

Original Research Article

A study of lipid profile in young smokers and non-smokers

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Received: 01 April 2022

Accepted: 16 April 2022

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ABSTRACT

Background: A prospective study was carried out to find the variations in lipid profile in smokers when compared to non-smokers. The aim was to study the alterations in lipid profile in terms of severity of smoking.

Methods: This study was carried out among 198 patients who attended medicine OPD of LLR hospital GSVM medical college Kanpur. The population was divided into 98 non-smokers and 100 smokers. The smokers were further divided into 3 groups depending on the intensity of smoking.

Results: Out of 100 patients in the present study the number of subjects in mild, moderate and high smokers' group were 33 (33%), 33 (33%), 34 (34%) respectively. Smokers had higher total cholesterol, plasma triglycerides, serum low density lipoprotein (LDL), serum very low-density lipoprotein (VLDL) and lower levels of serum high density lipoprotein (HDL) compared to non-smokers which was statistically significant.

Conclusions: Increase in total cholesterol, triglycerides, LDL and VLDL were found in smokers of all age groups. Whereas HDL values showed inverse relationship. These changes were directly proportional to the severity of smoking. So, Tobacco smoking is associated with dyslipidemia which is atherogenic in nature.

Keywords: Total cholesterol, Triglycerides, LDL, HDL, VLDL

INTRODUCTION

Tobacco is a serious hazardous to health and a proven killer and ranks second as a cause of death in the world.¹ Worldwide, tobacco use causes more than 7 million deaths per year.¹ Tobacco use is an emerging pandemic marching forward relentlessly. Evidence accumulating since early 1950s indicate that more than 25 diseases are now known or strongly suspected to be causally related to smoking. WHO estimates that unless current smoking pattern is reversed, tobacco will be responsible for 10 million deaths per year, by the decade 2020-2030, with 70% of them occurring in developing countries.

In India tobacco kills 8-10 lakhs people each year and many of these deaths will occur in people who are very young. It has been estimated that an average of five-and-a-half minutes of life is lost for each cigarette smoked. Youth in general and adolescents in particular fall prey to

this deadly habit with severe physical, psychological, and economic implications.² A large number of risk factors which predispose to atherosclerosis and coronary artery diseases have been identified. These include modifiable ones like hypertension, dyslipidemia, smoking, diabetes mellitus, changing lifestyle and non-modifiable ones like age and sex. As the number of risk factors in an individual increases, so does the risk of developing atherosclerosis and its complications mainly coronary artery diseases (CAD).³ In subject more than one of these risk factors the risk is more than additive.⁴ Although smoking has been established as an independent risk factor for coronary heart disease, the mechanism by which it increases the risk of coronary heart disease are unclear.⁵

However, studies to date have revealed incomplete, inconclusive or conflicting results about the association of smoking on the plasma lipid and lipoprotein levels. In some studies, smokers had increased plasma cholesterol

levels, in others plasma cholesterol level have actually been lower.⁶ Only a few studies have specifically examined the plasma lipoprotein according to smoking status or no. of cigarettes (dosage).⁷ Smokers are reported to have higher LDL and lower HDL cholesterol levels than non-smokers.⁴

There is inadequate data on the association of smoking and dyslipidemia in India. The present study provided a detailed profile of the plasma lipid and lipoprotein levels according to cigarette smoking status (smoker and non-smoker) and dosage (number of cigarettes smoked per day) in this part of UP.

METHODS

This study was carried out among 198 patients who attended medicine OPD of LLR hospital GSVM medical college Kanpur. The population was divided into 98 non-smokers and 100 smokers. The smokers were further divided into three groups depending on the intensity of smoking.

Inclusion criteria for smokers and non-smokers

The subjects will be divided into 2 groups. Non-smokers: subjects who had never smoked and smokers: mild smokers (1-10 cigarettes/bidis per day), moderate (11-20 cigarettes/bidis per day) and severe more than (20 cigarettes/ bidis per day). The subject's will be chosen in age groups of 18-40 years of age. The subject's BMI will be taken less than 28.

Exclusion criteria

Subjects having diseases mentioned below known to influence blood lipids will be excluded from the study. Diabetes mellitus, nephrotic syndrome, alcoholism, hypertension, hypothyroidism, subjects who were on following drugs-HMG CoA reductase inhibitors, fibric acid derivatives, nicotinic acid, beta blockers and the diuretics.

Methods used

A detailed history was taken. Subjects were explained in detail about the study and written informed consent was taken. Blood sample was collected after overnight fasting under all aseptic precautions and sample was centrifuged at 200 rpm for one minute. Lipid profile estimation which includes serum cholesterol, serum triglyceride, HDL, LDL, very low-density lipoprotein, fasting blood sugar (FBS), serum creatinine and urine for albumin, sugar and microscopic examination.

Study period

The study was carried out from December 2019 to October 2021.

Statistical analysis

Study was measured by z test (modified t test) with SPSS 23 version software. Statistical value $p < 0.05$ analyzed.

RESULTS

The present study the number of non-smokers in 18-22, 23-27, 28-32, 33-37 and >38 age group was 5, 21, 24, 26, and 22 respectively and number of smokers in 18-22, 23-27, 28-32, 33-37 and >38 was 5, 9, 29, 41 and 16 respectively (Table 1).

Table 1: Age distribution among non-smokers and smokers.

Groups	18-22	23-27	28-32	33-37	>38
Non-smokers	5	21	24	26	22
Smokers	5	9	29	41	16

Smokers had higher total cholesterol levels compared to non-smokers (191.96 versus 160.56) this difference was statistically significant. Smokers had higher plasma triglyceride level compared to non-smokers (164.29 versus 102.83) this difference was statistically significant. Smokers had higher serum LDL levels compared to non-smokers, (103.08 versus 82.08) this difference was statistically significant. Smokers had higher VLDL levels compared to non-smokers (29.02 versus 21.57) this difference was statistically significant. Smokers had lower levels of serum HDL compared to non-smokers (44.72 versus 49.62) and difference was statistically significant (Table 2).

Table 2: Lipid profile in non-smokers and smokers.

Lipid profile	Non-smokers, (n=98)	Smokers, (n=100)	P value
Total cholesterol	160.56±26.38	191.96±31.52	<0.001
Serum triglycerides	102.83±25.82	164.29±29.09	<0.001
Serum LDL	82.08±16.49	103.08±18.75	<0.001
Serum VLDL	21.57±6.20	29.02±9.02	<0.001
Serum HDL	49.62±8.47	44.72±10.08	0.002

Smokers were further subdivided into mild, moderate, heavy group based on number of cigarette/beedis smoked and the values of each group were compared with non-smokers (Table 3).

Total cholesterol value was highest in heavy smokers (176.5), less in moderate smokers (166) and least in mild smokers (155.06). The difference of these values with non-smokers was statistically significant.

Table 3: Lipid profile in relation to number of cigarette/beedis smoked per day in smokers as compared to non-smokers.

Lipid profile, (mg/dl)	Non-smokers, (n=98)	Mild smokers, (n=33)	Moderate smokers, (n=33)	Heavy smokers, (n=34)
Total cholesterol	160.56±26.38	155.06±31.80	166.00±26.63	176.5±25.62
Serum triglycerides	102.83±25.82	183.06±33.88	194.09±29.39	209±29.15
Serum LDL	82.08±16.49	97.12±13.05	105.58±20.07	114.20±20.41
Serum VLDL	21.57±6.20	23.15±7.67	32.73±6.67	34±9.27
Serum HDL	49.62±8.47	48.03±8.65	45.06±10.26	42±9.67

The triglyceride levels were highest in heavy smokers (209), less in moderate smokers (194.09) and least in mild smokers (183.06). The difference of these values with non-smokers was statistically significant.

The serum LDL level were highest in heavy smokers (114.20), less in moderate smokers (105.58) and least in mild smokers (97.12). The difference of these values with non-smoker was statistically significant.

The serum VLDL level was highest in heavy smokers (34), less in moderate smokers (32.73) and least in mild smokers (23.15). The difference of these values with non-smokers was statistically significant.

The serum HDL level was lowest in heavy smoker group (42), higher in moderate smoker group (45.06) and highest in mild smoker group (48.03). Difference of these values compared to non-smoker group statistically significant.

DISCUSSION

In Odedeji et al serum total cholesterol was significantly higher ($p < 0.05$) when compared to non-smokers.⁴ The mean triglycerides levels difference between smokers and non-smokers was not statistically significant ($p > 0.05$). The mean LDL levels were higher in smokers than non-smokers and this difference was statistically significant ($p < 0.001$). Mean VLDL difference between smokers and non-smokers were not statistically significant ($p > 0.05$). Mean HDL levels higher in non-smokers than smokers and difference was statistically highly significant ($p < 0.01$).

In Mokoto et al found that the mean triglycerides levels difference between smokers and non-smokers was statistically significant ($p < 0.05$).¹⁰ The mean total cholesterol levels difference between smokers and non-smokers was not statistically significant ($p > 0.05$). The mean VLDL difference between smokers and non-smokers were not statistically significant ($p > 0.05$). The mean LDL difference between smokers and non-smokers was not statistically significant ($p > 0.05$). The mean HDL levels were higher in non-smokers than smokers and this difference was statistically significant ($p < 0.05$).

In Aneela et al found that the mean serum total cholesterol in smokers when compared to non-smokers, which was statistically significant ($p < 0.05$).¹¹ The mean serum

triglycerides were higher in smokers when compared to non-smokers, which was statistically significant ($p < 0.05$). The mean serum VLDL were higher in smokers when compared to non-smokers, which was statistically significant ($p < 0.05$). The mean serum LDL were higher in smokers when compared to non-smokers, which was statistically significant ($p < 0.05$). The mean serum HDL were higher in non-smokers when compared to smokers, which was statistically significant ($p < 0.05$).

There is inverse relationship between smoking and serum HDL level. Also, this inverse relationship is dose dependent i.e., it is dependent on number of cigarettes/beedis smoked per day as in the present study. Serum HDL was lowest among heavy smoker group in present study (42 ± 9.67), in Imamura et al (55.2) compared to moderate smokers in present study (45.06), in Imamura et al (55.5), and mild smoker group in present study group (48.03), in Imamura et al (62.2), which was statistically significant ($p < 0.05$).

Serum TG was highest among heavy smoker group in present study (209), in Imamura et al (105.7) compared to moderate smokers in present study (194), in Imamura et al (100.1), and mild smoker group in present study group (183.06), in Imamura et al (90.7), which was statistically significant ($p < 0.001$).¹²

Serum LDL was highest among heavy smoker group in present study (114), in Imamura et al (118.2) compared to moderate smokers in present study (105), in Imamura et al (123.0), and mild smoker group in present study group (97.12), in Imamura et al (112.4), which was statistically significant ($p < 0.05$).¹²

Serum TC was highest among heavy smoker group in present study (176.5), in Imamura et al (194.6) compared to moderate smokers in present study (166), in Imaza et al (198.5), and mild smoker group in present study group (155.06), in Imamura et al (192.7), which was statistically significant ($p < 0.001$).¹²

As serum HDL is a protective risk factor against coronary heart disease, this greater risk to smokers of coronary heart disease development may result from this HDL lowering effect of smoking.

Limitations

Since the population selected for this study was small and the study was not a blinded study, an element of observer bias may have occurred. Large population studies should be conducted to confirm the results.

CONCLUSION

From the results of the present study, it may be concluded that, cigarette smoking in young adults induces dyslipidemic state in the direction of increased risk for coronary artery disease. So, it is strongly recommended to avoid smoking for the benefit of cardiac health.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sahu R, Singh R, Giri R. A comparative study of lipid profile in young smokers and non-smokers. Int J Adv Med 2022;9:556-9.