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ASSESSMENT OF SERUM IRON AND COPPER IN INDIAN SMOKERS

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Conflicts of Interest: Nil

Abstract:

Background: Tobacco smoking is one of largest public health problem throughout the world which has altered essentialminerals including serum iron and coppers those affecting important metabolic reactions. **Methods**: A cross sectional study was carried out to determine the effect of cigarettes/beedis smoking on serum iron and copper on 50 smokers and 50 nonsmokers aged 18 to 45 years, both sex and BMI ≤ 25were enrolled.

Results: statistical analysis revealed that serum iron and copper were significantly higher in smokers than nonsmokers ($p<0.05$).Serum iron showed significant correlation with number of cigarettes/beedis smoked per day but doesn't with duration of smoking. Serum copper showed that no correlation with number of cigarettes/beedis smoked per day and duration of smoking.

Conclusion: Our study concluded that smoking increases the serum iron and copper which leads to altered metabolism and hazards to overall health.

Keywords: Smoking, Metabolism, Iron and Copper.

Introduction

Cigarettes/beedis Smoking is a very common habit in humans in which a substance, most commonly tobacco is burned and the smoke tasted or inhaled[1]. Tobacco smoking alters the essential Minerals iron and copper involved as catalyst in most cellular enzymatic reactions and metabolic reactions in our body.[2] Functions of Iron include involvement in energy metabolism, gene regulation, cell growth and differentiation, oxygen binding and transport, muscle oxygen use and storage of serum iron[3,4]. Functions of copper is to participate in many biochemical processes including cellular respiration, cellular utilization of oxygen, all cell membrane integrity, and sequestration of free radicals[5]. There are very few studies about the effect of cigarettes /beedis smoking on the serum Iron and Copper in healthy adults in India. As there is wide spread habit of smoking cigarette/beedi among in India as well as population of Udaipur district and surrounding areas, hence it becomes crucial to this present study which provides a detail profile of the serum Iron and Copper according to cigarettes/beedis smoking (smoker and non-smoker), dosage (number of cigarettes /beedis smoke per day) and duration of smoking in healthy young male/female smokers of population in Udaipur region, Rajasthan, India.

Aims and Objectives

Aims of study to spread awareness among smokers, the hazards of smoking and discourage it.

The Effect of smoking on serum Iron and Copper in healthy smokers.

Compare the serum Iron and Copper in smoker and nonsmokers Effect of severity and duration of smoking on serum Iron and Copper.

Material and Methods:

Present study was an observational cross sectional study conducted in clinical lab in department of Biochemistry R.N.T. medical college Udaipur Rajasthan, after obtaining ethical clearance from the ethical committee. 100 male/female volunteers were enrolled in this

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study including 50 volunteers were cigarettes /beedis smokers and 50 volunteer's nonsmokers as a control group. The inclusion criteria, for smoker and nonsmokers aged 18 to 45 years, both sex, BMI <25 and average Indian diets. The subjects were divided (according no. of cigarettes/beedis per day) into 4 groups

(a) Nonsmokers: subjects who have never smoked and those who left at least more than 05 years smoking taken as controls
(b) Mild smokers: 01-10 cigarettes /beedis per day for at least 05 years or more
(c) Moderate smokers: 11-20 cigarettes/beedis per day for at least 05 years or more
(d) Heavy smokers: more than 20 cigarettes/beedis per day for at least 05 years or more

And divided them 3 groups (according to duration of smoking), group 1(5- 10 years), group 2 (11-15 years) and group3 (>15 years).

Exclusion criteria: Both groups were without history of chronic alcoholism, chronic disease, recent blood transfusion and drugs that affects analysis results.

Volunteers were enrolled in the study after being fully informed about the aims of study. After written consent, detailed history &physical examination, venous sample was collected from each volunteer by venipuncture technique and were placed in anticoagulant free containers, and allowed to clot then centrifuged at 3000 rpm for 5 minutes to obtain serum and measured serum iron and copper in semi auto analyzer by colorimetric methods.

Statistical Analysis

Data analysis the results were analyzed using the statistical package for social science software system (SPSS, VERSION 20). Data were described using the mean and standard deviation for the significant differences between groups. 't' test was used to compared the difference of serum iron or copper between smokers and nonsmokers. In addition ANOVA test was performed to find the differences of these parameter among three group of smoking intensity.Furthermore, the chi square test was used to evaluate the association between variables.All statistical tests were considered significant in p value of <0.05 with a confidence level of 95%.

Results:

Table 1: Iron and Copper in smoker and non-smokers

Case type	Nonsmokers(n=50)	Smokers (n=50)	P value
Iron	87.74±11.65	131.41±16.75	< 0.05
Copper	85.11±10.17	120.30 ±11.44	< 0.05

Values are presented asmean ±standard in µg/dl and p value <0.05 are statistically significant

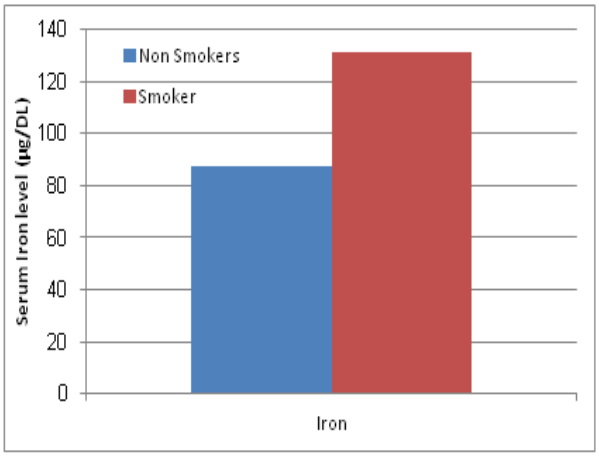

Figure 1: Serum iron level in smokers and nonsmokers

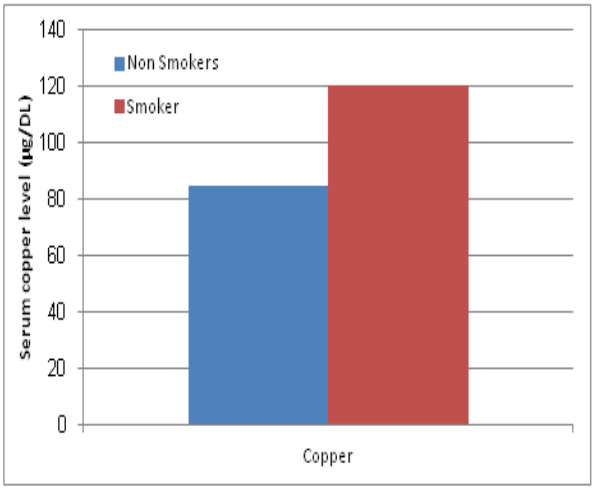

Figure 2: Serum copper level in smokers and nonsmokers

Discussion:

Tobaccosmoking causes disturbances which lead to serious consequences smoking leads to tissue hypoxia which leads to inadequate oxygenations of blood circulation that results in erythropoiesis and consequents increased production of erythropoietin which enhances erythropoiesis and increased cell mass above normal level this leads to increase in the number of destroyed red cells in the normal turnover process which subsequently increase iron overload which causes hepatocellular damage[6]. Several investigators have reportedcopper concentrations are typically increased in adult's smokers[7.] It has beendemonstrated that tobacco smokeincreases the inflammatory processes and causes increased expression of inflammatory mediatorssuch as interleukins1 (IL-1),(IL-2),(IL6) and (IL-8)[8]. In our study we found that serum Iron level was significant difference in smokers ($P<0.05$) when compared to nonsmokers and these results were in consistentwith above studies by Sulafaet al[9]and Shivasekaret al [10].And we found that serum copper level was significant difference in smokers ($P<0.05$) when compared to nonsmokers and these results were in consistentwith above studies by Davidoff et al[11] and Atheer A et al[12]. There is direct relationship between smoking (number of cigarettes/beedisper day) with serum iron which was significant positive correlation ($p<0.05$) but does not correlation with duration of smoking. These results were compared with previous study by SulafaAli et al.There is no correlation of serum copper with severity of smoking (number of cigarette/beedis per day) and duration of smoking inpresent study. These results were in compared with previous study by Atheer et al.

Conclusion:

Our study concluded that smoking increased the serum iron and copper in smokers but doesn't significant positive correlation with severity of smoking so that large sample size required for further study.

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