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Electromagnetic hypersensitivity

The latest accepted revision was accepted on *7 January 2019*. There are template/file changes awaiting review.

Electromagnetic hypersensitivity	
Idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF), Electrohypersensitivity, Electro-sensitivity, Electrical sensitivity (ES), Wi-Fi allergy	
Pseudomedical diagnosis	
Risks	Nocebo

Fluoroscopy burn: Injuries to back and arm from multiple prolonged electrophysiological and ablation procedures with bi-plane fluoroscopy. Wounds on back healed into scarred areas while injury on arm required grafting.

Electromagnetic hypersensitivity (**EHS**) is a claimed sensitivity to electromagnetic fields, to which negative symptoms are attributed. However, despite there being thousands of published scientific papers [1] on the study of adverse effects being caused to humans from exposure to EMF and RF radiation it's still considered to have no scientific basis and is not a recognised medical diagnosis. Claims are characterized by many a wide range of symptoms, these include:

- Alteration of heart rhythm[2]
- Altered gene expression[3]
- Altered metabolism[4]
- Altered stem cell development[5]
- Cancers[6]
- Cardiovascular disease[7]
- Cognitive impairment[8]
- DNA damage[9]
- Impacts on general well-being
- Increased free radicals[10]
- Learning and memory deficits[11]
- Impaired sperm function and quality[12]
- Miscarriage[13]
- Neurological damage[14]
- Obesity and diabetes[15]
- Oxidative stress[16]

Those who are self-described with EHS report adverse reactions to electromagnetic fields at intensities well below the maximum levels permitted by international radiation safety standards. However, on March 28, 2018, following the

most extensive and expensive carcinogenesis studies of cell-phone radio-frequency (RF) radiation in mice and rats ever carried out, a thorough review of the draft NTP reports, pathologists and toxicologists on the peer-review panel concluded, that there is statistically significant and "clear evidence" that both GSM- and CDMA-modulated RF radiation had led to the development of malignant schwannoma, a rare form of tumour in the heart of male rats and there was "equivocal evidence" for the same schwannoma risk among female rats. The panel also noted that there were unusual patterns of cardiomyopathy, or damage to heart tissue, in both RF-exposed male and female rats compared with concurrent control animals. In addition, based on statistical significance the panel concluded that the pathology findings showed indications of "some evidence" for RF-dependent carcinogenic activity in the brain of male rats, specifically Glioma.[17]

Many people have come forward giving their testimonies regarding ill health or microwave sickness due to the installation of cell towers, smart meters or even the purchase of a new smart phone.[18]

In 2008, The Wall Street Journal wrote an article claiming that the death rate among cell tower workers was 183.6 per 100,000, making it the most dangerous job in America. It was only this year in particular that the death rate in this job was that high, however it's something to be noted.[19]

As of 2005 the WHO recommended that people presenting with claims of EHS be evaluated to determine if they have a medical condition that may be causing the symptoms the person is attributing to EHS, that they have a psychological evaluation, and that the person's environment be evaluated for issues like air or noise pollution that may be causing problems.[20] Cognitive behavioral therapy may be helpful in managing the condition.[21]

Reduction in exposure to EMF inside the home, using wired internet and wired telephones can help reduce symptoms, as advised in the book Electrical Hypersensitivity, a Modern Illness written by Alasdair and Jean Philips.[22]

Some people who feel they are sensitive to electromagnetic fields may seek to reduce their exposure or use alternative medicine.[23] Government agencies have enforced false advertising claims against companies selling devices to shield against EM radiation.[24][25]

Contents

Signs and symptoms

There is a wide range of symptoms which vary from person to person due to the differences in a persons biological make up and sensitivity to microwave radiation as well as their location and environment contributing to an enormous range of variables including different sources of electromagnetic fields such as cellular phones, mobile base stations, mobile phone jammers, laptop computers, radars, dentistry cavitrons, magnetic resonance imaging, and Helmholtz coils.[26] In general, women tend to suffer with this condition more and the symptoms include, but are not limited to:

- Alteration of heart rhythm[2]
- Altered gene expression[3]
- Altered metabolism[4]
- Altered stem cell development[5]
- Cancers[6]
- Cardiovascular disease[7]
- Cognitive impairment[8]
- DNA damage[9]
- Impacts on general well-being
- Increased free radicals[10]
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- Miscarriage[13]
- Neurological damage[14]
- Obesity and diabetes[15]
- Oxidative stress[16]

More worryingly is how the immune system is affected. In an evaluation of the effects to antibacterial susceptibility it has now shown that exposure to RF-EMFs within a narrow level of irradiation (an exposure window) makes microorganisms resistant to antibiotics. This adaptive phenomenon and its potential threats to human health should be further investigated in future experiments. Altogether, the findings of this study showed that exposure to Wi-Fi and RF simulator radiation can significantly alter the inhibition zone diameters and growth rate for *L monocytogenes* and *E coli*. These findings may have implications for the management of serious infectious diseases.[26]

The prevalence of some reported symptoms is geographically or culturally dependent and does not imply "a causal relationship between symptoms and attributed exposure".[27][28] Many such reported symptoms overlap with other syndromes known as symptom-based conditions, functional somatic syndromes, and IEI (idiopathic environmental intolerance).[27]

Those reporting electromagnetic hypersensitivity will usually describe different levels of susceptibility to electric fields, magnetic fields, and various frequencies of electromagnetic waves. Devices implicated include fluorescent and low-energy lights, mobile, cordless/portable phones, and Wi-Fi.[29] A 2001 survey found that people self-diagnosing as EHS related their symptoms most frequently to mobile phone base stations (74%), followed by mobile phones (36%), cordless phones (29%), and power lines (27%).[23] Surveys of electromagnetic hypersensitivity sufferers have not been able to find any consistent pattern to these symptoms.[23][29][30]

Causes

Safety limits for RF exposure have been based (until recently) on the thermal effects of EMFs. But these standards do not protect people, particularly children, from the deleterious health effects of non-thermal EMFs (Nazıroğlu et al., 2013; Mahmoudabadi et al., 2015). Each of these diseases is associated with decrements in health and quality of life. Brain cancer patients often die is spite of some improvement in treatment, while EHS patients present with increased levels of distress, inability to work, and progressive social withdrawal. [31] [32]

Exposure to low frequency and radio frequency electromagnetic fields at low intensities poses a significant health hazard that has not been adequately addressed by national and international organizations such as the World Health Organization. There is strong evidence that excessive exposure to mobile phone-frequencies over long periods of time increases the risk of brain cancer both in humans and animals. The mechanism(s) responsible include induction of reactive oxygen species, gene expression alteration and DNA damage through both epigenetic and genetic processes. In vivo and in vitro studies demonstrate adverse effects on male and female reproduction, almost certainly due to

generation of reactive oxygen species. There is increasing evidence, the exposures can result in neurobehavioral decrements and that some individuals develop a syndrome of "electro-hypersensitivity" or "microwave illness", which is one of several syndromes commonly categorized as "idiopathic environmental intolerance". While the symptoms are non-specific, new biochemical indicators and imaging techniques allow diagnosis that excludes the symptoms as being only psychosomatic. Unfortunately, standards set by most national and international bodies are not protective of human health. This is a particular concern in children, given the rapid expansion of use of wireless technologies, the greater susceptibility of the developing nervous system, the hyper conductivity of their brain tissue, the greater penetration of radio frequency radiation relative to head size and their potential for a longer lifetime exposure. [31] [32]

The incidence of brain cancer in children and adolescents has increased between 2000 and 2010 (Ostrom et al., 2015). Gliomas are increasing in the Netherlands (Ho et al., 2014), glioblastomas are increasing in Australia (Dobes et al., 2011) and England (Philips et al., 2018) and all brain cancers are increasing in Spain (Etxeberrua et al., 2015) and Sweden (Hardell and Carlberg, 2017). The latency period between initial exposure and clinical occurrence of brain cancer is not known but is estimated to be long. While not all reports of brain cancer rates show an increase, some do. The continually increasing exposure to EMFs from all sources may contribute to these increases. The prevalence of EHS is unknown, but various reports suggest that it is between 1 and 10% of the population (Hallberg and Oberfeld, 2006; Huang et al., 2018). Male fertility has been declining (Geoffroy-Siraudin et al., 2012; Levine et al., 2017). EMFs increase the risk of each of these diseases and others. Alzheimer's disease is increasing in many countries worldwide and its association with ELF-EMF occupational exposure has been clearly demonstrated through several independent epidemiological studies (Davanipour and Sobel, 2009; Sobel et al., 1996; Qiu et al., 2004) and a meta-analysis of these studies (García et al., 2008). A recent meta-analysis (Huss et al., 2018) has reported an increased risk of amyotrophic lateral sclerosis in workers occupationally exposure to ELF-EMFs. [32] [31]

Most blinded conscious provocation studies have failed to show a correlation between exposure and symptoms, leading to the suggestion that psychological mechanisms play a role in causing or exacerbating EHS symptoms. In 2010, Rubin et al. published a follow-up to their 2005 review, bringing the totals to 46 double-blind experiments and 1175 individuals with self-diagnosed hypersensitivity.[33][34] Both reviews found no robust evidence to support the hypothesis that electromagnetic exposure causes EHS, as have other studies.[35][36] They also concluded that the studies supported the role of the nocebo effect in triggering acute symptoms in those with EHS.[37]

A statement signed by more than twenty doctors and scientists at the Brussels International Scientific Declaration on Electromagnetic Hypersensitivity and Multiple Chemical Sensitivity says "In view of our present scientific knowledge, we thereby stress all national and international bodies and institutions, more particularly the World Health Organization (WHO), to recognize EHS and MCS as true medical conditions which acting as sentinel diseases may create a major public health concern in years to come worldwide i.e. in all the countries implementing unrestricted use of electromagnetic field-based wireless technologies and marketed chemical substances" [38]

The Peoples Initiative Foundation has announced the conclusion of a pilot study they organized, headed up by Dr. Gunnar Heuser, showing EHS on an fMRI. This study was originally published by Degruyter in July of 2017, but was absent pictures of the controls. The company waited until the pictures were placed in the study to issue this press release, as the visual difference between the cases and controls is quite dramatic. EHS or "electrohypersensitivity" in civilian terms, "microwave radiation poisoning" in military terms, is an RF (radio frequency) or microwave radiation induced illness who's very existence is hotly debated by government and wireless industry scientists and personnel. This study provides evidence that abnormalities exist in the EHS brain that are not present in the non EHS brain and could put an end to the debate on the existence of EHS. It also defies the widely held governmental and wireless industry stance that wireless devices and infrastructure have no consequences to human health and could impact the prevailing opinion of wireless radiation being deemed safe. [39] [40] [41]

See also

Diagnosis

Electromagnetic hypersensitivity is not an accepted diagnosis; medically there is no case definition or clinical practice guideline and there is no specific test to identify it, nor is there an agreed-upon definition with which to conduct clinical research.[42]

Complaints of electromagnetic hypersensitivity may mask organic or psychiatric illness. Diagnosis of those underlying conditions involves investigating and identifying possible known medical causes of any symptoms observed.[20] It may require both a thorough medical evaluation to identify and treat any specific conditions that may be responsible for the symptoms, and a psychological evaluation to identify alternative psychiatric/psychological conditions that may be responsible or contribute to the symptoms.[20][43]

Symptoms may also be brought on by imagining that exposure is causing harm, an example of the nocebo effect. Studies have shown that reports of symptoms are more closely associated with belief that one is being exposed than with any actual exposure.[35][36][44][45]

Management

No matter what the cause of EHS, there is no doubt that it can be a debilitating condition that benefits from treatment or management.[21] Cognitive behavioral therapy has shown some success helping people cope with the condition.[21]

As of 2005, WHO recommended that people presenting with claims of EHS be evaluated to determine if they have a medical condition that may be causing the symptoms the person is attributing to EHS, that they have a psychological evaluation, and that the person's environment be evaluated for issues like air or noise pollution that may be causing problems.[20]

Prevalence

As of 2018 the number of cases of EHS was in decline, defying previous expectations of a rise as electronic devices became more widespread.[46] People seemed to be turning their attention to other environmental concerns, such as air pollution.[46] Overall women identifed as being electromagnetically hypersensitive more than men.[46]

In 2007, a UK survey aimed at a randomly selected group of 20,000 people found a prevalence of 4% for symptoms self-attributed to electromagnetic exposure.[47]

In 1997 A group of scientists attempted to estimate the number of people reporting "subjective symptoms" from electromagnetic fields for the European Commission.[48] In the words of a HPA review, they concluded that "the differences in prevalence were at least partly due to the differences in available information and media attention around electromagnetic hypersensitivity that exist in different countries. Similar views have been expressed by other commentators."[27]

Society and culture

In 2010, a cell tower operator in South Africa revealed at a public meeting that the tower that nearby residents were blaming for their current EHS symptoms had been turned off over six weeks prior to the meeting, thus making it a highly unlikely cause of EHS symptoms.[49][50]

In February 2014, the UK Advertising Standards Authority found that claims of harm from electromagnetic radiation, made in a product advertisement, were unsubstantiated and misleading.[25]

People have filed lawsuits to try to win damages due to harm claimed from electromagnetic radiation. In 2012, a New Mexico judge dismissed a lawsuit in which one person sued his neighbor, claiming to have been harmed by EM radiation from his neighbor's cordless telephones, dimmer switches, chargers, Wi-Fi and other devices. The plaintiff brought the testimony of his doctor, who also believed she had EHS, and a person who represented himself as a neurotoxicologist; the judge found none of their testimony credible.[51] In 2015, parents of a boy at a school in Southborough, Massachusetts alleged that the school's Wi-Fi was making the boy sick.[51][52]

In November 2015, a depressed teenage girl in England committed suicide. Her suicide was attributed to EHS by her parents and taken up by tabloids and EHS advocates.[53]

Some people who feel they are sensitive to electromagnetic fields self-treat by trying to reduce their exposure to electromagnetic sources by avoiding sources of exposure, disconnecting or removing electrical devices, shielding or screening of self or residence, and alternative medicine.[23] In Sweden, some municipalities provide disability grants to people who claim to have EHS in order to have abatement work done in their homes even though the public health authority does not recognize EHS as an actual medical condition; towns in Halland do not provide such funds and this decision was challenged and upheld in court.[54][55][56]

The United States National Radio Quiet Zone is an area where wireless signals are restricted for scientific research purposes, and some people who believe they have EHS have relocated there seeking relief.[57][58][59]

Gro Harlem Brundtland, former prime minister of Norway and Director general of the World Health Organization, claims to suffer from EHS.[60] In 2015 she said that she had been sensitive for 25 years.[61]

In the fictional television crime drama *Better Call Saul*, the character Charles "Chuck" McGill is depicted as experiencing the symptoms of EHS. In the episode *Alpine Shepherd Boy*, a skeptical doctor surreptitiously operates a switch controlling the electronics in Chuck's hospital bed. This does not affect his symptoms, suggesting that his electromagnetic hypersensitivity is not genuine.[62] A similar instance of Chuck's symptoms being objectively psychosomatic is seen on the episode *Chicanery*.[63] Although a fully charged cellphone battery is planted on his person without his knowledge,[64] Chuck experiences no adverse effects by having an electronic device on his body for close to two hours. When this fact is revealed to him, he is profoundly shaken, and comes to see "beyond a shadow of a doubt"[65] that his symptoms are an indication of mental disease spurred on by past emotional trauma,[66] rather than EHS.

There is an international appeal to stop 5G on Earth and in Space due to the harmful effects EMF and RF radiation has on people, animals and plants, so far there are more than 26 thousand signatures many of which are scientists [67], medical doctors [68] and many more highly educated and qualified professionals in their field [69]

PHIRE (http://phiremedical.org/), founded by Dr. Erica Mallery-Blythe (http://phiremedical.org/members/), which stands for Physicians' Health Initiative for Radiation and Environment is an independent association of medical doctors and associated specialists assembled for the purposes of improving education regarding health effects of non-ionising radiation. This organisation are giving many talks and conferences regarding EMF exposure and EHS saying those with Electromagnetic Hypersensitivity (EHS) are another vulnerable group, and some children also have EHS making them additionally at risk. EHS is a multi systemic physical condition hallmarked by classical symptom constellations (such as headaches, insomnia, mood disturbance, palpitations etc), in response to anthropocentric (man made), electromagnetic fields of various types.The condition has been documented in various forms since the birth of the use of electromagnetic fields by man, back in the early 1900s. Increased exposures associated with rapidly evolving emitting technologies, are leading to an ever-growing number of complaints from those who have identified electromagnetic fields as the source of their problems and also increases in reports of the cardinal symptoms in the general population, who may not realise that EMR may be the cause of their complaints.[70]

- Arthur Firstenberg
- Bioelectromagnetics
- Electromagnetic radiation and health

- List of questionable diseases
- Wireless electronic devices and health
- Environmental Health Trust (https://ehtrust.org/)
- A 36 Year old Warning (https://www.emfanalysis.com/wp-content/uploads/2014/11/Overloading-Towns-and-Cities-with-Cellular-Transmitters.pdf)

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External links

- Radiofrequency Electromagnetic Energy and Health:Research Needs (https://www.arpansa.gov.au/research-and-expertise/technical-reports/radiofrequency-electromagnetic-energy-and-health-research) from the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)