

# COMPARISON OF LIPID PROFILE IN TOBACCO USERS AND NON-TOBACCO USERS

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## ABSTRACT:

**BACKGROUND:** Tobacco usage is one of the major factors in the genesis of coronary atherosclerosis and development of coronary heart diseases (CHD). Tobacco usage is recognized as a major risk factor for the development of ischemic heart disease may lead to alter a normal plasma lipoprotein pattern. **AIM & OBJECTIVES:** To study variations of the lipid profile in tobacco users and non-tobacco users. To study the lipid profile in different age group of tobacco users and non-tobacco users. **MATERIALS AND METHODS:** The prospective study was carried out to find percentage of dyslipidemia among tobacco users in comparison with controls total 60 patients were included satisfying all the inclusion and exclusion criteria in this study. Serum lipid profile was analyzed in all the subjects. **CONCLUSION:** we observed significant increase in total cholesterol, triglycerides, low-density lipoproteins and high-density lipoproteins noted in age groups between 20 to 80 years with history of smoking and significant decrease in mean low-density lipoprotein, triglycerides and total cholesterol compared to non-tobacco users. Increased amount of tobacco usage causes more of dyslipidemia. Thus, the study is to make aware smokers and tobacco users about the variation in lipid profile impact and discourage tobacco usage in any form.

## I. INTRODUCTION:

In early 16<sup>th</sup> century, Portuguese sailors and merchants introduced tobacco in Asia among Indian sailors to take tobacco along with Yopa from Rio Guaviare in Colombia. It's use spread as a common practice all over India.<sup>(1)</sup> 34.6% of adults (out of which 47.9% is males and 20.3% is females) are smokers. 14% adults (out of which 24.3% males and 2.9% females) use smoking tobacco. 25.9% adults (out of which 32.9% males and 18.4% females) use smokeless tobacco.<sup>(2)</sup> Nearly 4 million tobacco related deaths every year attributed by WHO and is expected to raise 8.4 million deaths by 2020.<sup>(3)</sup> India is one among the world's top five tobacco producers and consumers. Two major forms of tobacco use in India are smoking (bidis or cigarettes) and chewing. A 'bidi' is a local cigarette made of strong tobacco rolled in a special leaf (temburni) which is grown abundantly all over India. Tobacco is chewed either alone or mixed with slaked lime, betel leaf and areca nut.<sup>(1)</sup> Tobacco chewing and cigarette smoking is the most preventable cause of preventable disease and premature death. Tobacco usage is one of the most potential and prevalent addictive habit influencing behaviour of human being. Smoking tobacco is now increasing rapidly throughout the developing world and is one of the biggest threats to current and future world health. Furthermore, while the prevalence of tobacco use has declined among men in some high income countries, it is still increasing among young people and women.<sup>(4)</sup> Cigarette smoking is the most common type of tobacco use which increases the risk of atherosclerosis, coronary heart disease, aneurysm and peripheral vascular disease.<sup>(5)</sup> On the other hand smokeless tobacco may increase the risk of cardiovascular disease and cancer of larynx, oesophagus and of other sites as well as gingival and periodontal disease.<sup>(1)</sup> The possible mechanisms of tobacco consumption in the pathogenesis of coronary heart disease are Carbon monoxide induced atherogenesis, Nicotine stimulation of the adrenergic drive, thus raising the blood pressure and the myocardial oxygen demand.<sup>(6)</sup> Tobacco continues to be the second major cause of death in the world. By 2030, if current trends continue smoking will kill more than 9 million people annually. It has been practised by most of the people all over the world from centuries.<sup>(4)</sup> Tobacco smoke contains 43 carcinogenic substances, over 4000 gases, particles and compounds such as tar, nicotine and carbon monoxide which can also cause the above diseases.<sup>(1,7)</sup> Nicotine is found to have effect on person's catecholamine & cortisol secretion which can alter carbohydrate and lipid metabolism in such person. Alteration in lipid metabolism may lead to dyslipidemic changes which may become a predisposing factor for atherosclerosis and ischaemic heart disease leading to increased morbidity and mortality in smokers.<sup>(8)</sup> In each cigarette 40-100ng/ml of nicotine is absorbed in the arterial blood.<sup>(9)</sup> According to National Cholesterol Education Programme: Adult Treatment Panel-III (NCEP: ATP-III)[4] dyslipidemia is defined as follows:

- Hypercholesterolemia: Serum cholesterol levels >200 mg/dl
- Hypertriglyceridemia: Serum triglyceride levels >150 mg/dl
- Low HDL cholesterol: HDL cholesterol levels <40 mg/dl for men and <50 mg/dl

For women:

- High LDL cholesterol: High LDL cholesterol levels >130 mg/dl (Friedewald equation)
- Isolated Hypercholesterolemia: Serum cholesterol  $\geq$ 200 mg/dl and triglyceride <150 mg/dl
- Isolated Hypertriglyceridemia: Serum triglycerides  $\geq$ 150 mg/dl and cholesterol <200 mg/dl(10)

## II. AIM AND OBJECTIVES:

The study is about the effects of tobacco in lipid profile of both tobacco users and non-tobacco users and to study the lipid profile in different age group of tobacco users and non-tobacco users.<sup>(4)</sup>

## III. MATERIALS AND METHODS:

The tobacco users were defined as those who had smoked at least once in every week for the last one year and who are using smokeless tobacco once in every week for the last one year. The controls were defined as those who had never smoked and never used smokeless tobacco for their life time.<sup>(4)</sup>

Here we included only those tobacco chewers who chew either tobacco lime preparation, ghutka or khaini and only smokers who smokes either bidi or cigarette.

## IV. INCLUSION CRITERIA:

- CONTROLS: 30 patients who never used tobacco.
- SUBJECTS: 30 patients who used tobacco products
- Both males and females are included.
- Different age group are included such as
  - i) 20-29.
  - ii) 30-39.
  - iii) 40-49.
  - iv) 50-59.
  - v) 60-69.
  - vi) 70-79.

## V. EXCLUSION CRITERIA:

Subjects having any of the following are excluded in the study

- Liver disease
- Chronic renal failure
- Nephrotic syndrome
- Hypothyroidism
- Diabetes mellitus
- DRUGS – beta blockers, glucocorticoids, thiazide Diuretics, lipid lowering drugs.

## VI. RESULT:

Table 1 Comparison of Lipid profile between Tobacco and Non-Tobacco Users.

Users	TC	TG	HDL	LDL
Non Tobacco	152.7 ± 27.18	140.87 ± 49.99	83.93 ± 29.1	45.43 ± 8.4
Tobacco	196.47 ± 43.38	200.17 ± 75.5	50.67 ± 12.83	91 ± 39.48

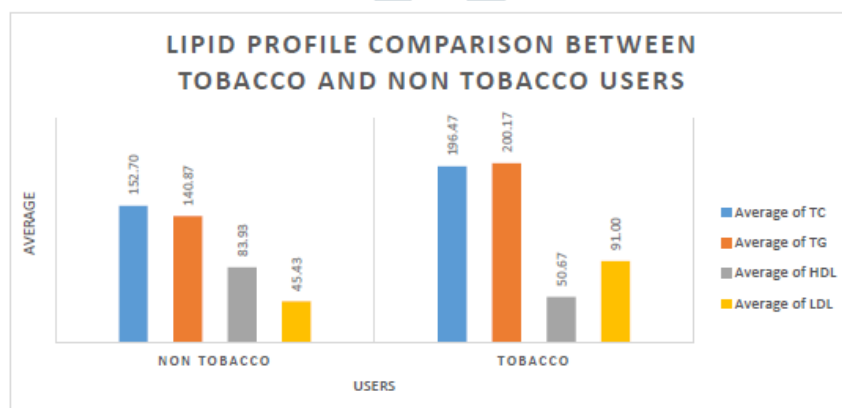


Figure 2 Comparison of Lipid profile between Tobacco and Non-Tobacco Users

This table shows that when standard deviation of TC, TG, LDL levels in non-tobacco users was compared with standard deviation of TC, TG, LDL levels in tobacco chewers and smokers which found to be statistically highly significant in tobacco chewers and smokers. When standard deviation HDL level in tobacco chewers and smokers compared with the standard deviation is significantly low in tobacco chewers and smokers.

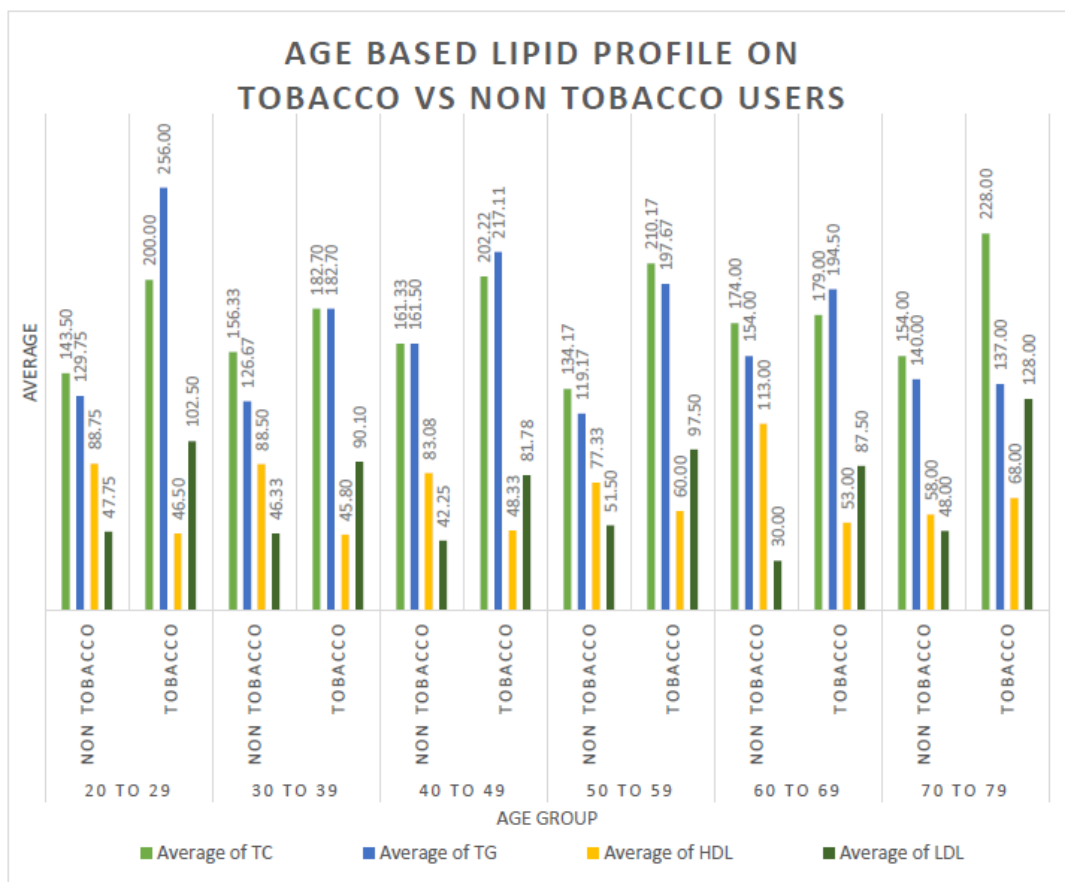


Figure 2 Comparison of Lipid profile between different age groups

In this chart shows that when standard deviation of TC, TG, LDL levels in controls in different age groups was compared with standard deviation of TC, TG, LDL levels in tobacco chewers and smokers in different age groups which found to be statistically highly significant in tobacco chewers and smokers.

Table 2 Comparison of Lipid profile between different age groups

Age Group	Users	TC	TG	HDL	LDL
20 to 29	Non Tobacco	143.5 ± 18.41	129.75 ± 17.92	88.75 ± 35.12	47.75 ± 10.11
	Tobacco	200 ± 32	256 ± 140	46.5 ± 3.5	102.5 ± 7.5
30 to 39	Non Tobacco	156.33 ± 45.73	126.67 ± 50.36	88.5 ± 31.42	46.33 ± 6.45
	Tobacco	182.7 ± 46.78	182.7 ± 58.23	45.8 ± 11.65	90.1 ± 41.99
40 to 49	Non Tobacco	161.33 ± 15.92	161.5 ± 58.36	83.08 ± 20.89	42.25 ± 5.29
	Tobacco	202.22 ± 46.88	217.11 ± 78.75	48.33 ± 13.13	81.78 ± 43.85
50 to 59	Non Tobacco	134.17 ± 15.19	119.17 ± 36.05	77.33 ± 34.89	51.5 ± 9.2
	Tobacco	210.17 ± 33.91	197.67 ± 61.45	60 ± 10.94	97.5 ± 36.93
60 to 69	Non Tobacco	174 ± 0	154 ± 0	113 ± 0	30 ± 0
	Tobacco	179 ± 21	194.5 ± 41.5	53 ± 8	87.5 ± 20.5
70 to 79	Non Tobacco	154 ± 0	140 ± 0	58 ± 0	48 ± 0
	Tobacco	228 ± 0	137 ± 0	68 ± 0	128 ± 0

When the standard deviation of HDL level in tobacco chewers and smokers of different age groups compared with the standard deviation of non-tobacco users is significantly low.

In comparison with different age groups the total cholesterol is comparatively high in 50 to 59 years of tobacco users, the triglycerides is higher in 20 to 29 years, LDL is high in 70 to 79 years of tobacco users, HDL is high in 60 to 69 years of non-tobacco users.

Thus, the result is significantly shows that the lipid profile is higher in tobacco users patients who are more prone for cardiovascular diseases.

## VII. DISCUSSION:

Brischetto C S et al, observed that in cigarette smokers, increased carbon monoxide in the blood may damage the endothelium and accelerate the entry of cholesterol into the wall of coronary artery. Smoking enhances platelet aggregation.<sup>(1,12)</sup> Increased plasma Free fatty acid level causes HDL to decrease and LDL to increase, which leads to higher risk cardiovascular disease(CHD).<sup>(3)</sup> Freeman et al observed that the lipoprotein lipase activity reduced in the chronic smokers, which may cause increase in triglycerides level and total cholesterol leadsto the higher risk of CHD.<sup>(4,13)</sup> Since tobacco contains nicotine and it is established that it causes considerable influence on the increasing levels of lipids in the blood.<sup>(6)</sup> Batic\_mujanovic O et al, observed that decreased levels of HDL cholesterol and increased levels of total cholesterol, LDL cholesterol and triglycerides in smokers as compared to those in non smokers. The same observation was found in our study also.<sup>(6,14)</sup> Lillian and Muula et al, observed that cigarette smoking is one of the leading causes of preventable morbidity and mortality that starts in the adolescence and continues into adult life. As same in our study, 20 to 29 years of age groups had increased triglycerides level while compared between the other age groups which cause increased risk of CHD.<sup>(11,15)</sup>

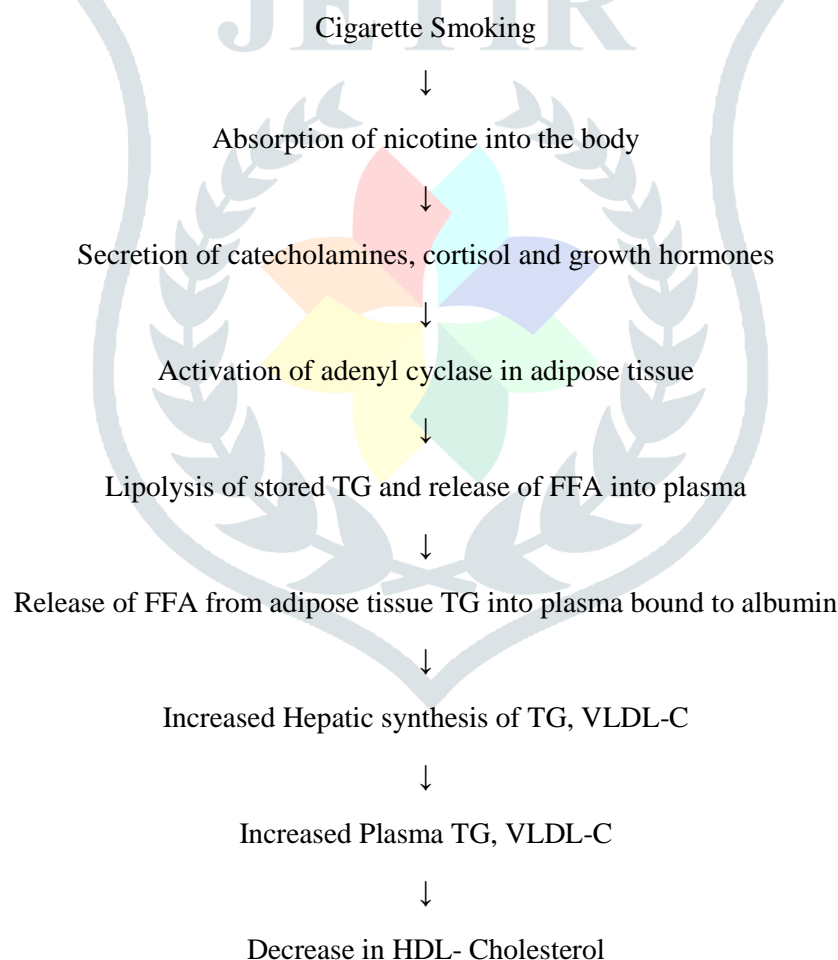


Chart:1 Chart showing a possible mechanism by which nicotine absorbed from cigarette smoke may elevate plasma lipids and lipoproteins.<sup>(5)</sup>

## VIII. CONCLUSIONS:

Tobacco usage causes decrease in HDL and increase in TC, TG and LDL indicating that they independently associated with such an unfavourable lipid profile there by greatly increasing the cardiovascular risk particularly for coronary artery disease.<sup>(1)</sup>

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