the nervous and endocrine systems. They have observed effects of microwaves emitted by cell phones on the nervous system

(Khudnitskii et al., 1999; Petrides, 2000) and cognitive function (. Kolvisto et al, 2000), as well as sleep (Mann & Roschke, 1996) and brain electrical response (EEG) (Eulitz et al., 1998;. Marino et al, 2003). These waves can cause headaches and other nervous system disorders in humans (Altpeter et al., 1995).

Rabbits were exposed to microwave radiation of frequency 1.5 GHz with a power of 0.3 mW / cm2 showed effects in the hippocampus, but not in the rest of the brain studied (Grigoriev et al., 1995a).

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Microwave radiation frequency of 1.5 GHz, with pulses of 16 m / s in length and 0.3 mW / cm2 power, in sessions of 30 minutes a day for a month, produced maladjustment, anxiety and alarm in rabbits (Grigoriev et al., 1995b). Farm animals exposed to radiation from nearby antennas, showed health problems and conspicuous aberrant behavior, which disappeared away from the antennas (Löscher & Käs, 1998). It has notified an attention deficit disorder with motor function, memory and reaction time in children who lived in the vicinity of a radar station (Kołodyński & Kolodynska, 1996) and has been warned of the potential hazards Radiation can have cell phones in learning in humans (Mann & Roschke, 1996), although other studies have found no effects on learning of rats (Sienkiewicz et al., 2000). The pineal gland responds to exposure to certain electromagnetic fields with a reduced synthesis of melatonin (Olcese, 1990). The reduction in melatonin can alter circadian rhythms and promoting the emergence of depression and tumor processes (Bardasano & Elorrieta, 2000). Some studies reported a decrease in the production of melatonin in people using mobile phones (Burch et al, 1997). While other studies have found no effects on melatonin levels in mammals exposed to radiation used in mobile telephony (Vollrath et al., 1997).

Studies show an increase in blood pressure and heart rate changes in people occupationally exposed to RF (Szmigielski et al., 1998). Although other authors found no effects on the heart rate of people exposed to cell phones while they sleep (Mann et al., 1998). Some studies have concluded that electromagnetic fields emitted by antennas and

mobile phones may favor the permeability of the blood brain barrier and allow the entry of damaging the brain, damaging brain cells of rats substances (Salford et al., 2003). But others find no effect on the physiological barrier (Tsurita et al., 2000). It also noted the possibility of headaches, reported by mobile phone users, may be related to this effect (Frey, 1998).

They have been reported urogenital system effects observed histological changes and reduced development of the tubules in the testes of rats when they were kept in close proximity of mobile phones running (Dasdag et al., 1999). The same authors found no effect in a subsequent study (Dasdag et al., 2003). A Greek study about a group of radio and television antennas (Lean & Xenos, 1997) shows a progressive decrease in the number of births of rodents. Mice exposed to an output of 0.168 μW / cm2 became sterile after five generations, while those exposed to 1,053 μW / cm2 reached sterility after three generations.

Radiation levels in this study surpass Spain currently around phone masts and affect a large land area in both villages, which could affect the reproduction of some wild birds (Balmori, 2003). It has been obtained an increase in cycle speed in nematode larvae exposed to radiation of frequency 750 MHz at a power density of 0.5 W / m2 (De Pomerai et al., 1999). The disease of radio frequencies or "microwave syndrome" is a medical fact, quite unknown, caused by exposure to these waves (Johnson-Liakouris, 1998; Navarro et al., 2003). It covers a set of common symptoms (headache, fatigue, irritability, loss of appetite, sleep disturbances, depression, etc.) that have been reported in epidemiological studies of people living in the vicinity of the phone base stations. His appearance statistically significant increases with decreasing distance to the emitting source (Santini et al., 2001, 2002, 2003a, 2003b) and its severity is directly related to the power density measured at each address (Navarro et al., 2003). These same symptoms have also been reported in mobile phone users (Frey, 482 BALMORI, A. Ardeola 51 (2), 2004, 477-490 1998). In a study commissioned by the Dutch government to assess the impact of the antennas of the third generation mobile (UMTS) health of people (Zwamborn et al., 2003),

significant effects on cognitive functions and welfare found at very low levels (1 V / m) field strength.

1. BA-thesis that, for the degree of Engineering in Communications and Electronics introduced Luz Maria Hernandez. 1995. "Limits maximum human exposure to radiofrequency electromagnetic fields (100 kHz to 300 GHz)". National Polytechnic Institute, Mexico, DF This thesis was developed under the leadership of researchers from the extinct Mexican Institute of Communications, the SCT.

2. "bachelor thesis that, for the title of Electrical Mechanical Engineering from the National Autonomous University of Mexico, presented Lumbreras Castro Aida, 2003, Draft Mexican Official Standard: Cellular telephone and radio personnel services (PCS) - Limits maximum exposure for humans to radiofrequency electromagnetic fields. "Mexico, DF This thesis was developed within the framework of regulatory activities Cofetel, in that office, the Director General, Israel Hurtado Acosta said they were aware that the Secretariat Labor issued the "Mexican Official Standard NOM-013-STPS-1993 concerning safety conditions and health in workplaces where non-ionizing electromagnetic radiation generated". (Secretariat of Labor and Social Welfare Date force: December 7, 1993) In order to protect the environment and health of people, set as maximum 4.6 W / m2 workforce exposure for this prolonged in areas with high radiation and 9.2 W /. m2, the distance between homes and power lines is at least 50 to 100 meters, radiation limits are established, with criteria for measuring through the implementation of studies to determine what is best for the general public. Prevent proliferation in the installation of cell phone antennas up as there are no medical technical requirements for installation, the distance between home and cell phone antennas is at least 50 to 100 meters.

The November 8, 2004, the local Congress of San Luis Potosi asked the Ministry of Health do ad campaigns necessary to prevent the public from the dangers of electromagnetic pollution that could cause the cell phone antennas.

The December 12, 2005, the State Congress of Baja California Sur send a statement to the Chamber of Deputies, which expresses concern about electromagnetic pollution.

Other countries have established distances and limit human exposure to non-ionizing radiation; Toronto 200 meters in Belgium is 300 meters and in Australia is 500 meters.

In this regard, it stresses the pronouncements of other legislatures, such as Queretaro, San Luis Potosi and Tlaxcala, who have taken up the issue of cell phone antennas, with the Congress of Queretaro which issued an agreement requesting the Congress and the legislatures of the states that federal, state and municipal authorities, establish precautionary principles and reform in the area of competence, legislation on the installation of cell phone antennas, based on the necessary studies on the effects caused by installation in public health and ecosystems.

In Baja California Sur requested information to the Secretariat of Communications and Transportation on the legality of the placement of the antennas, which are located within the urban area.

Congress of the State, found that this type of cell phone antennas emit a vibration due to the intensity and frequency of energy, producing electrical charges as charged atoms or molecules, cell membranes and, in general, heating the human body, causing skin penetration equal to one gigahertz (guigajertz).

The Congress of Baja California Sur, cited the study by the Department of Physics at the University of Warwick, UK, as a result of his research in that country, which apparently is the most serious study has been done. He claims that the damage to health of electromagnetic radiation result in:

NERVOUS SYSTEM DAMAGE: Insomnia, anxiety, depression, attention disorders, concentration, and speed, memory disorders, headaches, irritability, prestesias, espasmofilias, deregulation of circadian rhythms by modifying the secretion nocturnal melatonin.

VASCULAR SYSTEM DAMAGE: High blood pressure, increased blood viscosity with all its consequences, heart rhythm disturbances.

IMMUNE SYSTEM DAMAGE: Alterations to the viability of lymphocytes, abnormal secretions of different immunoglobulins, decreased secretion of ACTH and corticosteroids (the result is a decreased resistance to infections and increased fatigue and allergies).

VISUAL SYSTEM DAMAGE: Red eyes with tears stinging, dryness and blurry vision, modification of convergence that results in a modification of postural tone, interference with certain treatments of glaucoma.

HARM OSTEOARTICULAR: Adaptation of different electromagnetic captors that results in a modification of the body in space with aches that become chronic (disappear when more than four or five days of rest), pain, cramps, ramps, strained joints.

HARM skin: dry, scaly skin, itching, hives, increased sensitivity to cold.

DAMAGE TO HEALTH: Increased abortions, DNA damage, changes in the electrical activity of the brain, changes in blood pressure, decreased levels of melatonin, depression, insomnia, headaches, chronic fatigue syndrome, disorders system immune, cancer, brain tumors, childhood leukemia, headaches, abnormal behavior, anxiety, Alzheimer's disease, congenital malformations, reduced vision (cataract).

Problematic

The record makes clear that the electromagnetic energy is pernicious because escapes the senses; not seen, not touched, not feeling, just published its effects, so if the subject is unknown no symptoms with exposure to said energy associated

It is believed that strong electromagnetic fields around 50 or 60 hertz, and associated electromagnetic radiation can be harmful to living things. A long-term exposure can result in a weakened immune system, interacting with sense of loss of energy or fatigue, and eventually a deterioration in work performance, sleep disorders and emotional instability. An increasing number of hypersensitive to electromagnetic radiation people there, and many can feel the electricity passes through your body coming to experience symptoms such as tingling in the fingers, depression, difficulty in memorizing and even seizures. On the other hand, chronic high levels of electromagnetic radiation exposure, especially when you are asleep, can lead to chronic stress.

SYMPTOMS AND POSSIBLE CONSEQUENCES:

Effects on pregnancy
waterfalls
Insomnia
Fatigue
Behavioral changes
Irritability
Depression
Cancer

In Scandinavia, where young people use cell since 1994, girls aged 15 to 24 increased consumption of sleeping pills and antidepressants and were believed to be by the stress generated by the use of cell phones.

Justification

Conducting research is justified by the great benefits this would bring to users and society, knowing the damage that radiation from cellular cause to health, especially to children and youth. So take precautionary measures.

Request research

The need for this research comes from the uncertainty of the user and society, how true it is that radiation from cell are factor of the presence of symptoms and discomfort while can strongly affect health, especially in children and youth.

Problem Statement

Today, the general population is now involved in electromagnetic radiation whose origins are diverse sources such as transmitting antennas and cell receptors, which are possibly causing health disorders and manifesting through certain symptoms. The problem is very serious not only in our country but around the world; therefore, various international organizations have spoken out against this type of pollution, such is the interest that institutions and international organizations to take action on the matter. For example, a

project called EMF promoted by the World Health Organization, in which participating countries around the world and through which are intended to combine efforts in order to achieve an adequate knowledge on the effects of electromagnetic pollution.

DISCUSSION

Implementation and results of the survey

The implementation of the survey was 22 FEBRUARY 2012, in groups of third and fourth semester Baja California campus of the College of Bachelors of Baja California. The number of respondents per year was 20 young people according to the stratified sample, giving a total sample 200 youth.

SAMPLE CALCULATION:

CALCULATING THE SAMPLE SIZE FOR EACH YEAR TO USE THE CELL

Sample of users (n)
For many users, the sample with the following equation was calculated probability.

n = No / 1+ No / N
Where:
N = Population cellular user; Campus, Baja Califonia COBACH = 400
n º➔ provisional sample

Calculation of the provisional sample (n).
Equation: No = S2 / V2
Where:
S2 ➔ sample variance = p (1-p)
P ➔ chance proposal = 90%
Substituting:
S = p (1-p) = 0.9 (1-.9) = 0.09
Proposed standard error no greater than 0.015
V2➔ population variance: v2 = (0.015)2 = 0.000225

Substituting in equation: n º = S2/V2
n º = 0.09/0.000225
Result
n º = 400
Substituting in the initial equation:

n = n º / 1+ (n º / N)

n = 400/1+(400/400)=200
n = 200.00 ➔ probability sample size of the user population Baja California campus COBACH.

Stratified probabilistic sample (MPE)

Calculation of Stratified random sample (MPE) for each year of using the cell over a period of 10 years

The type of sample chosen was, stratified probability sample (MPE), due to the need to study for years the apparitions of symptoms in every young user Baja California campus.
A period of ten years based on the information that appears about possible cancer at age 20, therefore, it was considered that before any symptoms appear should be taken.

Stratified probability sample; n = 200 users

Calculating the multiplication factor (f), ie; the number with which affect the user population by years of cell phone use, reaching the stratified sample.

Equation: f = n / N
Substituting:
f = 200/400
Result
f = 0.5

Based on this factor from the table, the sample size of users per year of cell phone use is described.

Table 1. stratified probability sample of young users for years.

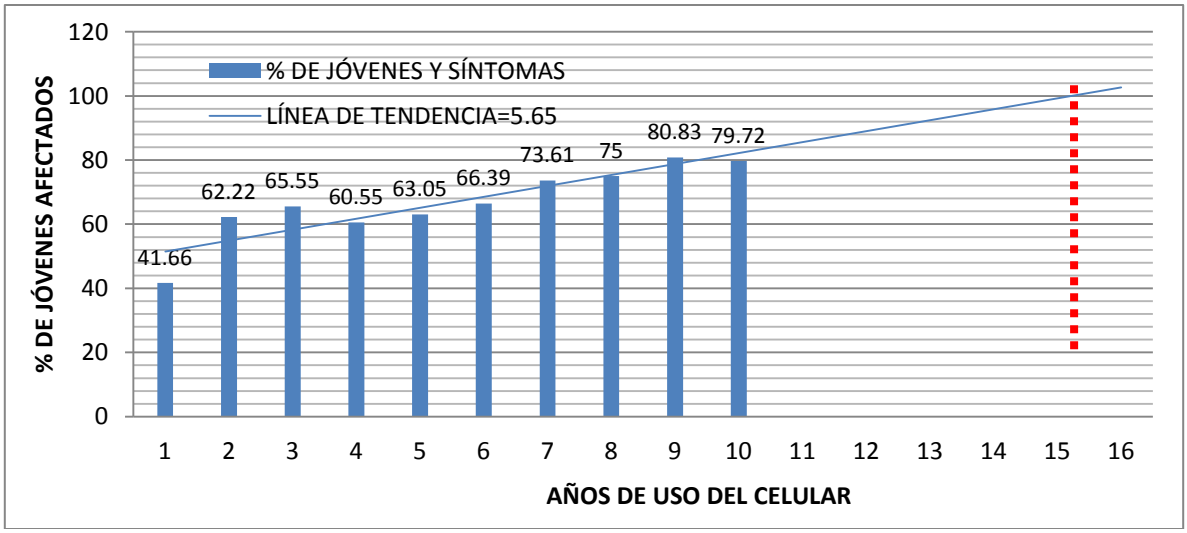
AÑO	No de Usuarios	Factor (f)	MPE (No de usuarios)*(f)
1	40	0.5	20
2	40	0.5	20
3	40	0.5	20
4	40	0.5	20
5	40	0.5	20
6	40	0.5	20
7	40	0.5	20
8	40	0.5	20
9	40	0.5	20
10	40	0.5	20
	SUMA = 400		SUMA = 200

Results obtained

SÍNTOMA	*1 AÑO*	*2 AÑOS*	*3 AÑOS*	*4 AÑOS*	*5 AÑOS*	*6 AÑOS*	*7 AÑOS*	*8 AÑOS*	*9 AÑOS*	*10 AÑOS*
DOLORES DE CABEZA	*10*	*16*	*16*	*20*	*15*	*18*	*20*	*20*	*20*	*18*
NERVIOSISMO	*10*	*12*	*16*	*17*	*15*	*9*	*20*	*20*	*20*	*14*
PROBLEMAS PARA CONCILIAR EL SUEÑO	*10*	*16*	*20*	*16*	*18*	*16*	*13*	*12*	*12*	*16*
VÉRTIGO	*0*	*4*	*7*	*3*	*10*	*9*	*7*	*10*	*10*	*14*
NÁUSEAS	*0*	*8*	*7*	*3*	*7*	*7*	*13*	*10*	*12*	*11*
FATIGA O DEBILIDAD	*10*	*16*	*13*	*16*	*12*	*13*	*20*	*20*	*20*	*19*
PÉRDIDA MOMENTÁNEA DE MEMORIA	*10*	*12*	*16*	*16*	*10*	*11*	*13*	*15*	*18*	*18*
FALTA DE CONCENTRACIÓN	*10*	*16*	*18*	*17*	*20*	*20*	*20*	*20*	*20*	*18*
DEPRESIÓN	*0*	*4*	*9*	*16*	*15*	*11*	*13*	*12*	*13*	*11*
MALESTAR EN EL PECHO	*10*	*8*	*13*	*7*	*5*	*9*	*20*	*16*	*16*	*12*
ZUMBIDOEN EL OÍDO	*10*	*16*	*13*	*7*	*15*	*9*	*20*	*20*	*20*	*18*
INFECCIONES RESPIRATORIAS	*10*	*8*	*13*	*7*	*8*	*9*	*7*	*10*	*10*	*11*
CANSANCIO	*10*	*20*	*18*	*17*	*13*	*18*	*13*	*15*	*17*	*19*
IRRITABILIDAD	*10*	*16*	*13*	*7*	*13*	*18*	*20*	*20*	*20*	*19*
DESESPERACIÓN O ANSIEDAD	*10*	*16*	*13*	*10*	*18*	*20*	*13*	*14*	*18*	*18*
ENROJECIMIENTO DE OJOS	*10*	*12*	*11*	*16*	*12*	*13*	*13*	*13*	*15*	*18*
LAGRIMEO DE OJOS	*10*	*12*	*9*	*16*	*13*	*18*	*13*	*12*	*14*	*17*
VISTA BORROSA MOMENTÁNEA	*10*	*12*	*11*	*7*	*8*	*11*	*7*	*11*	*16*	*16*
Suma total columnas	*150*	*224*	*236*	*218*	*227*	*239*	*265*	*270*	*291*	*287*

(20 youths per year) (18 symptoms) = 360 young-symptoms
SOME symptoms appear less than others, probably because some young people are more resistant to certain symptoms.
BASED ON THE TABLE, THE% OF YOUNG AFFECTED BY YEAR
A year of cell phone use: (150/360) (100) = 41.66%
Two years of cell phone use: (224/360) (100) = 62.22%
Three years of cell phone use: (236/360) (100) = 65.55%
Four years of cell phone use: (218/360) (100) = 60.55%
Five years of cell phone use: (227/360) (100) = 63.05%
Six years of cell phone use: (239/360) (100) = 66.39%
Seven years of cell phone use: (265/360) (100) = 73.61%
Eight years of cell phone use: (270/360) (100) = 75.00%
Nine years of cell phone use: (291/360) (100) = 80.83%
Ten years of cell phone use: (287/360) (100) = 79.72%

GRAPHICS:% OF YOUNG - YEARS OF USE OF CELL



The graph shows that the percentage of young people affected and their symptoms is increasing, with a trend of 5.65% per year, which can be predicted (red dotted line) that after 15 years of using the phone, 100 % of young people presented all the symptoms.

But the most important outcome is the effect of the first symptoms were young, and by the time elapsed 15 years, these symptoms will likely be chronic and cause more acute illnesses appear leading to cancer. This confirms what was said by the experts of the topic of cell irradiation cause cancer on users. Mexican neuroscientist Nora Volkow, director of the Institute for Drug Abuse in the United States, said the latency of brain cancer is about 20 years, so a 10-year study can not provide reliable answers because it is not a time sufficient for the development of cancer. However, the body can send signals that something is wrong through certain symptoms.

CONCLUSION

Based on the trend line in the chart, it is concluded that frequent prolonged cell, use and brings the user to the presence of the following symptoms:

HEADACHES

NERVOUSNESS

Not sleep

VERTIGO

NAUSEA

Fatigue or weakness

TEMPORARY MEMORY LOSS

LACK OF CONCENTRATION

DEPRESSION

Chest discomfort

Ringing in the ear

RESPIRATORY INFECTIONS

FATIGUE

IRRITABILITY

DESPAIR OR ANXIETY

Red eyes

Watery eyes

TEMPORARY BLURRED VIEW

That is, that while older cell is used, more are the symptoms and their intensity. Therefore, the likelihood that these symptoms become serious is high, according to the trend of the results showing the graph. Therefore, take preventive measures against cancer. In short, the results of the graph give reason to subject matter experts, ie; the systematic increase in the intensity of symptoms, is a sign of how dangerous it can be cell to the user, specifically, whether they are children and youth. Therefore, the intensive use of cell factor is that these symptoms they grow up to what scientists have commented that radiation from cellular CAUSE CANCER AFTER 20 OR MORE YEARS OF USE.

Reflection

As shown in the graph, the symptoms have an upward trend from the first to the tenth year, which gives an idea of how dangerous it could be with the passage of time as they may have synergistic effect. Therefore; if the result of research provided information on the presence of symptoms, may signal that the cancer threat to the user.

Therefore, it is very important that users and the relevant authorities aware of this situation to take preventive measures. Do not allow advance, as with smoking.

While studies are inconclusive to prove the damage of cancer, there is no alternative but to try to inform and convince the user to take preventive measures, for which you can use examples of similar phenomena and justify the effects of cell in the bless you. One of these analogous examples may be: cell radiation is like a drop of water falling on the stone constantly and eventually arrives at the break. The explanation is as follows: The water breaks the stone not by force but by persistence. Similarly you can apply to radiation from cell: radiation cause negative effects on the user and reach the brain through the ear, not by power but by his great insistence, from constant calls.

We do not see gravity, but we know it exists because of its effect, exactly the same can be said of the microwave cell, but we could not know of its existence by the symptoms presented by the user with the passage of time. Should not experience, but not prevent regret.

The companies accept such harmful effects, but parallel devices sold in order to protect the user from radiation entering through the ear and reach the brain cells called neurons.

Based on the analysis of the results of the graph, we must be alert. As in years was increasing cell phone use, symptoms began to appear gradually to cover the user in a hundred percent; and most disturbing is that their presence is increasing.

It is likely that over time irreversible damage will occur in the user, caused by radiation from the cell phone use; finally, the cell itself cause counterproductive effects on human body functions, specifically on the side of the head where the phone was usually placed.

These symptoms corroborate the results obtained by Swedish researchers in 2008, published by The International Journal of Oncology; Swedish researchers found significant associations between prolonged cell phone use and risk of brain tumors. Reads:

"We found that the use of cell phones is linked to gliomas [malignant brain tumors] and acoustic neuromas [benign tumors of the auditory nerve to the brain], and these are being manifested after only ten years," says lead author Lennart Hardell, an oncologist and cancer epidemiologist at the University Hospital of Örebro, Sweden. Specifically, studies that included at least 10 years of exposure, the risk of gliomas for ipsilateral exposures (same side) but not contralateral (opposite side) of the head doubled (relative to the hand the subject commonly used to hold your cell phone). 2.4 times increased risk of acoustic neuromas due to ipsilateral exposure was observed, while there was no increased risk of meningiomas (tumors that occur in the membranes covering the brain and spinal cord)¨.

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In his article "Strong Signal to the effects of cell phones": *

Since there are 3 billion mobile phone users worldwide, and more than 260 million only in the United States among them 46% of US children 8-12 years of age, according to figures from Nielsen Mobile published on 10 September 2008, human exposure to low energy radiation in the range of 800 to 2000 megahertz is at all times to its maximum. The most recent attempt to systematically study the epidemiological evidence of increased risk of brain tumors associated with mobile phone use indicates that the impact of this global experiment are coming to light.

The widespread use of mobile phones data about a decade ago, however, brain tumors induced by radiation usually takes about 10-15 years to develop, according to the American Cancer Society.

The team of researchers Hardell several of the studies included in the meta-analysis should be. In the October 2006 issue of the World Journal of Surgical Oncology,

researchers reported a 70% increase in the risk of astrocytomas (highly aggressive brain tumors) Grade III-IV users of analog cell phones.

There is emerging evidence that suggests that children may be more vulnerable to potential carcinogenic effects of cell phones and other microwave radio technologies. "They have raised concerns about the potential of children to radiofrequency fields (RF) vulnerable because their developing nervous systems are potentially more susceptible," says Leeka Kheifets, professor of epidemiology at the University of California, Los Angeles and formerly director of the research program on the EMF Research Institute of Electric Power. "In addition, their brain tissue is more conductive, RF penetration is greater relative to the size of the head and along his life will have a longer exposure (although the degree of risk for any carcinogen is mainly determined Based on the exact time and the precise magnitude of exposure)."

The importance of having a thinner skull and the difference in dielectric properties is confirmed by a study published in the issue of Physics in Medicine and Biology of June 7, 2008, which shows that a child's brain absorbs up RF double adult brain. Children today experience a longer period of exposure because they start to use cell phones at a younger age, according to Hardell; This could be important, because cumulative dose seems to exert a strong influence on the increased risk of brain tumors. However, Kheifets adds that "missing data on the effects of exposure on brain tumors in children [and] it is also necessary to consider other health effects."

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