



Review

Electromagnetic hypersensitivity: Fact or fiction? ☆

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ABSTRACT

As the prevalence of wireless telecommunication escalates throughout the world, health professionals are faced with the challenge of patients who report symptoms they claim are connected with exposure to some frequencies of electromagnetic radiation (EMR). Some scientists and clinicians acknowledge the phenomenon of hypersensitivity to EMR resulting from common exposures such as wireless systems and electrical devices in the home or workplace; others suggest that electromagnetic hypersensitivity (EHS) is psychosomatic or fictitious. Various organizations including the World Health Organization as well as some nation states are carefully exploring this clinical phenomenon in order to better explain the rising prevalence of non-specific, multi-system, often debilitating symptoms associated with non-ionizing EMR exposure. As well as an assortment of physiological complaints, patients diagnosed with EHS also report profound social and personal challenges, impairing their ability to function normally in society. This paper offers a review of the sparse literature on this perplexing condition and a discussion of the controversy surrounding the legitimacy of the EHS diagnosis. Recommendations are provided to assist health professionals in caring for individuals complaining of EHS.

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Not everything that is faced can be changed. But nothing can be changed until it is faced.

James Baldwin

1. Introduction

In the early years of the 21st century, there are increasing reports throughout the world of individuals and clusters of people complaining of various clinical symptoms in response to minimal exposure to everyday levels of electromagnetic radiation (EMR). Some individuals experience difficulty around wireless systems, when using cordless or cell phones, when exposed to some types of artificial light, or in response to various other common electromagnetic exposures. Once exposed, such vulnerable individuals often develop a variety of symptoms involving various organ systems. Although originally thought to be psychogenic in origin, such symptoms are being reported by ever-increasing numbers of previously healthy individuals (Hallberg and Oberfeld, 2006) – a phenomenon which has generated a closer assessment of the origins of electromagnetic hypersensitivity (EHS) complaints.

In this paper, a review of the emerging literature related to the perplexing EHS condition will be presented along with a case history detailing the development of EHS and subsequent recovery in an otherwise healthy individual. Consideration of physical, psychological and social aspects of this disorder will be presented. As well as an exploration of the polarizing debate that surrounds the EHS issue, recommendations are provided as to how clinicians might empower patients with EHS to regain their health and improve their wellbeing.

2. Background

The surge of wireless telecommunication throughout the world is provoking many people to question whether various EMR frequencies can have adverse effects on human health. It is widely accepted that ionizing high-frequency radiation from X-rays or emissions from radioactive materials are hazardous, with high energy levels capable of harming humans; (Ramirez et al., 2005; Brenner et al., 2003) the detrimental impact of non-ionizing radiation on humans, however, is not widely accepted.

A variety of sources emit anthropogenic EMR including high voltage power lines, cell phones, wireless internet, hair dryers, CT scanners, and radioactive nuclei (Fig. 1). While the wavelengths and frequencies emitted by these sources vary, they all have the capacity

to emit energy in the form of electromagnetic radiation. The question for many scientists and patient advocacy groups, however, is twofold: 1) do some frequencies of non-ionizing radiation have the potential to cause adverse physiological effects?; and 2) do some individuals become hypersensitive to otherwise non-perceptible everyday exposure levels of electromagnetic radiation (EMR)?

These quandaries prompted the World Health Organization (WHO) to form an international coalition in 1996 to research the impact of EMR on human health (World Health Organization, 2011a). The coalition continues to the present time and conducts research studies that are underway around the globe. While there is ongoing debate about the potential adverse effect of non-ionizing EMR, there appears to be an intriguing divide. Thus far, most research carried out by independent non-government or non-industry affiliated researchers suggests potentially serious effects from many non-ionizing EMR exposures; (Sage, 2007) research funded by industry and some governments seems to cast doubt on the potential for harm (Genuis, 2008). Emerging research, however, continues to uncover an assortment of potential sequelae resulting from exposure to anthropogenic EMR (Genuis, 2008; Dode et al., 2011; Dode, 2011; Li et al., 2011; Marino et al., 1977; Kabuto et al., 2006) including the finding – recently reported in the *Journal of the American Medical Association* (JAMA) – of alterations in brain glucose metabolism in response to cell phone radio frequencies (Volkow et al., 2011).

The issue of EHS legitimacy remains equally contentious with strong voices advocating on both sides. As widespread exposure to anthropogenic EMR with reports of consequent hypersensitivity is a recent phenomenon unprecedented in human history, it is interesting to trace a few major milestones in the unfolding EHS story.

2.1. Historical milestones related to electromagnetic hypersensitivity

In the 1950s, various centers in Eastern Europe began to describe and treat thousands of workers presenting with recent onset of clusters of multi-system complaints. These individuals were generally employed in i) the manufacture, inspection, operation, or repair of equipment involved in microwave transmission, and/or ii) the operation of radio frequency devices. The constellation of health complaints was initially given the name 'Radio Wave Sickness' and afflicted individuals often presented with symptoms such as headaches, weakness, sleep disturbance, emotional instability, dizziness, memory impairment, fatigue, and heart palpitations (Sadchikova, 1960).

This emerging public health issue persisted through the 1960s and 70s and early reports from various parts of the world began to detail

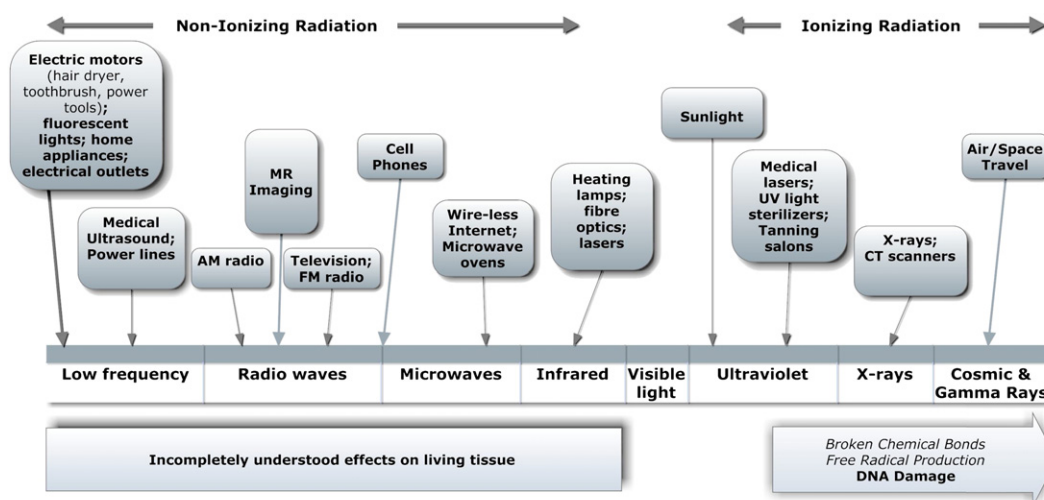


Fig. 1. The electromagnetic spectrum.

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