

Tobacco smoking: Health impact and association with serum lipid profile

Nivriti Singh¹, Shwetank Agrawal²

¹Department of Physiology, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India, ²Department Of General Surgery, Varun Arjun Medical Research Institute, Shahjahanpur, Uttar Pradesh, India

Corresponding Author:

Nivriti Singh, Department of Physiology, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India.
Phone: +91-7300964639.
E-mail: drnivriti@gmail.com

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Introduction: India being the world’s largest democracy with about 300 million people living in conditions of extreme poverty. Consumption of tobacco in various forms is one of the most common practices in India and it constitutes about 28.6% of the Indian population. Consumption of tobacco is a major health problem and a concern of immediate attention as it has a direct effect on cardiovascular system thereby causing atherosclerosis results in an increase in the risk of adverse cardiac events. **Materials and Methods:** A total of 120 male subjects with 60 each of smokers and non-smokers of 25–50 years age group selected and blood samples of the same were collected after an overnight fasting of about 12 h. The complete lipid profile was obtained and analyzed statistically. **Results:** The observed fasting lipid value in mg/dl was: Total cholesterol (TC), very low-density lipoproteins (LDL), LDL, high-density lipoproteins (HDL), and triglycerides were 221.01 ± 39.39 , 3.33 ± 20.01 , 119.99 ± 39.11 , 31.91 ± 7.51 , and 241.80 ± 96.02 , respectively, and TC/HDL ratio was 7.01 ± 1.65 and the result was found to be significantly higher in smokers when compared to non-smokers. **Discussion:** Smoking tobacco causes increased concentration of nicotine in blood and it also causes abnormal lipid profile due to sympathetic stimulation by nicotine. It also results in increase in levels of catecholamine’s which further enhances lipolysis and deranges lipid profile. **Conclusions:** Increase in the level of blood nicotine causes and promotes coronary, and cerebral atherosclerosis causing premature death and lipid profile was significantly higher among smokers when compared to non-smokers.


KEY WORDS: Atherosclerosis, chronic smokers, serum lipid profile, smoking

INTRODUCTION

India being the world’s largest democracy with about 300 million people living in conditions of extreme poverty.^[1] Consumption of tobacco in various forms is one of the most common practices in India and it constitutes about 28.6% of the Indian population.^[2] Among various forms of tobacco consumption, smoking is one of the most common habits practiced in the country and is one

of the largest preventable risk factor for causing morbidity. This practice is usually more prevalent among males than females. Globally, approximately one-third of the world’s population consumes tobacco in various forms.^[3]

In India, consumption of tobacco is a major health problem and a concern of immediate attention as this in the long run not only causes cancer of oral cavity and respiratory system but also adversely affects cardiovascular system causing and hastening atherosclerosis and increases the risk of adverse cardiac events. It also has various direct and indirect effects on various body systems. This also adds to the burden over the family both in terms of medical cost and economic burden and its prevalence being more common among lower socio-economic strata add to the medical and economic burden in the country. The present form of this practice is not only a social

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and cultural problem but also a biomedical, economic, as well as geopolitical.^[4]

In the year of 1995–1996, a national sample survey was organized by National Sample Survey Organization where data on tobacco consumption among Indian population by household survey were performed. The survey found prevalence of tobacco consumption among males to be 51.3% whereas it was 10.35% among females.^[5]

With a view of the 2030 agenda of sustainability development goal for the reduction of poverty and promotion of good health, a very effective tobacco control policies are required for hastening the fulfillment and achievement of the desired goal.

The present study has been undertaken with a view to evaluate and describe various demographic associations along with psychosocial and biologic factors that might be playing in the association with current practice of cigarette smoking.

MATERIALS AND METHODS

The present cross-sectional study has been conducted at a tertiary care teaching hospital in Uttar Pradesh with a view to study effect of tobacco smoking on health as well as its prevalence and correlation with serum lipid profile. Ethical clearance from institutional ethical committee was taken. A total of 60 male subjects were taken between the ages of 25 and 30 years who were smoking for more than 5 years from medicine outpatients department.

Inclusion Criteria

The following criteria were included in the study:

1. Age 25–50 years
2. Smokers who smoke more than 20 cigarettes for more than 5 years.

Exclusion Criteria

The following criteria were excluded from the study:

1. Subjects <25 years and >40 years of age
2. Body mass index more than 24 (obesity)
3. Persons with history of angina, diabetics mellitus
4. Habit of alcoholic
5. Subjects with renal and or hepatic failure
6. Family history of lipid disorders, tuberculosis, or other chronic respiratory illness
7. Females.

We explained the purpose and objective of the study to each and every subject in the local vernacular language. The cases were taken from the outpatient department of medicine of the institute and all the relevant details were taken from each individual in a preformed format. The blood was collected in the morning and send for analysis of various lipid parameters such as serum total cholesterol (TC), triglycerides (TG), high-density lipoproteins (HDL), and low-density lipoproteins (LDL).

OBSERVATIONS AND RESULTS

A total of 120 subjects were screened for the study and out of these, there were 60 smokers and non-smokers. The observed fasting lipid value in mg/dl was: TC was 221.01 ± 39.39 , very LDL (VLDL): 43.33 ± 20.01 , LDL: 119.99 ± 39.11 , HDL: 31.91 ± 7.51 , TG: 241.80 ± 96.02 , and TC/HDL ratio was 7.01 ± 1.65 and was found to be significantly higher in smokers when compared to non-smokers.

In the present study, *P*-value was considered to be significant if it was found to be less than 0.05 and the same was considered to be not significant if the value was found to be greater than 0.05 and it was considered as to be highly significant if *P*-value was found to be less than 0.001. The various lipid parameters which were found to be significant were VLDL and TG, whereas it was highly significant in TC, LDL and ratio of TC to HDL but the result was not significant in the analysis for HDL alone [Table 1].

DISCUSSION

Smoking tobacco causes increased concentration of nicotine in the lung alveoli and from the alveoli nicotine is absorbed in the blood stream and comes in the mainstream and gets circulated in different parts of the body and it causes adverse effect in various parts of the body and blood vessels are worst affected by it and it causes damage to vessel walls and initiated and progresses the formation of atherosclerosis which further damages various end arteries and also blood vessels supplying heart.^[6]

The present study shows a direct association of tobacco smoking with the causation of atherosclerosis. Other studies done by Mitchell,^[6] Glueck *et al.*,^[7] and Freedman *et al.*^[8] have also found a direct association of cigarette smoking with increases of serum level of lipid and lipoprotein.^[6-8]

Qiao *et al.*^[9] found increase in the risk of premature deaths among middle aged male smokers and giving up smoking at an early stage can prevent premature death attributable to smoking.

Meta-analysis done by Craig *et al.*^[10] found that mean TG, LDL-cholesterol (LDL-C), and HDL-cholesterol levels are significantly higher among smokers with a history of 8–19-year than among those smokers who started late in adulthood. The study found a net shift of the lipoprotein fractions among the two groups of smokers and thus they concluded that estimation of lipoproteins is likely to be a less sensitive indicator of coronary artery disease among smokers with excess serum lipid parameters.

The current study showed that smoking enhances the levels of TC, TG, and LDL-C level and these results are highly significant. Same results are also observed in the study of Friedman *et al.*,^[8] Neki^[11] and Akbari *et al.*^[12] which showed that change in serum lipoprotein levels are more marked in chronic smokers and the increased TC, TG, and LDL-C levels were also observed in the study of Friedman and Dale.^[13] A study showed that lipid profile level increases in chronic smokers.

Table 1: Level of serum lipid profile

Serial number	Parameters	Values (mg/dl)	P-value
1	Total cholesterol	221.01±39.39	P=0.001
2	VLDL	43.33±20.01	P=0.015
3	LDL	119.99±39.11	P=0.001
4	HDL	31.91±7.51	P=0.381
5	Triglycerides	241.80±96.02	P=0.015
6	Total cholesterol/HDL ratio	7.01±1.65	P<0.001

Increase in TG, TC, and LDLC levels and decrease in HDL-C levels were also observed in study done by and Kesaneimi *et al.*^[14] Our study did not match with the study done by Dirican *et al.*^[15] who did not found significant difference in the levels of serum TC, TG, LDL, and HDL between smokers and nonsmokers and found the same to be one of the risk factor for the development and progression of coronary artery disease.

CONCLUSIONS

Consumption of tobacco in various forms causes rise in the blood level of nicotine and this gives rise to various manifestations and adverse effect and simultaneously it increases the prevalence of various chronic non-communicable diseases such as carcinoma of the oral cavity and respiratory tract and lungs, derangement in lipid level promotes cardiovascular diseases with increases incidence of coronary artery disease and cerebrovascular accidents. Nicotine acts on the brain and causes dependence and urge for nicotine and thereby creates a vicious cycle of nicotine dependence and is one of the causes of premature deaths among middle-aged men and early quitting of smoking will help in preventing premature deaths.

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