

## Original article: Effect of Moderate consumption of Alcohol on Hematologic Profile of Indian Men

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### Abstract

**Background:** Alcoholism is a major public health problem. Consumption of excessive amount of alcohol for longer duration of period lead to development of various health related issues including hypertension, coronary heart disease and digestive system related disease.

**Objective:** The aim of this study is to demonstrate effect of alcohol consumption on complete blood count(CBC).

**Materials and Methods:** The present cross sectional study is conducted at Kesaral medical college, Ahmedabad. We select thirty(30) young age men between 20-40 year of age group with history of daily 2 to 3 units of alcohol intake/day for the past 1 to 3 years duration. Another thirty(30) men having same age of first(case) group, who were alcohol abstainers, served as controls. Hematological parameters of both groups were measured by using medonic (merck) Automated Hematology Analyzer. Data were presented as means±SD, and analyzed using the online student T-test.

**Results:** Mean corpuscular volume(MCV) value is found to be raised in case group 92±8 fl as compared to control 85±4 fl. The mean platelet concentration is found to be low 213±68( x 10<sup>3</sup>/LL) as compared to control group 213±68( x 10<sup>3</sup>/LL).

**Conclusion:** From our study we conclude that drinking of alcohol even for a short or moderate duration can affect various hematological parameter like platelet count and mean corpuscular volume(MCV).

**Key Words:** Alcohol; Moderate; Short-Term; Complete blood count.

Access this article online	
Quick Response Code:	Website: www.innovativepublication.com
	DOI: 10.5958/2394-6792.2016.00037.5

### Introduction

Alcohol has numerous adverse effects on the various types of blood cells and their functions. Consumption of excessive amount of alcohol for prolong duration causes suppression of bone marrow so it lead to defective erythropoietin and production of functionally abnormal red blood cell.<sup>[1]</sup> The present study is designed to determine whether or not alcohol, in amounts commonly consumed by "moderate drinkers," could alter the complete blood count value like Hb, MCV, MCHC, etc. Many bone marrow abnormalities occurring in severe alcoholics affect the RBC precursor cells. These abnormalities most prominently include precursors containing fluid-filled cavities (i.e., vacuoles) or characteristic iron deposits.

### Material and Method

This study is conducted at kesar sal medical

college and attached hospital, Ahmadabad, Gujarat, India after obtaining informed consent of all participants.

We have select thirty young age male patients of age group between 20-40 year with history of daily 2 to 3 units of alcohol intake/ day since last one to three years.

1 Unit of alcohol = 250-300 ml beer/150 ml wine/30-50 ml spirit. Physicians operationally define "light" drinking as 1.2 drinks/day, "moderate" drinking as 2.2 drinks/ day, and "heavy" drinking as 3.5 drinks/day. Abusive drinking is defined as 5.4 drinks/day.<sup>[2]</sup>

30 non alcoholic age and sex matched healthy volunteer are considered as a control group.

**Exclusion criteria:** Those who having smokers, any clinical signs of having nutritional deficiency or any pre-existing cardiopulmonary or hepatobiliary disorders, Diabetes mellitus, hypertension were excluded from the study. All subjects provided written informed consent.

3 ml of blood is collected from anterior cubical vein in supine position under all aseptic precautions in EDTA Vaccutainer. Hematological parameters were measured by using medonic(Merck) cell counter(3 part).

**Data Analysis:** The data are expressed as means $\pm$ SD, and analyzed using the one tailed unpaired (equal variance) t- test using the Microsoft Excel 07 software. The level of significance was taken at P values < 0.05.

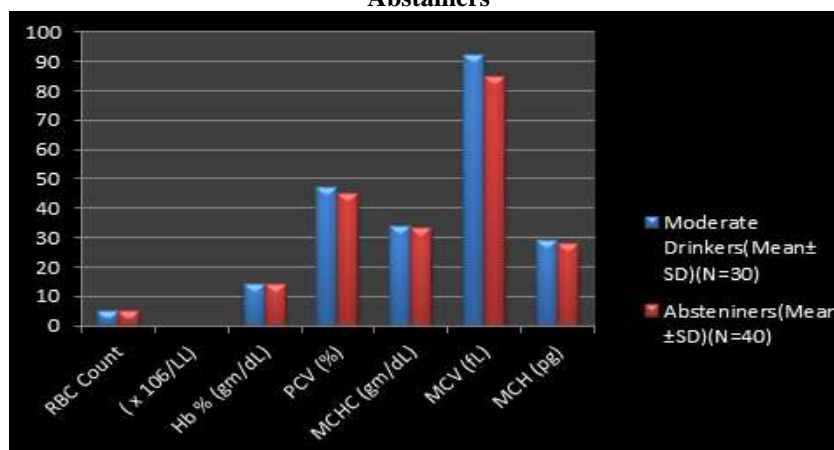
**Table 1: Showing complete blood count data of case(30) and control(30) group**

parameters	Moderate Drinkers(Mean $\pm$ SD)(N=30)	Abstainers(Mean $\pm$ SD)(N=40)	P-value
RBC Count ( x 10 <sup>6</sup> /LL)	4.8 $\pm$ 0.6	4.9 $\pm$ 0.5	> 0.05(Nonsignificant)
Hemoglobin(Hb) % (gm/dL)	14.2 $\pm$ 2	14.7 $\pm$ 1	> 0.05(Nonsignificant)
Packed cell volume(PCV) (%)	47 $\pm$ 5	45 $\pm$ 3	> 0.05(Nonsignificant)
Mean Corpuscular Hemoglobin(MCH) (pg)	29 $\pm$ 4	28 $\pm$ 3	> 0.05(Nonsignificant)
Mean corpuscular Volume (MCV) (fL)	92 $\pm$ 8	85 $\pm$ 4	< 0.05*(Significant)
Mean corpuscular hemoglobin concentration (MCHC) (gm/dL)	34 $\pm$ 2	33 $\pm$ 1	> 0.05(Nonsignificant)

**Table 2: Showing comparisons of complete blood count data between case(30) and control(30) group**

parameters	Moderate Drinkers(Mean $\pm$ SD)(N=30)	Abstainers(Mean $\pm$ SD)(N=40)	P-value
TLC ( x 10 <sup>3</sup> /LL)	5.8 $\pm$ 2	6.1 $\pm$ 2	> 0.05
Neutrophils (%)	55 $\pm$ 8	53 $\pm$ 7	> 0.05
Monocytes (%)	14 $\pm$ 5	16 $\pm$ 8	> 0.05
Lymphocytes (%)	33 $\pm$ 6	36 $\pm$ 8	> 0.05
Platelet count ( x 10 <sup>3</sup> /LL)	213 $\pm$ 68	257 $\pm$ 83	< 0.05*

**Graph 1: Graphical presentation of Hematological Parameters of Moderate Alcohol Drinkers and Abstainers**



The main clinical characteristics of the study and control groups are presented in the above section. We observed that the MCV value is significantly higher and platelet count was significantly lower in the short-term, moderate alcohol drinkers as compared to abstainers (see Tables 1 & 2).

## Discussion

In our study we found significant high level of MCV in moderate consuming alcohol patients as compared to healthy control and the platelet concentration is found to be significantly low as compared to control.

The Etiology of anemia in alcoholic is complex and multifactorial, causes include a combination of poor nutrition, chronic inflammation, blood loss, liver dysfunction and ineffective erythropoiesis. A number of clinical trials in men have suggested that alcohol may act as a hematological toxin in the body.<sup>[2]</sup>

Study done by John L and colleagues,<sup>[3]</sup> found a marked low level of platelet concentration in alcoholic population.

Shaper AG and colleagues<sup>[4]</sup> reported that alcohol intake has highly significant positive associations with hemoglobin, PCV and TLC and highly significant negative associations with RBC count. In our study, the MCV was significantly higher ( $P < 0.001$ ) in moderate drinkers than the abstainers. Elevated MCV in heavy drinkers has been reported by previous workers.

David S and colleagues<sup>[5]</sup> found an increase of MCV and thrombocytopenia much more commonly associated with heavy alcohol intake. Similar findings were observed in studies conducted by Oduola T and colleagues,<sup>[6]</sup> John BW and colleagues<sup>[7]</sup> Avasroglu D and colleagues,<sup>[8]</sup> and Whitehead TP and colleagues.<sup>[9]</sup>

Mechanism of action of effect of alcohol consumption on hematopoietic and platelet synthesis is not known but it was found that alcohol interfere in maturation step of platelet.<sup>[1]</sup>

Effect of alcohol is found to be similar to that of aspirin. Immediate effect of alcohol consumption is to decrease platelet aggregation in response to most of agonist like thrombin, Epinephrine, Collagan etc. The ant platelet activity of alcohol is explained by pure ethanol but also by polyphenolic components which are enriched in red wine.<sup>[10]</sup>

Beard JD et al. reported reductions in hematocrit, hemoglobin, and leukocytes in normal dogs fed ethanol while ingesting an "adequate diet".<sup>[11]</sup> Farland and Libre noted a leukopenic response to severe bacterial infections in ten alcoholics and found a suboptimal leukocyte response to injected endotoxin. They concluded that their patients had a decreased marrow granulocyte reserve of unknown etiology. Because of the frequent finding of folate deficiency in alcoholism the unknown factor might have been folate deficiency.

Shaper AG et al.<sup>[12]</sup> reported that alcohol intake has highly significant positive associations with hemoglobin, PCV and TLC and highly significant negative associations with RBC count.

## Conclusion

From our study conclusion is that drinking of alcohol even for a short or moderate duration can affect various hematological parameter like platelet count and

mean corpuscular volume(MCV). So it should be taken in to consideration while doing management of alcoholic patients.

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