

EFFECTS OF MOBILE PHONE RADIATION ON HEALTH OF DIABETIC PATIENTS

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ABSTRACT: *This paper presents an insight on the effects of mobile phone radiations on human health; specifically the health of elderly aged diabetic patients. The paper aims to expose the extremely negative effect of using mobile phone & its radiation on two types of diabetic patients, one, who report high level of blood glucose, and others who report low level of blood glucose. The experimental study has been conducted on a group of diabetic patients owning age groups ranging from 51 to 85 years. Also, all patients are assumed as having established diabetes which means that they are progressive from the early diabetic phase. To guarantee a healthy practice, previous health record of all the patients was collected and ensured that previous history is taken into account during experiment and conclusions. Health conditions were monitored over 60 days maintaining similar dietary conditions. Blood samples of the patients were taken against different parameters i.e. random, fasting and normal blood sugar level etc. Blood glucose was calculated with usage of mobile phone for a specific amount of time. Conclusions were made on the basis of statistics gathered.*

INTRODUCTION

There is a growing trend of extensive mobile phone usage. With its advantages, its radiations cause bad impact on human health. Mobile phones transmit and receive Radio Frequency (RF) signals in order to communicate. The RF signals from mobile phones fall within the microwave part of the electromagnetic spectrum. This radiation is also referred to as microwave radiation or electromagnetic radiation. Exposure to radio frequency affects human health in many ways likely affecting human brain as the electromagnetic waves strike directly to the sensitive brain portion via mobile phone resulting in sleeplessness disorders, fatigue and difficulty in concentration etc. Similarly, other effects include mouth cancer, behavioural problems in children and mood swings etc. This Research is first of its kind as mobile and cellular is a growing technology and with advancement in telecommunication, such health hazards are required to be addressed in interest of approx more than 285 million diabetic patients worldwide and also for the doctors who are treating this disease [1,8]. World is witnessing advancement in Telecom sector to be growing at enormous pace and until year 2011, total of 5981 million mobile cellular subscriptions were reported by ITU which are expected to grow up to 6 Billion by the end of 2012 [5]. This means that we are living on a planet with around 6.8 billion humans where we expect 6 billion cell phone subscription at the end of this year 2012 [4], yet the effect of cell phone radiation on the health of people who are in particular suffering from diabetes has not been explored previously [7]. Diabetes is now a development issue that threatens undermine economies, particularly developing countries and middle income communities worldwide, where 4 out of every 5 people are expected to report themselves as diabetic patients [1,2]. It is also reported that more than 70% of people with diabetes live in low and middle income countries [1], where interestingly at the same time, telecom and cellular phone subscription is growing at the pace of 117% annually within developing countries. Diabetes is one of major causes of premature illness and death worldwide. Non-communicable diseases including diabetes account for

60% of all deaths worldwide [1], Where as International Diabetes Federation is expecting that number of diabetic patients will raise to 435 million worldwide until 2030 [3, 6].

Therefore it is a convincing idea to follow up this issue and gather the findings on the effect of radiation caused by cellular mobile phones on the health of diabetic community. This research was conducted specifically on diabetic patients by taking their blood samples to perceive adverse effects of mobile phones. Various findings were discovered and conclusions were drawn on the basis of results gathered.

METHODOLOGY

This research is based on human blood samples collected from 11 different people comprising of males and females. The samples are taken against different parameters i.e. random, fasting and normal blood sugar level etc. The readings had been collected over the duration of two months to randomize the experiment results. Blood samples were taken for seven days and their blood sugar was calculated before and after breakfast and after letting diabetic patients talk on mobile phone for fifteen minutes. Blood sugar samples were compared before and after communication on mobile phone and comparison is also taken between normal blood sugar level and after when a diabetic patient is made to speak over a normal mobile phone.

ASSUMPTIONS

Diabetes is a disease in which success of treatment depends on how well the blood sugar level is maintained as per the body requirement keeping age factor into consideration. The diabetic patients monitor their readings usually on daily basis [3]. The values for the various blood sugar levels of patients taken in this survey have been taken for seven days over a course of one month. The values are not taken necessarily on consecutive days to randomize the experiment as much as possible. The randomization factor has been included to maintain synchronization with the nature cycle. Moreover, all patients are assumed as having established diabetes which means that they are out from the early diabetes phase.

The blood sugar readings of diabetic patients have two main categories:

- Fasting Blood Sugar (FBS)
- Random Blood Sugar (RBS)

Fasting blood sugar represents the blood glucose level without consuming any food/drink for more than 8 hours.

Random Blood Sugar measures blood glucose regardless of when lastly food was consumed. This test is also called a casual blood glucose test.

1. Age group of Samples

Table 1: Patient Categories & Age Group

Category	Age Group
A	51-55
B	56-60
C	61-65
D	66-70
E	71-75
F	76-80
G	81-85

2. Normal Glucose Level for Kids & Adults

Table 2: Generic range of Blood sugar level

Blood Sugar Level	Kids	Adults
Normal	70 - 100 mg/dL	70 - 140 mg/dL
Low	< 70 mg/dL	< 70 mg/dL
High	> 140 mg/dL	>180 mg/dL

3. Low Glucose Level

Table 3: Readings of Low Blood Sugar level

Blood Sugar Level	Readings (mg/dL)
Normal	70 - 140 mg/dL
Hypoglycemia (Initial stage)	< 70 mg/dL
Hypoglycemia (Fasting)	50 mg/dL
Insulin infusion	< 50 mg/dL

4. High Glucose Level

Table 4: Readings of High Blood Sugar level

Blood Sugar Levels	Fasting Values (mg/dL)	Post Meal Value: 2 hours after the Meal (mg/dL)
Normal	70 - 100	Less than 140
Early Diabetes	101 - 126	140 – 200
Established Diabetes	More than 126	More than 200

5. Normal Blood Sugar level for Women

Table 5: Normal blood Sugar level for women

Blood Sugar Levels	Readings (mg/dL)
Normal Blood Sugar Range	70 - 140
Post Meal Value: 2 hrs after the Meal	may rise up to 135-145
Post Meal Value: 1 hour after the Meal	may rise up to 180
Random Blood Sugar Range	70 – 140
Fasting Blood Sugar Range	70 – 100

6. Normal Blood Sugar level for Men

Table 6: Normal blood Sugar level for Men

Blood Sugar Levels	Readings (mg/dL)
Normal Blood Sugar Range	70 - 140
Fasting Blood Sugar Range	70 - 100
Post Meal Value: 2 hours after the Meal	may rise up to 140
Random Blood Sugar Range	70 – 125

The following table lists the normal blood glucose levels of diabetic patients, considered to be in normal range by their doctors according to the level and condition of their diabetes:

Table 7: Normal blood Sugar level of Samples

	Gender	Age Group	Glucose
Human 1	Female	B	Random: 141 Fasting: 110
Human 2	Male	B	Random: 155 Fasting: 120
Human 3	Male	C	Random: 150 Fasting: 115
Human 4	Male	A	Random: 149 Fasting: 114
Human 5	Female	D	Random: 150 Fasting: 100
Human 6	Male	G	Random: 160 Fasting: 110
Human 7	Male	A	Random: 119 Fasting: 100
Human 8	Male	A	Random: 125 Fasting: 110
Human 9	Male	B	Random: 150 Fasting: 125
Human 10	Female	G	Random: 154 Fasting: 112
Human 11	Male	B	Random: 141 Fasting: 107

Medical history of these patients was also considered to study the results accurately. This was done to ensure that the conclusion could be drawn as precisely as possible. The following table lists the medical history of the eleven samples:

The readings have been taken in a period of one month; randomly because of the health conditions of the patients.

The effect on readings before and after the breakfast may be due to the unhealthy diet conditions of the person. People with diabetes represent a large subsection of society and there will be range of variety in terms of dietary requirements from person to person; as the sugar level also varies from person to person and age. As a result, there is no set diabetic diet that will work for every patient, so the effect of the RF rays on different patients will be different because of their diet, sugar level and age group.

The patients' blood sugar level was again tested half an hour after the breakfast was consumed by the patients. Following results were gathered:

FINDINGS AND OBSERVATIONS

This research sampling was conducted among diabetic patients. Eleven blood samples were taken for seven days and their blood sugar was calculated before and after breakfast and after letting diabetic patients talk on mobile phone for fifteen minutes. The following readings were found:

Table 8: Medical History of Patients

Disease	H 1	H 2	H 3	H 4	H 5	H 6	H 7	H 8	H 9	H 10	H 11
D1	N	N	N	N	Y	N	Y	Y	N	Y	Y
D2	Y	N	Y	N	N	Y	N	N	N	Y	Y
D3	N	N	N	N	N	N	N	N	N	N	N
D4	N	N	N	N	N	N	N	N	N	N	N
D5	N	N	N	N	N	Y	N	N	N	Y	N
D6	N	N	N	N	N	N	Y	N	N	N	N
D7	N	N	N	N	N	N	N	N	N	N	N
D8	Y	N	Y	Y	N	N	Y	N	N	N	N
D9		N		N	N			N			Y
D10	N		N		N		N		N	N	N
D11	N	Y	N	N	N	Y	Y	N	N	N	Y

Whereas; D1-D11 refers to list of diseases mentioned as below:

- D1:**BloodPressure
- D2:** Heart Diseases
- D3:**Kidney Problem
- D4:**Liver Problem
- D5:**Knee Problem
- D6:**Back Problem
- D7:** Disability
- D8:**Hypertension
- D9:**Diarrhoea
- D10:**Swelling
- D11:**Stress

1.1. Pre-Breakfast Blood sugar readings:

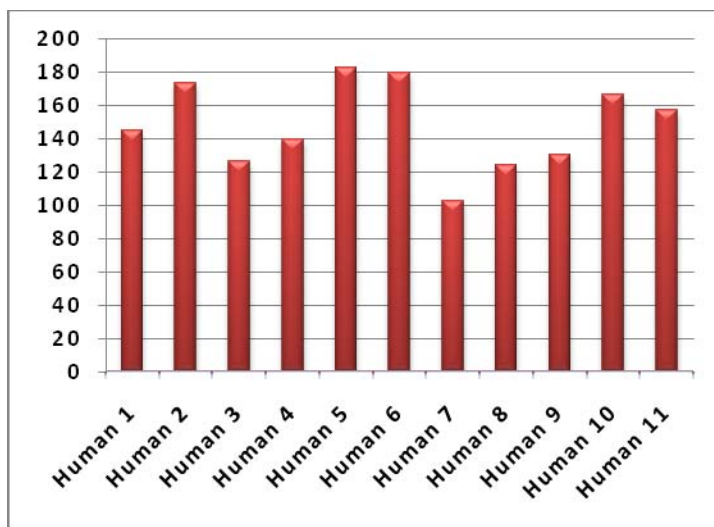


Fig1: Pre-Breakfast blood sugar readings of Patients

1.2. Post-Breakfast Blood sugar readings:

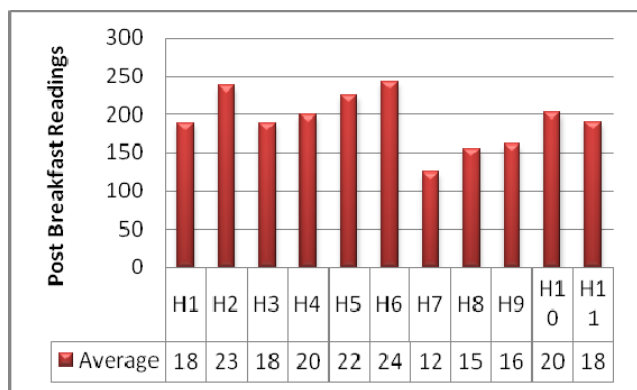


Fig2: Post-Breakfast blood sugar readings of Patients

After the patients have had their breakfast, they were made to talk on the telephone for the duration of approximately 15 minutes and above. In order to determine the effect of Radio frequencies and mobile phone usage on the health of diabetic patients, their blood sugar level was again tested in order to compare with the normal readings noted earlier. Following results were deducted that have been plotted in the following graph [Fig 3].

1.3. Post phone call Blood sugar readings:

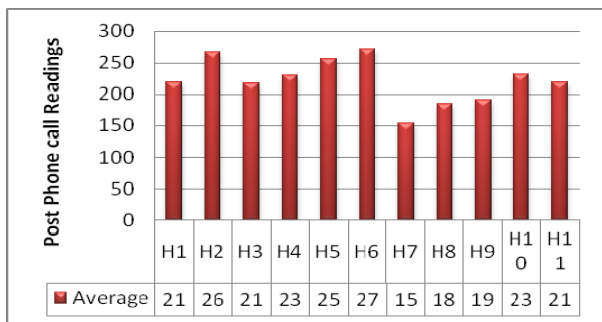


Fig3: Post phone call blood sugar readings of Patients

1.4. Comparison of Post-Breakfast and Post phone call Blood sugar readings:

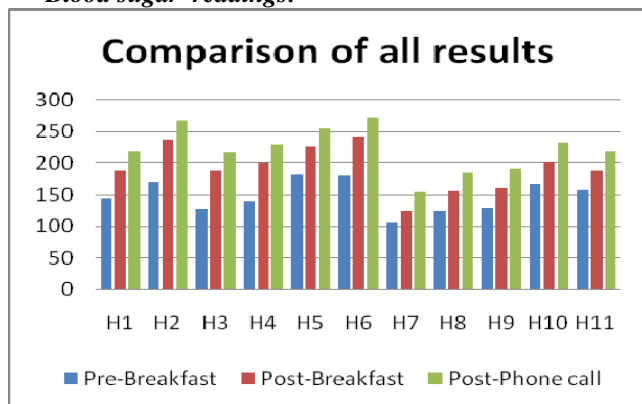


Fig4: Comparison of Post Breakfast and Post phone call blood sugar readings of Patients

CONCLUSION

From the above readings and comparisons of blood sugar level results, it is evident that mobile phone radiations adversely affect human health. Talking over a mobile phone has proved to increase the blood glucose level in humans, in case when age is ranging from 40 years and above. Also if humans are affected from high level of blood sugar or they are already diabetic patients. The results from samples have also proved that, blood glucose level has increased dramatically to higher level, when such people are made to talk over 15 minutes on a mobile phone. Mobile phone usage is harmful for the health of diabetic people if they are already reporting high level of glucose in their blood.

Vice versa it is also concluded that patients who experience low glucose level within blood, can be effectively treated in situations of emergencies as a remedial measure, if they are made to talk over fifteen minute on a mobile phone. This might act as an emergency measure to raise blood glucose of patients in situations where they have no access to any sweetener or medicine to bring their glucose to normal level or until they acquire some proper medical aid.

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