



STUDY OF EFFECTS OF MOBILE PHONE RADIATION ON MALE FERTILITY

Pathology

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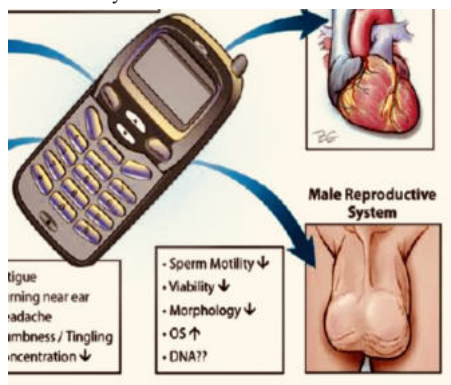
ABSTRACT

Male infertility is defined as inability to conceive after a year of regular sexual intercourse without the use of contraceptives when female subject is fit to conceive. It affects approximately 15% of couples of reproductive age groups and approximately 50% of these cases results from male factor infertility. Men usually carry mobile phones in their pockets or in holder cases close to their reproductive organs. Cell phones emit electromagnetic waves having radiofrequency of about 800 to 2200MHz. These frequencies can be absorbed by human body and potentially have adverse effects on brain, heart, endocrine system DNA, reproductive system etc. Radiations may interfere with normal spermatogenesis and result in significant decrease in sperm count and motility. Thus, it is important to evaluate effects of mobile phone usage on male infertility. Hereby, we carried out an experimental study on 48 voluntary male subjects attending gynec OPD for evaluation of their infertility and in whom female factor was found absolutely normal. These subjects were under study for about 3 months. We divided these 48 subjects into three groups based on their daily cell phone usage such as group A (>6 hrs/day), group B (3-6hrs/day) and group C (<3hrs/day). After study period, semen samples of subjects were sent for examination at clinicopathology department of Shardaben general hospital three times at regular intervals of 7 days with 3 days of sexual abstinence. Based on the collected data and ruling out other confounding factors, we concluded that male subjects belonging to group A had more deleterious effects on both sperm count, sperm motility and sperm quality and group C was found with the minimum adverse effects and had good chances of further conception. Hence, we concluded from the above study that mobile phone usage do have adverse effects on spermatogenesis and have a major role in male infertility.

KEYWORDS

INTRODUCTION:

During recent years, there is increasing percentage of male infertility affected by multiple factors such as environmental, health, lifestyle etc. One of the most important factors included in life style is increasing usage of cell phones that emit radiation which have direct effect on male genitals. We are surrounded by several types of ionizing and non-ionizing radiations. Since it is impossible to cover all types of radiation sources, we are including non-ionizing type cell phone radiations in our study.



MATERIALS AND METHODS:

An experimental study was carried out at Clinicopathological laboratory, SCL general hospital along with clinical side help of gynaecological department. After ruling out specific history such as that of smoking, alcohol consumption, orchitis, varicocele, diabetes mellitus, hypertension, drug history, genetic disease, cardiac disease, neural or nephrotic disease, viral or bacterial infection in past 4 weeks, 48 otherwise healthy male subjects were selected for study. All female partners were found both anatomically and physiologically fit to conceive ruling out female factor of infertility that can cause bias in results. All other confounding factors were taken care of during the study.

The study subjects selected were divided into three equal groups depending on their usage of cell phones per day:

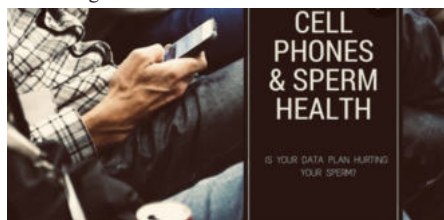
- (I) Group A (>6 hrs/day) – 16 subjects
- (II) Group B (3-6hrs/day) – 16 subjects
- (III) Group C (<3 hrs/day) or with minimum usage of cell phones – 16 subjects

All the study subjects of each group were monitored for a period of

three months. After 3 months, semen samples of all 48 subjects were collected three times at regular 7 days interval with 3 days of regular sexual abstinence. Results were calculated and concluded accordingly.

Semen Analysis

An early morning semen sample is collected by masturbation in a stress free and private environment in a sterile, dry, wide mouthed container. It is sent within 30 minutes to laboratory for proper semen analysis. Condoms should not be used for collection as it contains spermicidal powders which obliterate motility. Then the sample container should be properly labelled with group ID and name of the subject with time of collection noted over it. It should be transferred at proper temperature preferably human body temperature and protecting it from direct sunlight.



RESULTS:

Results of semen analysis of 48 subjects divided in groups were noted.

Normal parameters should be kept in mind for physical and chemical examination of semen:

Physical/ chemical examination of semen	Normal values
Volume	2-6ml
Colour	Greyish-white opaque
Viscosity	Poured drop by drop
Liquefaction time	20-30 minutes
pH	7.2 to 7.8
Fructose	150-300 mg/dl

Microscopic Examination of semen:

In our study, microscopic examination of semen plays a major role in calculating the proper risk. There may not be major change in physical and chemical properties of semen.

Microscopy	Normal value
Sperm Count	40-300 millions/ml
Motility after 2 hrs, 3 hrs, 6 hrs	60-95%
Actively or progressively motile sperms	Total motility should be >53%

Sluggishly or non-progressively motile sperms	
Non- motile or immotile sperms	<40%

(i) Group-A:

Results of 16 subjects using cell phones more than 6 hrs a day have reduced either quality or quantity of spermatozoa affecting the sperm count and motility. In some cases, due to intense exposure of cell phones and constant usage of other electronic devices leads to decrease in both sperm counts and motility.

There were 3 subjects found with results of reduced both motility and sperm count.

There were 6 subjects with results of reduced either motility less than 50% or sperm count less than 40 millions/ml.

Group ID	Name or Name of wife	Sperm Count	Sperm motility
A1	H/o Zakiya	10 millions/ml	30%
A3	Dilshad	<10 millions/ml	20%
A6	Rajeshbhai	20 millions/ml	30%
A8	H/o Kusum	30 millions/ml	55%
A9	H/o Payal	20 millions/ml	60%
A10	Jitendrabhai	50 millions/ml	20%
A12	Praful	70 millions/ml	35%
A14	Hiren	80 millions/ml	25%
A16	H/o Rekhaben	70 millions/ml	40%
A10	H/o Mumtaz	60 millions/ml	85%
A11	H/o Rukaiya	50millions/ml	90%
A12	Aman	60millions/ml	80%
A13	Sulaiman	80millions/ml	65%
A14	Kishorebhai	70millions/ml	70%
A15	Balrajbhai	80millions/ml	75%
A16	H/o Kalpanaben	80millions/ml	80%

(ii) Group-B:

Results of 16 subject whose average cell phone usage is about 3 to 6 hrs a day (not more than 6 hrs/day).

There were total 5 subjects found affected. Out of which, 1 showed results of reduced both motility and sperm count. Another 4 subjects showed either reduced sperm motility or sperm count.

The reduction in sperm motility was noticed but the ratio of sluggishly motile sperms is more as compared to active sperms. Sperm count reduced to about less than 50 millions/ml.

Group ID	Name or Name of wife	Sperm Count	Sperm motility
B5	Kalpeshbhai	<10millions/ml	20%
B9	H/o Jalpa	30millions/ml	55%
B13	H/o Heenaben	45millions/ml	40%
B15	Brijesh	60millions/ml	40%
B16	Nasir	50millions/ml	45%
B1	Riyaz	70millions/ml	65%
B2	H/o Lalita	65millions/ml	70%
B3	H/o Laxmiben	60millions/ml	85%
B4	Raesbhai	60millions/ml	90%
B6	H/o Manisha	75millions/ml	95%
B7	Kamleshbhai	85millions/ml	85%
B8	H/o Nazima	60millions/ml	80%
B10	Niharbhai	70millions/ml	75%
B11	Kanaiyabhai	50millions/ml	65%
B12	H/o Krishnaben	55millions/ml	60%
B14	H/o Nagma	65millions/ml	60%

(iii) Group-C:

Results of 16 subjects whose usage of cell phones were found minimum of less than 3 hrs/day. These subjects have a minimum risk of infertility as compared to group-A and group-B.

Only 2 subjects were found with either reduced sperm motility or sperm count. Reduction was also not so evident as compared to above groups.

Group ID	Name or Name of wife	Sperm Count	Sperm motility
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C9	Hanifbhai	45 millions/ml	20%
C14	H/o Yasminben	20millions/ml	55%
C1	Naynaben	80millions/ml	65%
C2	H/o Prafullaben	85millions/ml	75%
C3	H/o Savitaben	80millions/ml	80%
C4	H/o Geetaben	70millions/ml	80%
C5	H/o Lilavati	60millions/ml	95%
C6	Lalabhai	70millions/ml	90%
C7	Mannanbhai	65millions/ml	95%
C8	H/o Parvatiben	55millions/ml	80%
C10	H/o Roohiben	50millions/ml	85%
C11	H/o Palakben	70millions/ml	75%
C12	Usmanbhai	75millions/ml	80%
C13	Oveshbhai	80millions/ml	80%
C15	H/o Jaykala	90millions/ml	85%
C16	H/o Reshmaben	80millions/ml	65%

**CONCLUSION:**

In our study, we concluded that subjects belonging to group-A had maximum usage of cell phones showed abnormality in semen analysis affecting about 9/16 subjects to cause infertility.

Group-B subjects were on an average usage of cell phones between 3 to 6 hrs per day. It showed abnormality in 5/16 subjects.

Group-C subjects were on minimum usage of cell phone about less than 3 hrs/day. It showed abnormality in only 2/16 subjects.

Male subjects belonging to group A had more deleterious effects on both sperm count, sperm motility and sperm quality and group C was found with the minimum adverse effects and had good chances of further conception. Hence, we concluded from the above study that mobile phone usage do have adverse effects on spermatogenesis and have a major role in male infertility.

