The Effect of Smoking on Blood Counts

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Haematological parameters (Hb, PCV, MCV, TLC & DLC) in 150 smokers (100 cigarette + 50 biri) were compared with 50 non smokers apparently healthy individuals of same age and sex. It was observed that there is increase in all these haematological parameters in smokers as compared to non-smokers. There was no difference in these parameters in individuals, smoking cigarettes to those smoking biris. Number of cigarettes/biris smoked per day had significant effect on these parameters as the individuals smoking more than 20 cigarettes/biris per day had raised value of these parameters than those smoking 10 cigarettes/biris per day.

INTRODUCTION

It is a well known fact that values of blood counts such as Hb, PCV, MCV, TLC, & DLC are influenced by a large number of physiological and pathological phenomena. At birth the values are very high and the adult levels are achieved by puberty. Smoking was introduced in England in the early part of 17th century. At first smoking of tobacco was believed to confer medicinal benefit upon the individual, but later it was considered as luxury. Indeed as late as 1890, tobacco was listed as medicine in the US pharmacopia. Tobacco smoke contains nicotine, pyridine, bases, hydrocyanic acid, ammonia, carbondioxide, carbomonoxide, organic acids, aldehydes, hydrocarbons and radioactive elements like polonium-210, carbon-14, potassium-40. The agent present in tobacco smoke responsible for most of the

pharmacological symptoms is principally nicotine. Nicotine is also called poison of enjoyment.¹

The changes of some of the measures of erythrocyte values were explained on the basis of chronic hypoxia and Landaw⁴ (1978) showed that chronic exposure to even low levels of carbon monoxide results in tissue hypoxia and an increase in red cell mass.

First it was observed that Hb, PCV & MCV are higher in smokers than non smokers.^{2,5} It was also demonstrated that in some cases the total leucocyte count and neutrophil counts in smokers were in the range which would normally be associated with infection or myeloproliferative disorders.⁶

The previous workers have not studied the effect of biri smoking a very common

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smoking habit in India on these haematological parameters.

Investigations were carried out three times and the mean of three were taken as values.

MATERIAL AND METHODS

The study was conducted on 200 apparently healthy looking individuals. These were divided into following groups:

Cigarette smokers males	100
Biri smokers males	50
Age matched non smokers males	50

In the smokers were included only those individuals who were smoking at least a packet (10) of cigarettes or biri daily. The various haematological parameters studied included Hb, PCV, MCV, TLC & DLC (Dacie and Lewis, 1991).⁷ The effect of age on these parameters were also recorded among all these individuals. Blood counts were carried out immediately after taking the blood and not beyond 8 hours of collection. Hb was estimated by cyanmethamoglobin method, WBC count by modified Neubauer's chamber method, PCV by macromethod Wintrobe's tube, MCV from the values calculated and DLC by examining the PBF stained with Leishman's stain. All the

RESULTS

The male subjects were grouped according to their smoking habits. For control the same studies were conducted in 50 healthy male individuals who were non smokers. To see the effect of age, all the groups were subdivided into various age groups as shown in Table I and II. The age range was from 20-58 years with mean age of 31 years in smokers, while in control group the mean age was 32 years. The individuals comprising smokers were further subgrouped depending upon the number of cigarettes or biris smoked per day and the results are shown in Table III.

Analysis of results in smokers were compared with controls and highly significant change in haematological parameters was observed (Table IV). While the analysis of results in cigarettes and biris smokers when compared, no significant change in haematological parameters was observed in both groups (Table V).

Table I: Showing the mean values of various blood parameters in normal male control group according to their age.

Age group (in years)	No.	Hb g/dl	PCV l/l	MCV fl	TLC/cu mm	DLC			
						P	L	M	E
20-29	20	12.66	0.457	86.88	8040	61	35	2	2
30-39	22	13.12	0.46	87.75	8320	61	36	1	2
40-49	6	13.66	0.48	89.18	8165	61	36	1	2
50-58	2	13.4	0.46	86.14	7656	58	39	1	2

Table II: Showing the mean values of various blood parameters in smokers according to their age.

Age group (in years)	No.	Hb g/dl	PCV l/l	MCV fl	TLC/cu mm	DLC			
						P	L	M	E
20-29	60	13.9	0.495	95.38	7850	62	33	2	3
30-39	61	14.2	0.504	96.04	8550	62	33	2	3
40-49	24	14.05	0.506	96.17	8830	61	35	2	2
50-58	5	14.5	0.53	97.83	9200	61	33	3	3

Table III: Showing the values of various blood parameters in smokers according to their number of cigarettes or biris smoked per day

No. of cigarettes/ biris smoked / day	Hb g/dl	PCV l/l	MCV fl	TLC/cmm	DLC			
					P	L	M	E
10 - 15	13.52 $\pm$ 0.78	0.483 $\pm$ 0.019	97.27 $\pm$ 2.08	8270 $\pm$ 840	62	33	2	3
16 - 20 Mean $\pm$ SD	14.29 $\pm$ 0.54	0.508 $\pm$ 0.015	96.79 $\pm$ 1.19	8310 $\pm$ 974	62	33	2	3
21 - 25	14.81 $\pm$ 0.52	0.525 $\pm$ 0.018	97.65 $\pm$ 1.37	8480 $\pm$ 895	61	34	2	3

Table IV: Showing the statistical analysis of various values in smokers in comparison of control group.

S.No	Parameters	Difference of two means	Standard error of difference between two means	Critical ratio (t - test)	P value	Significance
1.	Hb	1.07	0.23	4.65	< 0.001	Highly significant
2.	PCV	0.039	0.0036	10.8	< 0.001	
3.	MCV	8.49	0.42	20.21	< 0.001	
4.	TLC	220	126.2	1.81	> 0.05	Not significant

Table IV: Showing the statistical analysis of various values in smokers in comparison of control group.

S.No	Parameters	Difference of two means	Standard error of difference between two means	Critical ratio (t - test)	P value	Significance
1.	Hb	0.04	0.14	0.28	> 0.05	Not significant
2.	PCV	0.001	0.0047	0.2	> 0.05	
3.	MCV	0.28	0.47	0.59	> 0.05	
4.	TLC	186	156	1.19	> 0.05	Not significant

DISCUSSION

The haematological parameters were found to be higher in cigarette and biri smokers than non-smokers and our findings are consistent with the findings of other workers.^{2,5,6,8} But Helman and Rubenstein⁹ (1975) observed decrease in the value of Hb in individuals after the age of 50 years which was not observed in our study. Not much change

was seen in differential leucocyte counts. There was no difference in the value of haematological parameters in individuals smoking either cigarettes or biri, though there was relationship to the number of cigarettes or biri smoked, the haematological parameters were significantly higher in individuals smoking more than 20 cigarettes or biri per day in comparison to those smoking less than 10 cigarettes/biri per day. With increasing age

upto 50 years there was slight increase in the levels of haematological parameters, but after the age of 50 years, there was slight decrease in the levels of these parameters.

smokers are explained on the basis of chronic hypoxia by persistent presence of carboxy haemoglobin in the blood.^{2,4}

The change of increased blood counts in

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