# THE INFLUENCE OF THE ELECTROMAGNETIC OF HIGH VOLTAG OVERHEAD LINES ON THE HUMAN BIENG

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**ABSTRACT:** There are many researches and studies about the environmental and biological affects of the electrical and magnetic fields of High Voltage Over Head Lines (HVOHL)[1-6] .The most of these researches were performed either on the human being , who are not living directly under HVOHL, or on animals exposed to electrical and magnetic fields in the laboratories. In Damascus country side, there are great number of people, who are living in houses directly under 230 kV- & 66 kV- HVOHL. Statistical, laboratorial, hematological and hormone studies were performed by us about the influence of the electromagnetic fields of these HVOHL on inhabitants, who are living directly under high voltage lines, and who are living in the same region but away from HVOHL.
These studies shows very important and clear results about the influence of the electromagnetic fields of HVOHL on the human being, and indicate an increases of some diseases among peoples, who had exposed to electromagnetic fields of HVOHL.
This paper should show and discuss the results of these studies.

## 1. INTRODUCTION

The increase number of People, who are living in houses directly under 230 kV- & 66 kV- HVOHL in surrounded region of Damascus has escalated over the last thirty years.

Figure 1: Site in surround region Damascus

There are many evidences that exposure to electrical and magnetic fields of HVOHL can increase the risk of some disease. This evidences and Public debate about possible adverse effects on human being health lead us to make this research. We performed Statistical, laboratorial, hematological and hormone studies about the influence of the electromagnetic fields of these HVOHL on both types:
1-people, who are living directly under high voltage lines, and
2-people, who are living in the same region but away from HVOHL.

## 2. STATISTICAL FIELD STUDIES

### 2.1. Statistical study procedure

Statistical field studies were performed, compained with electrical and magnetic fields measurements, to find relation between HVOHL and disease incidence of peoples in the studied site (exposure and not exposure).
This study were performed on 3194 people (group1 = 3194 statistical samples), who are living directly under high voltage lines. This group of people, who are exposure to the electromagnetic fields of HVOHL, called "**cases**". The measured field strength values in houses direct under HVOHL were : 1.5-2.0 kV/m and 0.7-1 µTesla.
Also study were performed on 2678 inhabitants (group2=2678 statistical samples), who are living in the same region but more than100 m away from high voltage lines. This group of people called "**controls**".

The figures 2-4 shows the number and kind of registered disease incidence N of inhabitant in the studied area; (man, women and children), for cases and control in the same period of 5 years.

Table 1 shows code of various disease kind , which are studied by cases and controls..

Table 1: code of disease

| Kind of disease | Disease code |
|---|---|
| Headache | 1 |
| Wheezing | 2 |
| Skin disease | 3 |
| Spontaneous abortion | 4 |
| Memory loss | 5 |
| Congenital mal formation | 6 |
| Neuroma | 7 |
| Thyroid Gland | 8 |
| Blood disease | 9 |
| Tumor | 10 |
| Uri genital | 11 |
| Tachycardia | 12 |
| Sensitivity | 13 |
| Digestive | 14 |
| Diabetes mellitus | 15 |
| abdominal pain | 16 |
| diarrhea | 17 |
| Other disease | 18 |

Figure 2 shows the number of disease N and the kind of disease D of manner adults for cases and control in the same period while 5 years

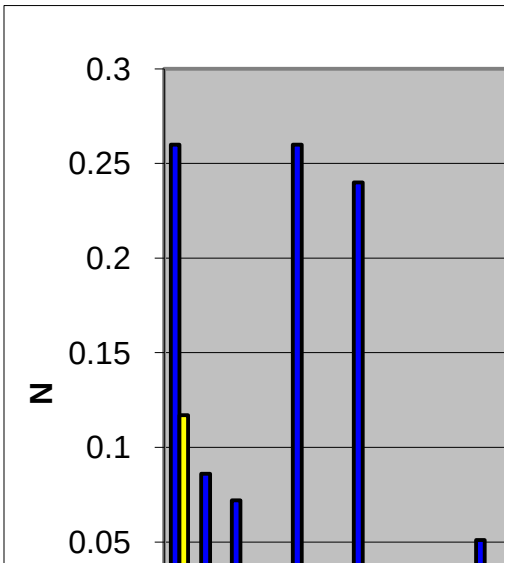


Figure2: number of disease N as function to the kind of disease D of manner adults for cases and control

Figure 3 shows the number of disease N and the kind of disease D of women adults for cases and control in the same period while 5 years

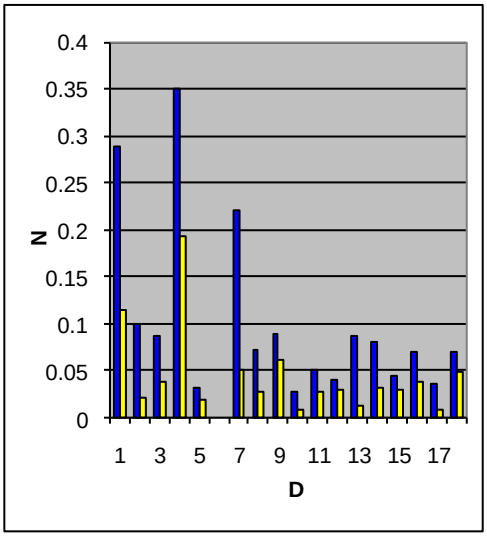


Figure3: number of disease N as function to the kind of disease D of manner adults for cases and control

Figure 4 shows the number of disease N and the kind of disease D of children for cases and control in the same period while 5 years

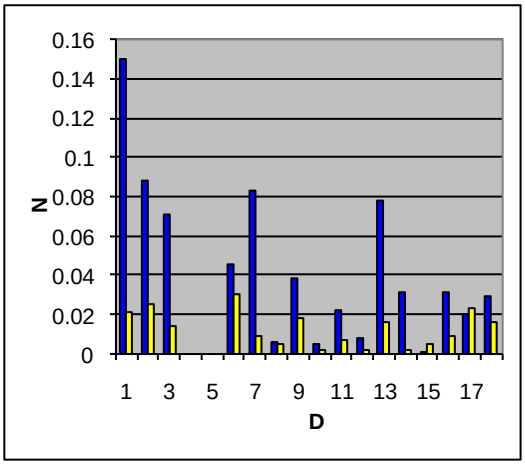


Figure4: number of disease N as function to the kind of disease D of children for cases and control

## 2.2. assessment of result

Results of these studies are reported in terms of statistical association between HVOHL fields and disease. The challenge is to discover whether the statistical results indicate a true causal association. A best and modern statistical way for study results assessment is Odds Ratio way O.R [6] .

$$O.R = A / B$$

Where, A =is the disease ratio of the exposures(cases) to the non exposures (controls), B = is the non disease ratio of the exposures (cases) to the non exposures (controls), for same kind of disease .
If the odds ratio equal or less than ( 1 ) , there is no association between HVOHL fields and disease . If the odds ratio bigger than ( 1 ) there is a positive association between HVOHL fields and disease

The figure 5 shown the Odds Ratio for the various kind of disease D of manner adults for the same period of 5 years .

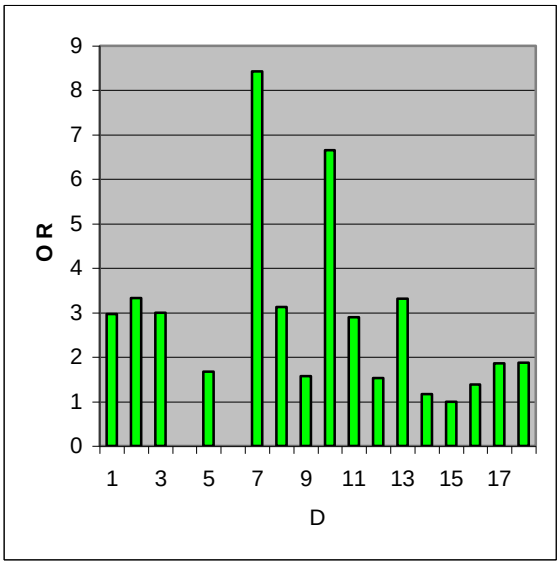


Figure 5 : Odds Ratio OR for the various kind of disease D at manner adults

The figure 6 shown the Odds Ratio for the various kind of disease D of women adults for the same period of 5 years .

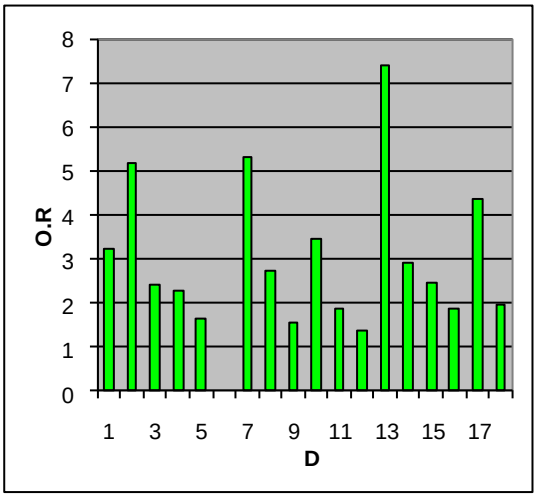


Figure 6: Odds Ratio OR for the various kind of disease D at women adults

The figure 7 shown the Odds Ratio for the various kind of disease D of children for the same period of 1 year

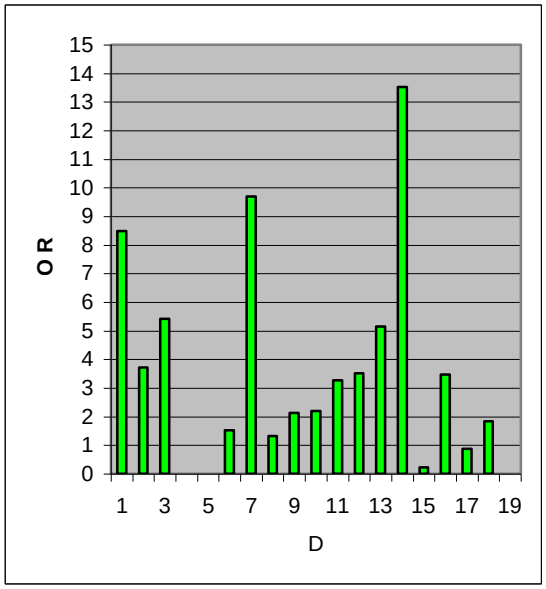


Figure 7: Odds Ratio OR for the various kind of disease D at children.

This statistical study reported that people, who lived long – term under HVOHL are associated with increase in the incidence of various kind of disease .
By comparison between number of disease in both groups ( cases and controls) from figures 2 ,3, 4, We have reported that number of disease in group cases is greater than in group controls for various kind of disease .
Also it shows from figures 5, 6, 7 that Odds Ratio is bigger than 1 for various kind of disease . So, it means, that the evidence of association between exposure people to electromagnetic fields of HVOHL and various kind of disease; like: head ache , tumors , blood disease , Neuroma , Spontaneous abortion , Congenital mal formation , Skin disease , Tachycardia , Wheezing , Digestive , Sensitivity , and other disease .

## 2.3. Statistical inference

We can estimate from the statistical studies, that the sample represent population with confidence intervals 95% [(C.I (95%)],acc to the equation [7]:

$$[\text{C.I}\ (95\%)] = \ln(O.R) \pm 1.96\, S_E[\ln(O.R)]$$

*Where :*

$$S_E[\ln(O.R)] = \sqrt{1/a + 1/b + 1/c + 1/d}$$

When we take Neuroma disease at manner adult, with O.R = 8.42 as example, than the confidence intervals of standard errors is:
[(C.I (95%)] = 1.72—2.54
and the confidence intervals of odds ratio is:

(C.I (O.R) =5.58—12.6

That is a small value, so represent the samples population [7].

## 3. Hematological STUDY

### 3.1. Blood film tests on inhabitants

Blood films of two groups of inhabitants were tested . One made up of people, who are living far away from HVOHL (controls) . The second group of people, who are living directly under HVOHL and had long – term exposure to electromagnetic fields of HVOHL (cases).

The following figures shown these patterns for person living far away from high voltage lines (figure 8) and pattern for person living directly under high voltage lines less than 5 years (figure 9) in addition pattern for person living directly under high voltage lines more than 25 years (figure 10) .

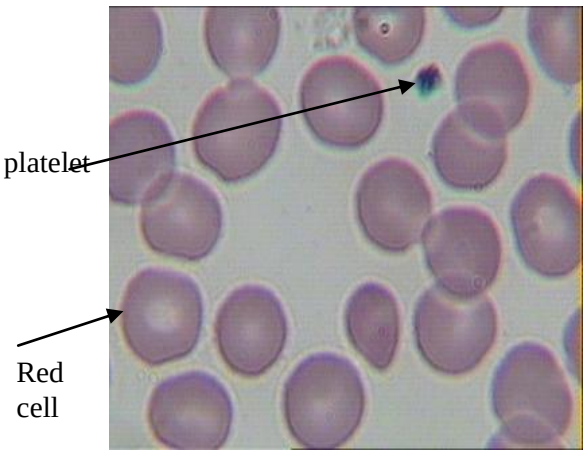


Figure (8) blood film of person living far away from high voltage lines
( normocytic normochromic blood red cells, adequate platelets, WBC,S Normal )

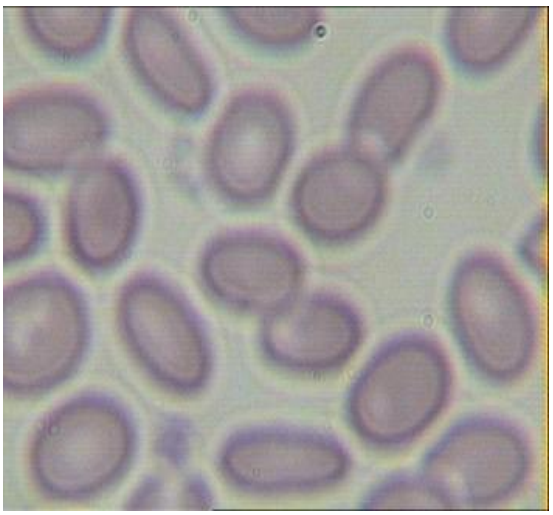

Figure (9) blood film of person living directly under high voltage lines less than 20 years
( mild changes: anisocytosis and poikilocytosis)

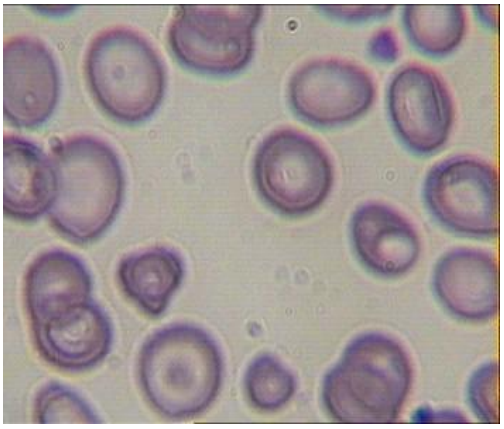

Figure (10) blood film of person living directly under high voltage lines bigger than 25 years
( anisocytosis ++, poikilocytosis+++, ovalocytes, tear cell, hypochromic cell )

This Study reported, that blood film of people, who are living long-time under HVOHL, shows changes in shape, number and volume of cells and platelet.

### 3.2. Exposing blood specimen to high voltage electric fields:

These tests were performed on blood samples of healthy people in high voltage laboratory .We put the samples of blood in homogeneous field with electrical strength:
(10 kV /m -15 kV /m - 22 k V / m - 30 kV /m ) for tow hours (cases).
In addition, we have blood specimens of the same person (controls) without exposing of HV-field.
After that we performed blood film tests for all these samples.
The exposing of blood samples to electrical Field lead to changes of blood film. We observed in all tests changing in anisocytosis, poikilocytosis and Hypochromia.
The following figures shown results of these tests:

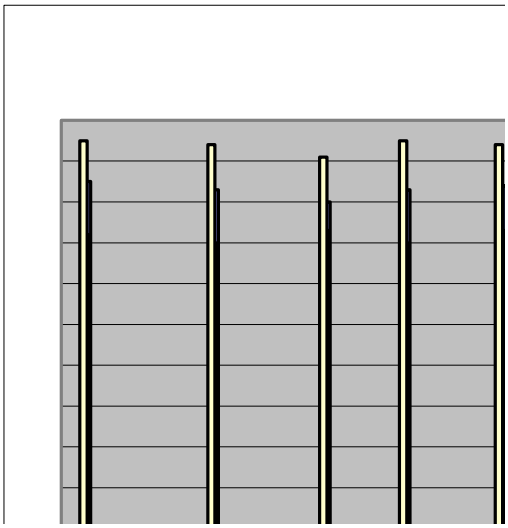

Figure (11) changes of blood film of samples After HV fields test.
anisocytosis,
poikilocytosis,
Hypochromia

#### 4. MELATONEN HORMONE LEVEL TESTS:

These hormone tests performed on persons who exposed to HVOHL fields (30) person (cases). In addition (30) person, none exposed to HVOHL fields (controls).

The following table 2 shows average value and standard error for the results of melatonin hormone level tests:

Table (2) melatonin hormone level test

| Study | Average value and stander error for results melatonin hormone | |
|---|---|---|
| Kind of radiation | High voltage radiations | |
| Value | Plasma melatonin Pg/mL | $S_{E*}$ |
| non expose (control) | 30 | 2.43 |
| EMF expose (case) | 18 | 2.13 |

$S_{E*}$: standard Error

This table (2) shows, that plasma melatonin hormone concentration decrease 40% in the EMF exposed (cases).

## 5. CONCLUSION.

The result of statistical, hematological and hormone studies show that exposing of peoples to HVOHL fields lead to:

- increase some diseases
- decrease hormone melatonin concentration
- Change of anisocytosis, poikilocytosis,- Hypochromia in blood film .

## 6. REFERENCES

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