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COMPARISON OF MEAN LIPID PROFILE IN MALE SMOKERS AND NON SMOKERS

Shujaat Hassan[a], Hafiz Muhammad Sajid Jehangir[a] , Hamza Naeem[a], Maryam Abid [a], Sadia Asif[a] , Sarfaraz Khan[b]

[a]King Edward Medical College, Mayo Hospital Lahore, Pakistan. [b]Mercy Teaching hospital, Peshawar.

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ABSTRACT:

INTRODUCTION: *Smoking leads to deranged lipid profile which in turn leads to atherosclerosis which itself is a major risk factor for cardiovascular events.*

AIMS & OBJECTIVE: *We aimed to compare mean lipid profile among smokers and non smokers presenting in medical OPD of a large tertiary care hospital.*

MATERIAL & METHODS: *It was a descriptive, observational cross-sectional study conducted at Mayo Hospital, Lahore from 20th May 2020 to 19th November 2020. A total of 137 males presented in medical OPD for routine checkup of age 25-65 years were included. Patients already taking lipid lowering drugs, alcoholics, CRF & CLD were excluded. After informed, written consent, patients were divided into smokers and non-smokers and 3 ml blood sample of each patient was taken and sent to the institutional laboratory for measuring the serum lipid levels. Measured levels were statistically analyzed.*

RESULTS: *In our study, frequency of smokers in patients presenting in medical OPD was found in 37 (27.08%) patients. In my study, We found that mean serum total cholesterol (271.33±19.43 mg/dl), triglyceride (187.29±13.67 mg/dl), low density lipoprotein cholesterol (177.65±13.24 mg/dl), very low density lipoprotein cholesterol (39.37±7.65 mg/dl) were higher in smokers than non-smokers which have mean serum total cholesterol (179.48±14.21 mg/dl), triglyceride (121.81±9.79 mg/dl), low density lipoprotein cholesterol (111.73±8.79 mg/dl), very low density lipoprotein cholesterol (24.14±5.89 mg/dl). Whereas, mean serum high density lipoprotein cholesterol was lower in smokers (41.68±3.61 mg/dl) as compared to non-smokers (52.51±5.29 mg/dl).*

CONCLUSION: *Smoking leads to dyslipidemias that is an important risk factor for cardiovascular diseases. Ceasation of smoking and awareness of its hazardous effects is suggested.*

KEY WORDS: *Smokers, lipid profile, cholesterol.*

Correspondence : Shujaat Hassan, King Edward Medical College, Mayo Hospital Lahore, Pakistan. Email: shujaat.hassan1@gmail.com

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INTRODUCTION:

Dyslipidemia is the circulation of abnormal amounts of lipids in the blood. The hallmark characteristics of dyslipidemia are increased blood concentration of total Cholesterol (TC) , Low density lipoprotein (LDL) , triglycerides (TG) and decreased levels of High density Lipoprotein (HDL).[1] Serum concentrations of these lipid contents are important and has a great impact on cardiovascular and cerbrovascular disease risk either directly or indirectly.[2] It has been proven that cigarette smoking also alters lipid profile in addition to increasing risk and causing many other medical disorders.[3] Smoking being a preventable cause of mortality and morbidity has now become the largest cause of ill health among the preventable causes in the world.[4]

Toxic substances present in the cigarette are inhaled in the lungs where they are absorbed to blood after local damage and fastens the plaque formation in the vessels.[5] Nicotine is one of the most abundant and commonly studied substances present in tobacco smoke of cigarette. It causes dyslipidemia through several different mechanisms. It increases the secretions of cortisol and catecholamine by increasing sympathetic outflow. This leads to change in lipid metabolism in such a way that it results in increased lipolysis, and increased hepatic secretions of TG and VLDL.[2] Decreased estrogen and hyperinsulinemia leads to decreased HDL and increased cholesterol and LDL. (Dyslipidemia). All these events ultimately leads to increased predisposition to atherosclerosis and hence increased cerebrovascular events risk.[6,7]

Literature has revealed the fact that dyslipidemia tends to be higher among the smokers than non smokers. Smokers have increased levels of TG, Cholesterol and LDL and much lower levels of HDL when compared with smokers.[8,9,10]

As in previous studies, it is seen that smoking is associated with abnormalities in the serum lipids which might be a potential risk for cardiovascular diseases. So, the purpose of this study is to compare the mean lipid profile in male smokers and non-smokers in local population. Although many international studies are available on this previously, but we found no local data on this topic, so the results of our study will provide the clinicians with a useful information regarding serum lipid profile in smokers in order to reduce the complications due to deranged lipid profile. The results of international studies are not applicable to our population as we belong to different geographical areas where lifestyle is different and also majority of our population belong to rural areas, so there are chances of getting variable results.

MATERIAL AND METHODS:

It was a Cross-Sectional Study aimed to find frequency of smokers in patients presenting in medical OPD and to compare the mean lipid profile in male smokers versus non-smokers. This study was conducted at East Medical Ward, Mayo Hospital, Lahore after getting permission from ethical review board of the institution from 20th May 2020 to 19th November 2020. A sample size of 137 was calculated with 95% confidence level, 6% margin of error and taking expected frequency of smokers as 15.5%.[11] Patients were selected through non-probability consecutive sampling technique.

All the male aged from 25-65 years who presented in medical OPD for routine checkup were included in the study. All the patients who were already taking lipid lowering drugs i.e. statins (assessed on history), known alcoholics, chronic renal failure and chronic liver disease were excluded from the study. All the patients having other causes of dyslipidemia like hypothyroidism , nephrotic syndrome etc were also excluded.

After approval from local ethical committee and CPSP, 137 subjects were included. All men smoking >10 cigarettes in a day for last 5 years or more were labeled as smokers and others as non smokers.

After informed, written consent, 3 ml blood sample of each patient was taken and sent to the institutional laboratory for measuring the serum lipid levels i.e. TC,TG , HDL, LDL and very low density lipoprotein (VLDL). All this data (age, height, weight, BMI, place of living, occupation, monthly income and diabetes mellitus) was recorded on a predesigned Performa.

All the collected data was analyzed by using SPSS version 23.0. Age, height, weight, BMI and lipid profile parameters were presented as mean and standard deviation. Smoking, place of living (rural/urban), occupation (office/field work), diabetes mellitus (yes/no) and monthly income (<20000/20001-40000/>40000) were presented as frequency and percentages. Comparison of mean lipid profile between smokers and non-smokers was done using independent 't' test. (p-value ≤0.05 was considered significant.

RESULTS:

Of 137 included male patients, mean

Table 1: Distribution of Studied variables and Their Association with Smoking.

Variables		Smoker	
		Yes	No
Age (Years)	25-45 93 (67.68%)	26	67
	45-65 44 (32.12%)	11	33
BMI Kg/m^2	<27 70 (51.09%)	19	51
	≥ 27 67 (48.9%)	18	49
Place Of Living	Rural 50 (36.50%)	16	34
	Urban 87 (63.50%)	21	66
Monthly Income (PKR in Thousands)	<20 30(21.90%)	08	22
	20-40 51 (37.23%)	12	39
	>40 56 (40.87%)	17	39
Diabetes Mellitus	Yes 66 (48.18%)	19	47
	No 71 (51.82%)	18	53
Occupation	Office Work 88(64.23%)	22	66
	Field Work 49 (35.77%)	15	34

Table 2: Comparison of Lipid profile e of Smokers and Non-Smokers			
Outcomes	**Smoker (n=37)**	**Non-smoker (n=100)**	**p-value**
	Mean ± SD	Mean ± SD	
Total cholesterol	271.33±19.43	179.48±14.21	**0.0001**
Triglyceride	187.29±13.67	121.81±9.79	**0.0001**
Low density lipoprotein cholesterol	177.65±13.24	111.73±8.79	**0.0001**
Very low density lipoprotein cholesterol	39.37±7.65	24.14±5.89	**0.0001**
High density lipoprotein cholesterol	41.68±3.61	52.51±5.29	**0.0001**

of age and BMI was 41.56 ± 9.03 years and 27.53 ± 3.03 kg/m^2 respectively. Distribution of patients according to place of living, monthly income according to DM and occupation and their stratification along with calculated p-value is shown in the table-1.

In our study, frequency of smokers in patients presenting in medical OPD was found in 37 (27.08%) patients. In our study, it was revealed that mean serum TC (271.33±19.43 mg/dl), TG (187.29±13.67 mg/dl), LDL cholesterol (177.65±13.24 mg/dl), VLDL cholesterol (39.37±7.65 mg/dl) were significantly higher among the smokers than non-smokers which have mean serum TC (179.48±14.21 mg/dl), TG (121.81±9.79 mg/dl), LDL cholesterol (111.73±8.79 mg/dl), VLDL cholesterol (24.14±5.89 mg/dl).Whereas , value of mean serum HDL cholesterol was lower in smokers (41.68±3.61 mg/dl) as compared to non-smokers (52.51±5.29 mg/dl). A comparison of their mean values and p-value is shown in the table-2.

DISCUSSION:

Smoking is a proven risk factor for cardiovascular diseases. It does so through several different mechanisms. One of the most important of them is its effect on lipid profile. Several studies have studied the subject but our study is the pioneer on it in local setup.

In our study, frequency of smokers in patients presenting in medical OPD was found to be 17.08% (37). Most of them were in a range of 25-45 years (67.68%). We found that mean serum TC (271.33±19.43 mg/dl), TG (187.29±13.67 mg/dl), LDL Cholesterol (177.65±13.24 mg/dl), VLDL cholesterol (39.37±7.65 mg/dl) were significantly higher among the smokers than non-smokers (p-value <0.05) which have mean serum TC (179.48±14.21 mg/dl), TG (121.81±9.79 mg/dl), LDL Cholesterol (111.73±8.79 mg/dl), VLDL cholesterol (24.14±5.89 mg/dl). On the other hand value of mean serum HDL cholesterol was lower among smokers (41.68±3.61 mg/dl) as compared to non-smokers (52.51±5.29mg/dl). This increases the risk of many diseases among smokers many a times than in non-smokers. This same trend of frequent dyslipidemia with significant difference among the smokers and non-smokers has also been reported in many studies and their results are comparable to our study. [8,9,10,12,13,14]

Our study showed the fact that smoking increases TC, TG, LDL and VLDL and decreases HDL. However, the relation with the number of cigarettes per day and lipid profile was not studied. It has been reported in a study of India that dose response relation exists between number of cigarettes and dyslipidemia. This implies that dyslipidemia was more pronounced in severe smokers than mild or moderate smokers but still was lower than non-smokers which is also depicted in our study.[15] Adding tobacco smoking to cigarette smoking also worsens lipid profile more drastically than cigarette smoking

alone[16] None of the patient in our study was additionally smoking tobacco.

All the participants of the study were males. It was observed that there was more marked effect on HDL lowering than TG increase. This has also been observed in a study which proved that female smokers have more changes in TG whereas in males direct effect on HDL with resulting more obvious decrease in HDL levels occur when compared to females.[17]

There were 19 smokers who were diabetic and 18 were non diabetic, there was a significant difference in means of TC, TG, LDL , VLDL and HDL. Diabetic smokers have more deranged lipid profile than non diabetic smokers. (P-value <0.05).This is consistent with a recent study. [18]

HDL Cholesterol is the good cholesterol of the body and significantly reduces the atherosclerotic risk. HDL is reduced in smokers as studied by us. Literature has explained the reversal of HDL levels to normal after the cessation of smoking. This warrants the need of educational programmes, seminars, pamphlets and laws to avoid this deadly addiction leading to loss of precious lives.[19,20]

Our study has explained the effect of smoking on lipid profile and has also compared it with non smokers. However, there are few limitations to our study. Firstly it is a single centre study involving residents of particular areas only, secondly it has limited sample size, thirdly it has not included females which might have produced different results, fourthly classification of smokers was not made and fifthly long term cardiovascular risks were not assessed in both the groups which are the mainstay of clinical outcome in patients with dyslipidemia.

CONCLUSION:

Smoking leads to dyslipidemias that is an important risk factor for cardiovascular diseases.Ceasation of smoking and awareness of its hazardous effects is suggested.So, we recommend that educational programs should be arranged on national level to convince our public for quieting smoking and regular monitoring of serum lipid profile to prevent cardiovascular risks in this particular population.

DECLARATIONS SECTION:

Ethics approval and consent to participate:

The study protocols and informed consent documents were approved by the Institutional Bioethics Review Committee (IBRC).

Availability of data and materials:

The datasets used and/or analyzed during the study are available from the corresponding author on reasonable request.

Competing interests:

The authors declare that they have no competing interests.

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