

# HAEMOGLOBIN, HAEMATOCRIT AND PLASMA FIBRINOGEN IN CIGARETTE SMOKERS

Pages with reference to book, From 162 To 163

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Acute change in smoking habits results in fluctuations in haemoglobin levels<sup>1</sup>. This study was therefore undertaken to see the effect of smoking on various haematological parameters.

## SUBJECTS, METHODS AND RESULTS

Seventy males (40 smokers and 30 non-smokers) between the ages of 35 to 70 years were selected for this study. A detailed medical and smoking history was taken and a thorough medical examination was done. Smokers included had history of smoking 10 or more cigarettes per day for at least 5 years. None of the subjects were found to have diabetes, liver or respiratory disease, congestive cardiac failure, bleeding disorders or any active illness known to effect the haematological parameters. Venous samples were taken from resting subjects in the morning and anticoagulated with E1)TA (1.5 mg/ml) for haemoglobin and haematocrit determinations. Haemoglobin was done by Cyan methaemoglobin method and haematocrit by microhaematocrit method on microhaematocrit machine (Hamule W. Germany). Samples were centrifuged in duplicate for 10 minutes and then averaged. Fibrinogen levels were determined in citrated plasma by quantitative clotting technique using Sigma diagnostic kits. Haemoglobin, haematocrit and fibrinogen levels were significantly higher in smokers than non-smoker (Table I).

**TABLE I. Comparison of haemoglobin, haematocrit and fibrinogen between control group and smokers.**

Group	Haemoglobin gms%	Haematocrit (%)	Fibrinogen (mg%)
Control (30)	14.30 ±0.14	41.50 ±0.23	241.83 ±3.03
Smokers (40)	15.63* ±0.15	46.00* ±0.25	356.38* ±4.32

\*P < 0.001 when compared to control group.

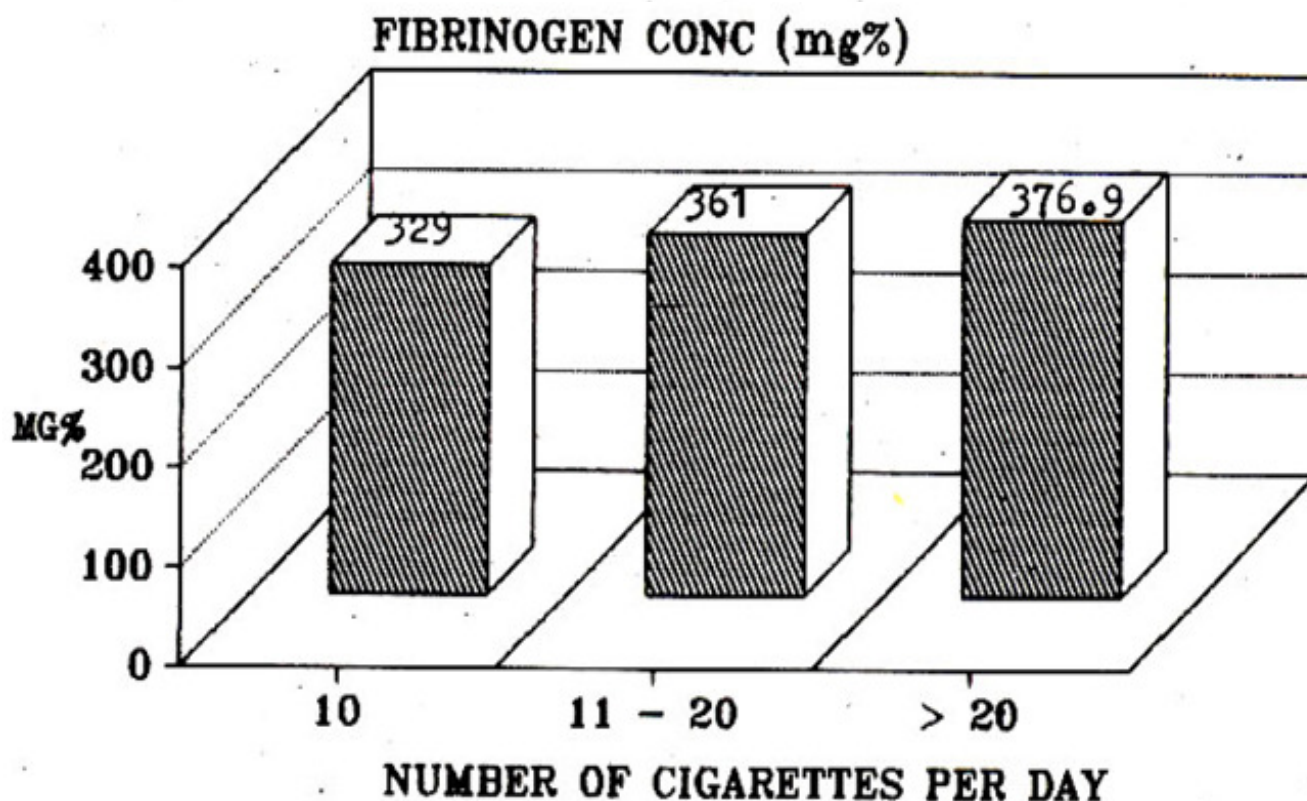
Number of subjects in parenthesis.

The percentage rise was 9.3, 10.3 and 47.4 respectively.

**TABLE II. Relationship of fibrinogen (mg%) concentration with number of cigarettes smoked per day.**

S.No.	No. of cigarettes/day	Fibrinogen conc. (mg%)	P value
1 (10)	10	329.00 ± 7.40	-
2 (22)	11-20	361.00 ± 4.74	<0.001
3 (8)	>20	376.90 ± 6.60*	<0.05

\*P < 0.001 when compared to group 1.  
Number of smokers in parenthesis.



**Figure. Relationship of fibrinogen (mg%) concentration with number of cigarettes somoked per day.**

Table II and Figure show that flbrinogen concentration increased significantly with the number of cigarettes smoked per day. Smokers with 11-20 dgarettes per day showed 9.7% and smokers with more than 20 cigarettes per day showed 14.5% rise offibrinogen when compared to the smokers of 10 cigarettes per day.

## COMMENTS

The venous blood haemoglobin and haematocrit are the simplest and most frequently measured laboratory parameters. There is increasing debate as to their normal reference ranges in a healthy population and also their levels in various physiological adaptations, e.g., high altitude, pregnancy, exercise and disease states respiratory, cardiac and vascular diseases. The definition of normal

population is difficult with smoking, stress, temperature and physical fitness. It is generally felt that the currently accepted upper limits for Hb levels of 180 gms/l in males and 165 gms/l in females are probably inappropriately high<sup>2</sup>. Levels of venous haematocrit that is generally accepted as normal may not necessarily be optimum<sup>3</sup>. The results of haemoglobin, haematocrit and raised fibrinogen levels reported here are in agreement with previous workers<sup>4-10</sup>. Fibrinogen also showed a dose dependent relationship with smoking<sup>5,10,11</sup>. Smoking increases fibrinogen levels and raised fibrinogen levels are associated with ischaemic heart disease<sup>9,12,13</sup>. A substantial part of the relationship between smoking and ischaemic heart disease appears to be mediated through fibrinogen concentration. It is concluded that reference values for healthy normal persons need reassessment specially with the exclusion of healthy smokers, the effect of smoking on various haematological parameters.

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