

Children and Electromagnetic Radiation

by Lena Hedendahl, M.D. (translated from Swedish)

The physician Lena Hedendahl has written a compilation of scientific studies which show that children, teenagers, and pregnant women take on health risks when using cell phones and other wireless gadgets.

During the past four years, I have read a large number of scientific studies on the possible health effects from electromagnetic fields (EMF). I have found that the reassuring public stance of the authorities is not supported by the science.

There are studies available from many countries, many of which have been published in prestigious medical journals, such as Lancet Oncology and the Journal of the American Medical Association. These studies show health effects on the level of individual cells and molecules, both in lab animals and humans. Epidemiological studies on large groups of people also show health effects.

My intention with this report is to show that there is scientific evidence which points to serious risks to humanity from the use of wireless technologies, especially for our children, young people and pregnant women. I wrote this on my own initiative and independently of my employer, who may or may not share my opinions.

Pregnant women

Two studies on pregnant women are of particular importance. The first^{1,2} followed two groups of Danish children born in the years 1997 to 2002. This study found that if the mother used a cell phone while pregnant and the child later used a cell phone or cordless phone, then the child had a 50% increased risk of getting ADHD at the age of seven. If the mother kept her cell phone turned on all the time, then the child's risk of getting ADHD increased by 100%. The risk increased further if the mother used the cell phone four or more times a day while she was pregnant.

An increased risk of 50% or 100% may not seem like much, but since the study followed 40,000 children, the numbers start to add up. When this study was done at the turn of the century, only 18 percent of the pregnant women used a cell phone. Today, nearly all pregnant women do.

Another study³ was done in Egypt and clearly showed that when the mother talks on a cell phone for ten minutes, then it affects the heart rhythm of the fetus or newborn. In the study, the mother held a GSM cell phone to her right ear. The newborn child was held on the mother's arm. The scientists measured the heart rhythm and heart volume flow before and after the ten minute exposure.

The heart rhythm increased by five to fifteen beats a minute. The greatest change was seen for the youngest fetuses of 25 to 30 weeks, while the newborns showed the least change. The blood flow from the heart was measured using ultra sound and was seen to decrease by up to 25% for the youngest fetuses and 10% in the newborns.

This study shows clearly that the youngest fetuses are the most affected by a ten-minute cell phone call.

Effects on children and adolescents

There are several studies which show effects on children and adolescents. In a German study⁴, a group of children wore a dosimeter for 24 hours, which recorded their exposure to microwave radiation (GSM, 3G, wireless networks, etc.)

The study clearly showed that the most exposed children had an increased risk of behavioral problems, such as ADHD. Those children became more rowdy and uncontrolled.

Children living near a military radar station in Latvia were studied in the 1990s⁵. The children living closest to the radar had poorer memory function and poorer ability to pay attention. Their reaction time was slower and they also did more poorly on a coordination test where they were asked to push buttons with their right and left hands for 30 seconds.

The Rimbach study

When a GSM cell phone mast was erected in the town of Rimbach, Germany in 2004, a study was done on people living there⁶.

Sixty people ranging in age from two to 68 years old participated. The neurotransmitters were tested in their urine before and after the GSM transmitter was turned on. Neurotransmitters are used in our bodies to communicate between nerve cells.

The stress hormones adrenalin and noradrenalin increased dramatically for the first six months the transmitter was operating. After a year and a half, the adrenalin

and noradrenalin levels had almost returned to the prior levels. Those people with the highest radiation exposures from the transmitter did not return to their prior levels, however. Especially not those who also used cordless phones or had wireless networks in their home. The study did not do any urine tests after the 18 months study period.

The levels of the neurotransmitter dopamine dropped by 50 percent during the first six months and never recovered to base level.

Phenylethylamine (PEA) increased some during the first six months and then dropped to 50 percent of the original level by the 18 month mark. Especially the children and chronically ill adults were the most affected. PEA is made in our bodies from dopamine, noradrenalin, adrenalin and other compounds. When more of the stress hormones adrenalin and noradrenalin are secreted, it can cause the PEA level to go down. PEA is very fat soluble and thus can easily pass through the blood-brain barrier, so the levels in the blood and the brain are similar. PEA is important for psychological illnesses. Depressed patients tend to have low PEA levels while manic patients tend to have high PEA levels in their blood. PEA has an effect similar to amphetamine. Children with ADD or ADHD usually have low levels of PEA. Children with ADHD are sometimes prescribed drugs with amphetamine-like effects to normalize the PEA levels in their urine.

The rising rates of ADHD and similar behavior problems in today's children may partially be due to the lowered levels of PEA, which are caused by the increasing levels of microwave radiation in society.

It points to a wearing out of the body's ability to cope, that the levels of neurotransmitters do not return to normal in children and the chronically ill. This increases the risk of various health problems.

Cell tower radiation can also be a reason for the increasing symptoms reported by the Rimbach population. Eight of the sixty people reported sleep problems after the cell tower was installed, five got allergies, four had problems with concentration and three reported dizziness.

Other studies show that the DNA in stem cells is more sensitive to microwave radiation than mature skin cells. It is easier to damage the DNA in immature cells. Children, and especially fetuses, have more immature cells and are thus more vulnerable to the effects of microwave radiation than adults are⁷.

Several studies show that the electrical activity in the brain can be affected, both while asleep and during various memory tests. This can be seen on an EEG.

The blood-brain barrier

The blood-brain barrier protects the brain from harmful compounds in the blood. The Salford-group at the University of Lund in Sweden has repeatedly done experiments with rats, where the blood-brain barrier becomes leaky after two hours' exposure to a normal GSM cell phone. They can see that the barrier is leaking, as albumin is then found in the rat brain. Albumin is normally found in the blood in the rest of the body, but kept out of the brain by the blood-brain barrier.⁸

The Swedish researchers also found that there were many shrunken and dark neurons in some of the exposed rat brains, which is an indicator of cell damage. This damage was especially seen in the areas used for memory. The rats that were not exposed to the cell phone did not show this damage.

It is not just natural compounds that enter the brain when the barrier becomes leaky. Harmful chemicals coming into our bodies through our lungs and from our food may also more readily reach the brain.

Doctoral candidate Henrietta Nittby, also at Lund University, showed how rats, who were exposed to a cell phone for just two hours a week, over the course of a year, had poorer memory function. It was especially the short-term memory which was affected.⁹

Using a cell phone for two hours a week may seem like a lot, but many children and adults talk for hours every day using a cell phone or cordless phone. Many do not even have access to a landline telephone any more.

More studies

Dr. Hedendahl's full report covers many additional studies and provides additional references. The complete report is titled "Barn och EMF" and is presently only available in Swedish, though the reference section is in English. It is available at: <http://tinyurl.com/7qwfs97>.

About the author

Lena Hedendahl is a general practitioner (M.D.) who lives in northern Sweden. Her report is her own opinion, and not necessarily that of her employer.

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