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Do Cellular Phones Cause Headaches?

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"Do Cellular Phones Cause Headaches?"

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DO CELLULAR PHONES CAUSE HEADACHES?

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Chapter I - Introduction

Many people have recently complained about experiencing headaches in association with the use of their cellular telephones. There is much controversy over this subject because it has not yet been proven that the microwaves emitted by cellular telephones cause headaches. The research questions include the following: What are the effects, if any, of the use of cellular telephones on human health? Do they cause headaches? Are they responsible for the increase in size of some brain tumors?

There have been many experiments performed by various scientists in the field of bioelectromagnetics and by the World Health Organization (WHO); however, these studies are fairly new and the results have not been collected. There is evidence, however, to prove that the microwaves emitted by cellular telephones affect the blood-brain barrier and the dopamine-opiate systems of the brain. It is also known that the penetration of the blood-brain barrier causes headaches in human beings. Although there are many different factors that are involved with the causes of headaches, I hypothesize that the frequent use of cellular telephones can be linked to an increased frequency of headaches.

The particular question that I plan to address is “Does the prolonged use of cellular telephones cause headaches?” I am not licensed as a scientist; however, my research on this subject will draw more attention to this controversy and will question the safety of cellular phones. My perspective is that the microwaves emitted by cellular telephones are involved in the breakdown of the blood-brain barrier and the dopamine – opiate systems of
the brain and, therefore, are associated with the frequent headaches that cellular phone
users complain of.
Chapter II - Background/Literature Review

Many cellular phone owners report headaches that they say are caused by their hand-held phones. Even though some scientists question this possibility, others feel that there is adequate scientific evidence to warrant serious concern. Even before the existence of cellular phones, research in the 1960s and 1970s showed that microwaves of the type generated by today’s phone technology can disrupt human physiology. Scientists found that when people were exposed to very low intensity microwave energy, they reported hearing sounds, such as buzzes, clicks, and tones. Researchers also noted that they themselves as well as the people they were testing suffered an unusually higher number of headaches. As a result, the experiments had to be stopped (Hayes, 1998).

There are two additional types of evidence that implicate cellular phones as the causes of headaches. First, exposure to low-level microwave energy, such as that from cellular phones, has been found to cause an opening of the blood brain barrier that separates the blood stream from the brain and cerebral spinal fluid. Headaches have been associated with the opening of this barrier. Second, electromagnetic fields, including those of the kind generated by cellular phones, affect the dopamine-opiate systems of the body, and a disturbance in these systems is also associated with headaches (Moulder, 1998).

Researchers warn that headaches may be only one of several harmful biological effects caused by cellular phones; however, these warnings have yet to be backed up by scientific experiments done in the United States for fear that the cellular phone industry may have a decrease in profit therefore affecting the United State’s overall gross national
profit. Elizabeth Cardis, the Chief researcher at the International association for Research on Cancer (IARC), recently initiated a two-stage study on the effects of microwaves emitted by cellular telephones. There are nine countries involved in this study: Germany, Italy, Australia, New Zealand, Israel, Canada, Sweden, France, and the United Kingdom. The first stage of the study will focus on the evaluation and frequency of cancer sites in the head, neck, brain, parotid gland, and the acoustic nerve among both cell phone users and nonusers. The second stage will consist of a multinational case-control study that will involve identifying all new cases of the target diseases in the study population over a period of 2-3 years, choosing controls, and comparing historical phone use and exposure to radio frequency radiation between the cases and their controls. The results of the completed research are expected in 2004 but the results from the ongoing research will be periodically published in the Journal of Bioelectromagnetics (Neergaard, 2000).

Dr. Allen Frey also conducted research that proved that low intensity microwaves emitted by cellular telephones could break down the blood-brain barrier and the dopamine-opiate systems of the brain. He subjected laboratory rats to the low intensity microwaves identical to the waves given off by cellular phones. He used fluorescent dyes to test if the blood-brain barrier had been penetrated. His results were positive; thus, he hypothesized that these types of waves are associated with headaches. He also stated that he had to discontinue his research in the early 1960's on this topic because his human subjects complained about experiencing headaches (Frey, 1998).

Stanislaw Srzigielski conducted research that suggests that radio frequency (RF) radiation can promote tumor growth in animals; however, Ben Greenbaum noted the only scientifically proven effects on the record—"the thermoregulatory effects such as heat
stress that are linked to fairly brief but intense RF exposures." John E. Moulder also did his own research on the effects of antenna base stations on human health. He found that the antenna stations did not have many adverse effects on the human body; however, he questioned if the actual phones themselves produced adverse effects (Moulder, 1998).

Dr. George Carlo with the University of Virginia concluded that there are at least two potential problems resulting from cellular phone use. These include genetic damage predicted from the study of human blood and an increased risk of a rare type of brain tumor. Overall, there was no increase in certain types of cancer growth. Dr. Carlo also added that cancer is a disease with a long period of latency and cellular phones are basically new to the market. Because of the new technology, it may take years of use to actually study the long term effects of cellular phone use. Dr. Carlo has been accused of profiting from the public scare by creating a web page and selling information about the dangers of cellular phones (Neergaard, 2000).

Dr. Martin Melps, a scientist at the University of Texas and a cellular phone industry consultant, states that any evidence of risk whether valid or not needs to be examined. Dr. Melps also added that new studies say cellular phones are not dangerous but they do not state that they are completely safe. The cellular phone industry upholds that there are no health risks involved in cellular phone use; however, there are many international scientists that disagree with the cellular phone industry's statements. To name a few: Dr. Henry Lye, a Seattle scientist studying genetic changes; Dr. Allen Priese, an English scientist studying brain function; Dr. Hardell, A Swedish scientist studying brain tumors; and Dr. S. Adey, the Dean of the School of Medicine at the University of California (McKinley, 1996).
Recently Brian Ross, chief investigative correspondent for ABC News, reported on tests that were performed in Dusuldorf, Germany, at the Institute for Mobile and Satellite Technology (IMST). The tests had to be performed in Europe because no American lab would perform the tests for ABC News for fear of being blacklisted. Dr. Akin Barr performed the tests to find out if the specific absorption rates (SAR) of specific phones exceeded the limit allowed by the Federal Consumer Commission (FCC). Five phones were tested—two made by Motorola, two made by Nokia, and one made by Ericsson. The FCC limit was 1.6 watts/kg SAR for phones used in the standard touch position (Neergaard, 2000).

The standard industry method was used to test the SAR for each phone. Each phone was placed under a phantom head filled with a fluid composition similar to brain tissue. A device was then used to penetrate the head and measure the amount of radiation absorbed. The phones were tested in both the standard touch position and a 90 degree position. The Motorola “MicroTac Lite XL” showed a SAR of 1.83 with the antenna extended and 3.15 SAR with the antenna retracted. The Nokia "6160" showed a 1.84 SAR and 2.16 SAR with the antenna extended and retracted, respectively. The Nokia "636" from Radio Shack showed a 1.54 SAR and 2.12 SAR while the Ericsson showed a 1.34 SAR and 1.65 SAR with the antennas extended and retracted, respectively. The Motorola Star Tac showed an SAR of .43 and .25 with the antenna extended and retracted, respectively (Neergaard, 2000).

Dr. Barr speculated that the reason for the fractional result was because the phone was made with an antenna that is positioned at a 90 degree angle to the earpiece. The Nokia "6160" was tested with an earpiece and showed an SAR of .0281. In this test, the source of radiation
was taken away from the head. The FCC advised the laboratory to study the specific types of microwaves in relation to the electromagnetic spectrum (Neergaard, 2000).

The cellular industry suggests that there are thousands of studies that prove cellular phones are safe to use. It also stands behind its statement claiming "the prevailing scientific consensus is that there is no evidence of risk from the use of wireless phones." The industry also states that the radiation and microwaves emitted by cellular phones has not been proven to be dangerous or cause health problems. The FDA urges the cellular phone industry to design more phones like the Motorola Star Tac with an antenna in the 90 degree position to lessen the absorption of radiation by the head (O'Sullivan, 1999).

Recently, a study was done and the amount of radiation coming from the most popular cellular telephones was measured and recorded in a report by a European Commission Group (McKinley, 1996). This study showed all of the specific absorption rates for the most popular phones used around the United States. The phone model with the lowest SAR was the Motorola Star Tac, which has a 90 degree antenna, and the phone with the highest SAR was the Philips Genie 900, which has a fixed antenna. These results are not final because the uncertainty of how the SAR should be measured is debated in this study (McKinley, 1996).

Among other studies concerning cellular phone use and adverse effects includes a study published in the Irish Times (O'Sullivan, 1999), which associates mobile phone use with brain tumors. Many of the researchers declined to comment when asked about their most recent findings even though their study proved that cell phone use is harmful and may cause brain tumors. There was also a study done that may associate cellular phone usage with memory
damage. This study was commented on in the New York Post and stated, "the phones' radiation might disrupt memory and learning with continued use" (O'Sullivan, 1999).

There have been many television specials that have had documentaries and commentaries on the effects of cellular phone use. One particular show, 20/20 on the American Broadcasting Channel (ABC) arranged for a leading research laboratory in Europe to conduct tests on five popular cellular phone models to determine how much microwave radiation can be absorbed into the head of a cell phone user, depending on how the phones are held.

While the cell phone industry has assured consumers for years that cellular phones are completely safe, the industry's former research director has now come forward to say this can no longer be assumed. Dr. George Carlo recently made this statement: "The industry had come out and said that there were thousands of studies that proved that wireless phones are safe, and the fact was that there were no studies that were directly relevant." For the past six years, Carlo ran the cell phone industry's $25 million research program, which has studied the effects of microwave radiation from cell phones. During an interview with ABC NEWS' 20/20, Carlo added, "We've moved into an area where we now have some direct evidence of possible harm from cellular phones" (1999).

Plans for more research have began and, in October 1999, an agreement was made between the Food and Drug Administration (FDA) and the cellular phone industry to begin research to find the risk factors, if any, involved with cellular phone use.
Chapter III- Methodology

I studied and examined the experiments performed by various scientists on different types of cellular phones and used the results to make a determination that associated cellular telephones with reoccurring headaches. I also performed my own mini-experiment by devising a survey asking questions pertaining to the frequency of cell phone use and headaches among cell phone users. (see appendix 1) I asked 50 students who I observed using their cellular phones to respond to the questionnaire. My reason and objective for using the survey was to try to find at least 3 subjects that I could possibly use as case studies. The questions asked are as follows:

1) Do you use a cellular phone regularly?

2) What brand of phone do you use?

3) How long does an average call using your cell phone last?

4) Do you experience recurring headaches?

5) How often do you experience headaches?

6) What is the severity of the headaches you experience?

7) Do you have any chronic health problems that cause headaches?

8) Are you currently taking any medications that list headaches as a side effect?

9) What time of the day do your headaches occur?

10) What position do you hold your phone in during cell phone calls?
Sample and Population

The experiment involved the use of a questionnaire consisting of ten questions asking 50 Langston University students who use cellular phones as a means of communication regularly about the type of phone used, duration of average calls, and the frequency of headaches experienced. The students were identified as cellular phone users by observing cellular phone use on the campus. While analyzing the data, I was able to isolate 3 subjects— all African-American males 22 years old— to use as case studies. I informed the three subjects that I wanted to use them in this study and they all gave informed consent. I asked them to respond to the survey once more and to use a "Waveshield" phone shield for 6 months. (see appendix 2) All three of the subjects agreed to use a phone shield for 6 months, which was half of the contract length. After the 6 months ended, I asked the subjects to answer the same questionnaire they answered before.

Results

The rate of headaches among the 3 subjects was significantly lower after the 6 months of using the phone shield. The weaknesses involved in the study were taken into account and include the many different factors involved in recurring headaches and many different causative factors that could not be controlled. The subjects involved in this study were all college students and may have other pathophysiological reasons for experiencing the headaches.

All of the subjects continue to use the phone shields today. They offered their support for my research and agreed to spread the word about the dangers of unprotected
cellular phone use. Overall, I contributed to this topic by encouraging awareness to the current studies of the association of cellular telephone use and headaches.
Chapter IV-Presentation

My contribution to the body of knowledge about this subject includes my hands-on involvement in the research of this topic by performing a mini-experiment to see if cellular phones cause headaches. The results of the survey are as follows:

1) Out of the 50 students surveyed, 50 students used cellular phones as a mode of communication regularly.

2) The brands of phones used varied tremendously; however, the phones associated with the higher frequency of headaches were the concentration of this study = (Nokia).

3) The average phone call lasted from 5-10 minutes.

4) Out of 50 students, 22 students reported experiencing recurring headaches.

5) Out of the 22 students that experienced headaches, the frequency of recurring headaches among 8 students was 3-5 times a week.

6) The severity of headaches varied greatly from mild to moderate to severe.

7) 17 of the 22 respondents reported having a chronic illness or other factors that would cause headaches (i.e. stress, smoking, diabetes, hypertension, etc).

8) All 22 of the respondents reported using some type of prescribed or over-the-counter drugs in conjunction with their cell phone use.

9) Nearly half (10) of the respondents reported experiencing their headaches in the evening time (after 6:00 pm) while the other 12 respondents varied from experiencing headaches in the morning, afternoon, and night.
10) 16 of the respondents reported using their cell phones in the standard touch position, while 6 of the respondents used the 90 degree approach.

Out of the 22 students who experienced recurring headaches, 8 students reported experiencing headaches 3-5 times a week. Out of the 8 students that reported experiencing recurring headaches 3-5 times a week, I used 3 students as case studies. I acquired informed consent to use the information gathered from these 3 case studies in my thesis and presentation. I chose the three subjects because they used the phone that was reported to have the highest specific absorption rate among the other phones used by the respondents to the survey. The subjects were all 22-year-old African-American males attending Langston University. The brand name of the phone they all used was the Nokia. One weakness of this study was that the three subjects owned different styles of the Nokia model. The results are as follows:

Subject #1
Occupation- telemarketer
Phone Used- Nokia 6162
Frequency of headaches before intervention = 3-5 times a week
Frequency of headaches after intervention = 2-4 times a week

Subject #2
Occupation- full time student
Phone used- Nokia 6185
Frequency of headaches before intervention = 3-5 times a week
Frequency of headaches after intervention = 2-3 times a week

Subject #3
Occupation- sales associate
Phone used- Nokia 5160
Frequency of headaches before intervention = 3-5 times a week
Frequency of headaches after intervention = 1-2 times a week
Chapter V-Conclusion

The idea of cellular phones and their adverse effects has caused a feeling of uneasiness among many Americans today. Many people think that the emergence of cellular phones and their effects will mimic the effects of cigarette smoking seen after many years of smoking was considered safe. There are many different factors that have to be considered before a final conclusion can be made about whether or not cellular phones cause headaches. On the one hand, there are many different health conditions that may cause headaches in conjunction with using cellular phones for communication. On the other hand, with all of the contradicting research studies that have been performed over the years, it is very confusing to the general public that the government really does not know of the effects, if any, of repeated cellular phone use.

Regardless of the conflicting studies and opinions on whether or not cellular phones cause headaches, it is everyone's personal duty to safeguard themselves from any danger or harmful effects that cellular phones may have. Protection from the microwaves that cellular phones emit comes in many different forms. Some people may decide to use a headset while others may decide to use a phone shield. Still other people may decide that they would rather not take a chance with using cellular phones and revert back to the traditional house phone. In any event, measures must be taken to protect the public from any potential harm that cellular phones may cause.

I feel that I contributed to this topic by increasing awareness that cellular phones may cause adverse effects. I cannot honestly say that the 3 subjects experienced their headaches solely because of their cellular phone use; however, after using the phone shield for 6 months, the subjects reported a lower incidence of headaches overall.
Therefore, it has not been proven that cellular phones cause headaches; however, it has been proven through this study, that using a phone shield during conversations on cellular phones will reduce the incidence of headaches versus using a cellular phone without a phone shield.
Bibliography


McKinley, A. F. ed. (1996). Possible health effects related to the use of radiotelephones; Proposals for a research program by a European Commission expert group. [available on request to the European Commission, DG XIII.A.1 (fax + 32-2-296 8391) and on the Commission’s ISPO site on the internet].


Appendix A: Questionnaire
**DO CELLULAR PHONES CAUSE HEADACHES?**

Thank you for taking the time out to answer a few questions regarding your cellular phone use.

1) Do you use a cellular phone regularly?

| Please circle one: | 1-2 times a week | 2-3 times a week | 3-5 times a week | Daily |

2) What brand of phone do you use?

3) How long does an average call using your cell phone last?

| Please circle one: | 30 sec.- 1 min | 5-10 min | 10-30 min | 1 hr | >1 hr |

4) Do you experience recurring headaches?

| Please circle one: | Yes | No |

5) How often do you experience headaches?

| Please circle one: | 1-2 times/week | 2-3 times/week | 4-5 times/week | Daily |

6) What is the severity of the headaches you experience?

| Please circle one: | Mild | Moderate | Severe |

7) Do you have any chronic health problems that cause headaches?

| Please circle one: | Yes (if yes, please identify condition) | No |

8) Are you currently taking any medications that list headaches as a side effect?

| Please circle one: | Yes (if yes, please identify medication) | No |

9) What time of the day do your headaches occur?

| Please circle one: | Morning | Noon | Evening |

10) What position do you hold your phone in during cell phone calls?

| Please circle one: | Standard Touch | 90 degree position |
Appendix B: Waveshield
This is Something that YOU Can Do…

The WaveShield is a protective system about the size of a penny that adheres to the ear piece of any Cellular Phone.

WaveShield also blocks up to 97% of the electromagnetic radiation that enters into the unprotected soft tissue of the inner ear, without affecting the quality of transmission.

The WaveShield is Available in Two Styles

WaveShield 1000          WaveShield 2000

Order No. WS1000          Order No. WS2000
$19.95                    $24.95

Both offer the following Features:
- Fits All Phone Styles
- Attaches in Seconds
- Soft, Comfort Cushion
- Will not Affect Reception

Laboratory Test Results Are Available Upon Request!

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