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Research Article

**AN ANALYSIS REPORT ON THE OUT COMES OF SMOKING  
ON ABSOLUTE BLOOD COUNTS, SERUM C-REACTIVE  
PROTEIN AND MAGNESIUM QUANTITIES AMONG YOUNG  
HEALTHY MALE SMOKERS**<sup>1</sup>Dr. Usman Tariq, <sup>2</sup>Dr. Muhammad Farman Raza, <sup>3</sup>Dr. Muhammad Safer Ul Islam<sup>1</sup>Hospital Services<sup>2</sup>AIMH Sialkot<sup>3</sup>Nasir Hospital LGH**Abstract:**

**Objective:** To study the deep results due to smoking in young male smokers on serum C-reactive protein, magnesium levels and complete blood count.

**Methods:** The complete study was held in 2 villages of Qasoor district in Punjab, Pakistan, from February, 2017 to January, 2018. The people involved in this study were vigorous young male smokers and equal quantity of non-smokers as references. For the judgement of the results of smoking, the serum C- reactive protein, complete blood count and magnesium levels in all the male smokers were calculated.

**Results:** The age group of 19 years to 39 years was having 50 persons in it. Except for lymphocyte found comparable results of complete blood count. In smokers, neutrophil was lower ( $p < 0.001$ ) and lymphocyte was significantly higher ( $p > 0.001$ ) as compare to the non-smokers. Smokers were having Serum CRP protein absorptions level at  $14.62 \pm 0.16$  mg/L as compared to the non-smokers level at  $4.81 \pm 0.38$  mg/L which is considerably greater ( $p > 0.001$ ). Though, opposite was right for serum magnesium levels which were considerably higher ( $p > 0.001$ ) in the non-smokers it was  $2.52 \pm 0.18$  mg/L as against the smokers it was  $1.09 \pm 0.38$  mg/dl. Smokers rather than the non-smokers were having the ratio of Serum C-reactive protein to magnesium was considerably greater ( $p < 0.001$ ).

**Conclusion:** Neutrophil count was lower whereas lymphocyte count was found higher in smokers. The major increase in serum C-reactive protein concentration in the smokers was due to smoking and it reversely results in decrease of magnesium level.

**Keywords:** Magnesium, Complete blood counts, Smoking, C-reactive protein.

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**INTRODUCTION:**

Among many dangerous diseases the smoking is the most hazardous reason of producing most killing diseases for example chronic obstructive pulmonary disease (COPD) and such as cardiovascular disease (CVD). Medical tests such as White Blood Cell (WBC) counts and C-reactive Protein (CRP) might be used to examine the infections activated by smoking which will describe the raise in plasma levels of inflammatory markers. Adipocytes and macrophage releases the cytosine which causes uncertain increase in CRP synthesis in the liver. According to an observation made in a recently released research study, level of C - reactive protein was more in young male smoker rather than persons who do not smoke. Furthermore, it has been also observed that the persons who have increased level of CRP Protein were in high danger zone of becoming addict of CVD, hypertension, diabetes and obesity.

Resistance from insulin was observed more in vigorous adult male smoker rather than in nonsmokers. Thirty percent lower high-density lipoprotein (HDL) cholesterol, too much poor density of lipoprotein (VLDL) cholesterol, much increased insulin levels and high glucose levels were also got in notice in them. It is very clear that smoking decreases cellular magnesium levels although these factors are not enough for better calculation of magnesium status of the smokers. It looks like that there is a relation between increased plasma levels of CRP in biological processes and hypomagnesaemia that make affect the function of vascular endothelial in persons having variation issues in blood pressure (BP) and obese people. Reaction identification of smoking in adult male smokers on magnesium levels, complete blood count (CBC) and serum levels of CRP was main purpose of this research study. Such a study, especially in the rural areas, determining the smoking reactions in young healthy persons on C-reactive protein, magnesium levels in blood and CBC was not conducted before.

**METHODS AND MATERIAL:**

The whole research study was carried out in 2 villages of Qasoor district in Punjab, Pakistan, from February, 2017 to January, 2018. The people involved in this study as reference (controls) were equal quantity of non-smokers as to subjects who were vigorous young male smokers. Criteria for choosing these villages was based on the mind set of

maximum male population regarding habits of smoking as active smokers/ passive smokers, one or the other. The case of the other villages was not according to the selection criteria. The margin of error was half (1/2) in the total of one hundred and twenty-five selected people of these villages. Used a simple formula to calculate the needed sample size for proportions that was 95.25.

Randomly selected the peoples (subjects) for purpose of study from these both villages. This selection was made only for males on the grounds of matching their social and economic status, height, weight and age. Persons who either using any medication or facing any kind of dangerous infection or diseases were not included in this study. Those subjects were termed as healthy smokers who were smoking from last at least three years at the rate of at least ten cigarettes in a day and also they were not undergoing from any inflammatory disease or infection. People who were not found in the habit of smoking ever in their life, termed as non-smokers. Observation parameters on the effects of smoking were set on the results of magnesium levels, CRP serum and CBC measurements from all subjects. Before taking blood samples an informed written permission was gained from all participants of the study. Also obtained the approval from Ethical committee of Jinnah Hospital, Lahore. The Sysmex XE-2100 a haematology automated analyzer was used to examine results of complete blood count (CBC). Whereas, standard methods Nyocard and Diasys kits were used to calculate the magnesium levels and serum CRP. Mean  $\pm$  Standard Deviation (SD) was used to show the gained data. Student's t- test was put in practice to compare the mean values amongst the controls and cases. Considered differences were indicating ( $p < 0.001$ ) significantly.

**RESULTS:**

Planned age wise group in which age range selected was 19 years to 39 years, total of 100 male people were included in it and was distributed into two groups as 50 subjects were healthy smokers and 50 as controls non-smokers. Found comparable resultant values of CBC for both groups of healthy smokers and non-smokers except for lymphocytes, which were significantly raised ( $p < 0.001$ ) and neutrophils, which were significantly higher ( $p < 0.001$ ). Result comparison is shown in table listed below.

**Table No1: Comparison between healthy smokers and nonsmokers on bases of blood CP**

Blood CP	Non-Smokers (n=50)	Smokers (n=50)	P Value
<b>Lymphocytes %</b>	31.10± 7.14	48.39 ± 1.30	<0.001
<b>Neutrophils %</b>	56.65± 9.80	45.74 ± 1.14	<0.001
<b>WBC %</b>	8.90 ± 2.62	8.38 ± 2.45	0.294
<b>Platelets x103/µl</b>	322.85 ± 9.52	273.73 ± 9.01	0.223
<b>MCHC g/dl</b>	30.50± 2.65	31.94 ± 2.19	0.315
<b>MCH pg</b>	26.55 ± 4.23	25.37± 5.09	0.137
<b>MCV fl</b>	83.05 ± 9.27	83.07± 11.82	0.226
<b>HCT %</b>	41.49± 4.78	40.34 ± 5.94	0.342
<b>Hb g/dl</b>	12.70± 2.17	12.89 ± 2.09	0.400

**MCHC:** Mean corpuscular hemoglobin concentration

**WBC:** White blood cell Results are presented as Mean ± S.D.

**MCV:** Mean corpuscular volume

**MCH:** Mean corpuscular hemoglobin

**HCT:** Hematocrit

**Hb:** Hemoglobin

**Table No2: Serum CRP and magnesium levels Comparison between healthy smokers and non-smokers.**

Variable	Non-Smokers (n=50)	Smokers (n=50)	P value
Magnesium Normal range 1.82 to 2.6 mg/dl	2.52±0.18	1.09±0.38	<0.001
CRP Normal range <5mg/L	4.81±0.16	14.62±0.16	<0.001

Results are presented as Mean ± S.D.

The mean absorption of serum magnesium in non-smokers (2.52±0.18mg/L) compared to smokers (1.09±0.38 mg/L) was considerably higher (p<0.001). The mean absorption of serum CRP in smokers (14.62±0.16mg/L) was significantly higher (p<0.001) as compared to non-smokers (4.81±0.38mg/L) as shown in table number two.

It was observed in healthy smokers that serum CRP level was higher than 10mg/l, whereas, serum magnesium level was less than 1.8mg/dl. But on the other hand, serum CRP was less than 7.5 mg/L and serum magnesium concentration was greater than 2.0mg/dl in all non-smokers. It was observed through serum samples of the smokers and nonsmokers that ratio of magnesium to CRP was 1.63±1.02 against 0.20±0.04 whereas P value was (p<0.001).

### DISCUSSION:

As like the previous judgments of adult smokers against non-smokers it was also observed in this study that counts of neutrophils was lower and lymphocytes count was considerably higher. Serum magnesium levels were also noticed to be considerably reduced in adult smokers through this study. The main reason behind it might be increased thermogenic effects of nicotine (an important integral

of tobacco) and release of adrenaline due to increased demand of magnesium in smokers. Moreover, because of poor tendency of eating in smokers they may get less magnesium as compared to non-smokers. According to the results of this study, high levels of serum CRP was also observed in another study. Inflammatory response was an early result of magnesium deficiency in rats according to another research study, which was carried out on 16 magnesium deficient rats. This result is also supported by the theory that in chronic infection magnesium lowers CRP levels and inhibits inflammation.

In accordance to another study that was carried out on 18 persons it was found that they were more likely to increase serum CRP with low intake of magnesium. It was found that hypomagnesaemia possibly the reason for the immune cells to be in activated state as after studying correlation amongst the raised CRP concentrations and low serum magnesium levels in healthy smokers. With the aim of explaining the role of serum magnesium shortage in the aetiology inflammation processes, more search studies are needed to be conducted as to examine more effects of smoking on CRP levels and plasma magnesium. Smoking rises the risk of infection as it

is very clearly observed in the present study after examining the relationship between magnesium levels and CRP. Anyhow, it will be very good to observe if the results of this relationship could be used to study the advanced reactions of smoking for analysis of deadly diseases.

### CONCLUSION:

Bad habit of smoking results in considerable decrease of magnesium levels and an increase of C-reactive Protein absorption, causing a reverse correlation amongst these two properties in young healthy smokers.

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