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Physiological Effect of Hematological Parameters From Exposure to Radiation of Mobile

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ABSTRACT

Background: *Today we live in a rapidly accelerating technological era, which is called by many names, including the era of the global technological revolution, the era of information technology, and the technological explosion.* ***Methods:*** *Fouty five samples were divided into three study groups: fifteen sample 15 uses phone for more than 2 hours daily, and fifteen sample 15 uses phone for more than 5 hours daily and fifteen sample 15 uses phone for less than 1 hours daily (control group) . The samples was collected from the in AL-Najaf province/ Iraq and during the period from October 2024 until January 2025. The age of sample from 17 to 40 years. All participants were exposed to questionnaire about age, number of use phones mobile , then blood samples was collected and sent for analysis. Both sample is informed about the study and consent was ensured .* ***Results:*** *the results show when 2 hours exposure to radiation from mobile phone on leukocytes counts significantly increased ($p<0.001$) in total leukocytes count in compared with control groups, while, no significantly differences in Lymphocytes (%), Neutrophils (%), Monocytes (%), Eosinophils (%) and Basophils (%) with control groups. the result show when 5 hours person exposure to radiation on total counts of leukocytes, significantly increased ($p<0.001$) in total leukocytes count and Lymphocytes (%) and decrease in Neutrophils (%) in compared with control groups, while, no significantly differences in Monocytes (%), Eosinophils (%) and Basophils (%) with control groups. Also the resulr show when 2 hours exposure to radiation from mobile phone on total red bloods , no significantly differences in Total RBCs count and Hb (g/dl) and PCV (%) , MCV (fL), MCH (pg) and MCHC (g/dl) in compared with control. Also the resulr show when 5 hours exposure to radiation from mobile phone on total red blood corpuscles and red blood cell absolute values , significantly increased ($p<0.001$) in Total RBCs count and Hb (g/dl) and PCV (%) in compared with control groups, while, no significantly differences in MCV (fL), MCH (pg) and MCHC (g/dl) with control groups.* ***Conclusion:*** *The current study indicated that Using a mobile phone for long period have effect on hematological parameters., The change that occur from long period of use of phone causes increase in count of WBC and lymphocyte also increase in RBC count and Hb and PCV.*

Keywords: Physiological Effect, Hematological Parameters, Radiation of Mobile.

Article Information

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INTRODUCTION

Today we live in a rapidly accelerating technological era, which is called by many names, including the era of the global technological revolution, the era of information technology, and the technological explosion (1).

These features allow the use of 4G and 5G in many areas in life such as voice calls,

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sending messages, e-mail, web, TV, program downloading and others [2].

METHODS

Fouty five samples were divided into three study groups: fifteen sample 15 uses phone for more than 2 hours daily , , and fifteen sample 15 uses phone for more than 5 hours daily and fifteen sample 15 uses phone for less than 1 hours daily (control group) .

The samples was collected from the in AL-Najaf province/ Iraq and during the period from October 2024 until January 2025. The age of sample from 17 to 40 years. All participants were exposed to questionnaire about age**,** number of use phones mobile , then blood samples was collected and sent for analysis. Both patients and control is informed about the study and consent was ensured**.**

Inclusion Criteria

The sample were diagnosed by CBC test (laboratory test) using new devices (Minividus).All control women had no history of any disorder, not taking therapy, the control were collected from the relative of the patients and from the out patients clinic.

RESULTS

Comparison of results total and differential counts of leukocytes after 2 hours exposure to radiation from mobile phone compared with control groups:

The **Table 1** revealed result of patient and compared with control groups, significantly increased ($p<0.001$) in total leukocytes count in compared with control groups, while, no significantly differences in Lymphocytes (%), Neutrophils (%), Monocytes (%), Eosinophils (%) and Basophils (%) with control groups**.**

Comparison of results total and differential counts of leukocytes after 5 hours with exposure to radiation from mobile phone compared with control groups:

The **Table 2** revealed result of patient and compared with control groups, significantly increased ($p<0.001$) in total leukocytes count and Lymphocytes (%) and decrease in Neutrophils (%) in compared with control groups, while, no significantly differences in Monocytes (%), Eosinophils (%) and Basophils (%) with control groups.

Comparison of results total red blood corpuscles and red blood cell absolute values after 2 hours exposure to radiation from mobile phone compared with control groups:

The **Table 3** revealed result of patient and compared with control groups, no significantly differences in Total RBCs count and Hb (g/dl) and PCV (%) , MCV (fL), MCH (pg) and MCHC (g/dl) in compared with control.

Comparison of results total red blood corpuscles and red blood cell absolute values after 5 hours exposure to radiation from mobile phone compared with control groups:

The **Table 4** revealed result of patient and compared with control groups, significantly increased ($p<0.001$) in Total RBCs count and Hb (g/dl) and PCV (%) in compared with control groups, while, no significantly differences in MCV (fL), MCH (pg) and MCHC (g/dl) with control groups.

Table (1): Alterations in leukocyte counts following two hours of mobile phone radiation exposure.

Parameters	Mean ± SD		
	Control	After exposure 2 hours	P-value
total leukocytes count (×103) (cell/mm3)	4.63^{A} ± 0.42	6.63^{B} ± 0.62	0.001
Neutrophils (%)	68.18 ±3.57	60.18 ±3.57	0.4
Lymphocytes (%)	16.44 ±2.67	18.84 ±2.34	0.05
Monocytes (%)	0.795±0.07	0.855±0.07	0.48
Eosinophils (%)	0.025±0.02	0.045±0.02	0.6
Basophils (%)	0.006±0.01	0.005±0.01	0.45

Table (2): Alterations in leukocyte counts following five hours of mobile phone radiation exposure.

parameters	Mean ± SD		
	Control	After exposure 5 hours	P-value
total leukocytes count (×103) (cell/mm3)	4.63^{A} ± 0.42	8.67^{C} ± 0.88	0.001
Neutrophils (%)	68.18^{A} ±3.57	35.57^{B} ± 17.74	0.001
Lymphocytes (%)	16.44^{A} ±2.67	27.44^{B} ±3.77	0.001
Monocytes (%)	0.795±0.07	0.795±0.07	0.48
Eosinophils (%)	0.025±0.02	0.055±0.02	0.6
Basophils (%)	0.006±0.01	0.004±0.01	0.45

Table (3): Two-hour mobile phone radiation exposure and its effect on erythrocyte profile.

parameters	Mean ± SD		
	Con	After exposure 2 hours	p-value
Total RBCs (×106) (corpuscle/mm3)	4.78^{A} ± 0.42	5.13^{A} ± 0.52	0.4
Hb (g/dl)	13.2 ±1.57	13.8 ±1.27	0.5
PCV (%	38.44±2.67	40.44±2.67	0.05
MCV (fL)	79.8±2.07	82.3±0.06	0.45
MCH (pg)	27.6±1.02	29.7±2.02	0.55
MCHC (g/dl)	35±2.01	37±2.4	0.44

Table (4): Five-hour mobile phone radiation exposure and its effect on erythrocyte profile.

Parameters	Mean ± SD		
	Con	After exposure 5 hours	p-value
Total RBCs (×106) (corpuscle/mm3)	4.78^{A} ± 0.42	9.67^{B} ± 0.61	0.001
Hb (g/dl)	13.2 ±1.57	15.17^{B} ± 1.74	0.001

Parameters	Mean ± SD		
	Con	After exposure 5 hours	p-value
PCV (%	38.44±2.67	55.44 ^{B} ±3.67	0.001
MCV (fL)	79.8±2.07	88.8±4.07	0.45
MCH (pg)	27.6±1.02	29.5±3.02	0.55
MCHC (g/dl)	35±2.01	40±3.4	0.44

DISCUSSION

This study found ,the result of patient and compared with control groups, significantly increased ($p<0.001$) in total leukocytes count in compared with control groups, while, no significantly differences in Lymphocytes (%), Neutrophils (%), Monocytes (%), Eosinophils (%) and Basophils (%) with control groups after 2 hours exposure to radiation from mobile phone compared with control groups**.**

This result agreed with [3] .the waves of EMR cause action and this are negatively act on system of haemopietic to synthesis more lymphatic than normal and can cause increase in number of wbc. Also may be cause from this increase of lymph are inflammation in lymphatic of lymph [7,8,9]. Also exposure to EMW cause increase in RBC and Hb.

CONCLUSIONS

Conclude from the current study:

1-Use of a mobile phone for short period have no effect on hematological parameters.

2-Using a mobile phone for long period have effect on hematological parameters.

3- The change that occur from long period of use of phone causes increase in count of WBC and lymphocyte also increase in RBC count and Hb and PCV.

RECOMMENDATIONS

1. Reduce mobile phone use and use it only for necessary things

2- Keep the mobile away from the person as much as possible, even when sleeping.

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