

The Effect of Smoking on Hemoglobin Concentration and Packed Cell Volume and Comparing them Between Smokers and Non- smokers in Diyala Province/Iraq

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ABSTRACT

Background: Smoking is a habit or pursuit in which smoker burn a substance (usually is a dried plant) and the resulting smoke enters the lungs through the mouth It is affecting on the health of human and causing serious conditions. **Objective:** This study aims to compare the effect of smoking on hemoglobin concentration and the packed cell volume between smokers and non-smokers persons attending to the health centers. **Subjects and Methods:** The study included two groups: Thirty nine smoker individuals and fifteen non- smoker individuals who attending Balad-Roze health center and Saray Baquba health center. This study was conducted for the period from 1st November 2014 to 1st March 2015. **Results:** The age of the studied groups range between 10-70 years. The results obtained that there is increase in the concentration of the Hemoglobin and Packed cell volume in smoker group compared with non-smokers and both of Hemoglobin and Packed cell volume mean of their concentration were related with increase of age. In Addition the mean of Hemoglobin and Packed cell volume was increase with smoking period. **Conclusion:** This study concluded that the smoking effect on Hemoglobin and Packed cell volume.

Keywords: Smokers; Hemoglobin; Packed cell volume.

INTRODUCTION

Smoking is habit or pursuit in which smoker burn substance (usually is dried plant) and the resulting smoke enters the lungs through the mouth. The smoker get this resulting smoke from water pipes and cigarette. Smoke contains a large number of toxic substances and the most important of them are a carbon monoxide and nicotine These substance are considered as the main cause of Yellowing teeth^{1,2}. Hemoglobin in the blood which is a portable protein inside red blood cells containing iron atoms² and band together with oxygen in the lungs and carry it to the tissues³. Smoking had verity effects on the health of human and consider as a responsible of development of many pathologic conditions and diseases of respiratory and circulation systems even digestive system and metabolic syndrome³.

Smoking is related with a raise of the risk of cardiovascular diseases and this may due to the many compounds in Tobacco Smoke especially the nicotine and carbon monoxide³. The nicotine induces formation of a clot in coronary arteries while the increase in formation of the carboxy hemoglobin may cause hypoxia⁴.

In addition there are an important role of free radical and peroxides from the Tobacco Smoke in Carcinoma and inflammatory process as they involved in Synthesis of prostaglandins and thromboxane⁵.

The present study was carried out to Compare the effect of Smoking on some hematological parameters include Hb and PCV.

SUBJECTS AND METHODS

Subjects

Two groups of people were included in this study, The first group comprised Smokers (39 individuals) while the second group comprised non- smokers (15 individuals) Who attending Balad-Rose health center and Saray Baquba health center. it was ascertained that all individuals in both groups do not suffer from any disease by questionnaires. The age of the individuals were ranged between 10- >71 years

Methods

This study was done for the period from 1st November 2014 to 1st March 2015. Blood samples were collected from all individuals in studied groups and the concentration of hemoglobin and PCV have been estimated Statistical analysis was performed using SPSS. Groups were compared using t. test for parameters: data are expressed as mean \pm standard deviation. $P < 0.05$ was consider significant.

RESULT

The Result revealed that the smokers comprised 35.64 ± 14.18 among studied individuals while non- Smokers comprised 25.80 ± 8.59 as Show in Table 1.

Table 1: Distribution of study groups based on numbers of smokers and non-smokers.

Age	Study group	
	Non smokers	Smokers
Mean and SD	25.80 ± 8.59	35.64 ± 14.18
T test	2.40	
P value	0.018	

Table 2: Means of Hb and PCV in smokers and non-smokers individuals.

P value	T test	Study group		
		Smokers	Non Smokers	
0.046	9.13	16.80+ 2.72	13.49 1.16	Mean ± SD
0.065	9.23	2.464± 50.08 39	42.00 ± 3.780 15	Mean Pcv ± SD Total number

Table 3: Means of Hb and PCV in smokers according to Age groups.

Age periods	Number	Hb		Pcv	
		Mean	SD	Mean	SD
10-20	2	47.00	0.00	15.00	0.00
21-30	17	49.11	2.02	15.71	0.65
31-40	7	50.83	0.98	16.07	0.54
41-50	6	49.50	1.76	15.80	0.57
51-60	2	54.50	0.70	16.80	2.12
61-70	3	54.00	0.00	16.98	2.64
71>	2	53.00	0.00	17.00	0.00
T test	155.37			71.63	
P value	0.01			0.01	

Table 2 Showed that the mean of Hb concentration was higher in smokers 16.80+2.72 compared with non- smokers 13.49 ±1.16 with P- Value 0.046. The mean of PCV in smokers was significantly higher in smokers 50.08_+2.464 than in non-smokers 42. 00 ± 3.780 with P-value 0.065

According to Age groups of smokers the mean of Hb concentration was higher in Age groups 51-60,61-70 and >70 years of respectively compared with young age groups as shown in Table 3. The mean of PCV among old individuals was higher than in younger as revealed in Table 3 .The Mean of concentration for both Hb and PCV was increase with increasing of the smoking periods as show in Table 4. The results obtained that there was a positive correlation between Hb and PCV in smokers as showed in Fig 1.

DISCUSSION

The Smoking has effects on hemoglobin and PCV concentrations in this study and there is a significant increase in the smokers. This agree with^{9,10} and the increase in hemoglobin concentration occurred a positive correlation with the smoking periods.

CO is one of 4000 substances of cigarette smoke and consider. And it is the main toxic substance⁹.

CO diffuse rapidly across alveolar capillaries and band strongly with Hb (it has 200-250) times bind ability stronger than O2¹⁰ and Form HbCO When it bind with Hb and this may cause hypoxia which is leading to increased values of RBCs- Hb and PCV^{11,12}.

Many studies were done in different places and different periods but they consist with the present study with slight variations such as^{9,10,11,12}. In Saudi Arabia and India and Nigeria the high value of hemoglobin and PCV were observed which is agree with the result of the present study and this may contribute to a hypercoagulable state in

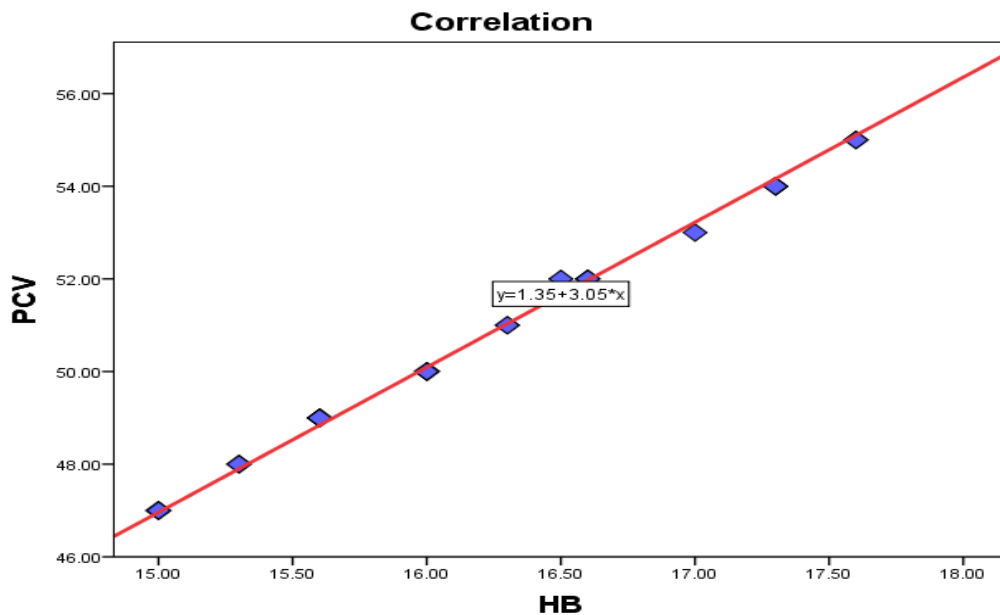


Figure 1: correlation between Hb and PCV in smokers.

Table 4: Hb and PCV among smokers according to smoking periods.

Smoking period	(1-4) year	(5-7) year	(8-10) year	(11-19) year	(20-26) year	T test	P value
Hb Mean± SD	15.244±0.384	15.6±0.447	16.01±0.623	16.5±0.173	17.3±0.189	71.26	0.01
Pcv Mean	47.77±1.201	48.86±1.345	50.17±1.915	51.66±0.577	50.40±0.632	53.88	0.01

smoker^{13,14,15}. The increase of hemoglobin and PCV in older ages may reflect the increase of the exposure period and the result of exposure periods in this study (table 4) support that the increase of consumption of cigarette lead to a make influence on the hemoglobin and PCV concentration¹⁶. In Individuals who smoke frequently and continuously the car boxy Hb levels increase and produces a progressive of hypoxia which result from CO bind with Hb which lead to functional anemia and this causes the impaired oxygenation of tissues and hemoglobin parameters¹⁷. There is appositive relationship between hemoglobin and PCV this may reflect the normal correlation between them since both parameters indirectly represent the Hb concentration in blood especially that all Hb in blood is contained with erythrocytes⁸.

CONCLUSION

The present study Showed that the hemoglobin concentration and Packed cell volume of smoker group was higher than non- smoker group. Further substantial in Large Population should be conducted to generalize these findings.

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