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The Influence of Cigarette Smoking on Serum Lipid Levels and Cardiovascular Diseases in Elbasan District[#]

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Abstract: Cigarette smoking is considered an important risk factor for cardiovascular diseases which means the risk of coronary heart disease and stroke. Smoking is as widespread and significant as a risk factor that is called as "the leading preventable cause of disease and death". The effects of cigarette smoking in atherosclerosis initiation and progression as well on its complications are mostly responsible for the enhanced cardio and cerebrovascular risk observed in smoking and non-smoking. The aim of this study was to see the effect of smoking on serum lipid levels and to compare the deference in the levels of total cholesterol, triglicerydes, HDL-cholesterol and LDL cholesterol levels in smokers and non-smokers. Fasting blood samples were collected for lipid profile from 350 persons that were presented in the hospital laboratory of Elbasan. 150 of them were regular smokers and 200 were non-smokers. The two groups matched about age and sex. A questionnaire was used to take information about their age, family history with dislipidemia, cigarette smoking, high blood pressure, alcohol consumption, height, weight, obesity, physical activity. The patients that match the exclusion criteria were excluded. The data collected were analysed using SPSS V20. We found that cigarette smokers were characterized from higher levels of total cholesterol (222±110.2 mg/dl) and LDL-cholesterol (148±23.7 mg/dl) ($p < 0.05$) than non-smokers T C (168±96.3), LDL-ch (124±30.8). Mean serum triglycerides level were significantly high ($p < 0.01$) at smokers than non-smokers. Smoking and a comparatively low HDL-cholesterol ($p < 0.01$) were associated. Cigarette smoking effects on serum lipid levels which increases the risk for developing cardiovascular diseases.

Keywords*: cigarette smoking, HDL cholesterol, LDL cholesterol, triglycerides.*

Introduction

Cigarette smoking is an important risk factor for cardiovascular diseases which means the risk of coronary heart disease and stroke. Smoking is as widespread and significant as a risk factor that is called as "the leading preventable cause of disease and death". Many studies (Durrington, 2003; NCEP 2002) detail the evidence that smoking is the major cause of coronary heart disease, which leads to heart attack. Many factors that contribute in CHD (coronary heart disease) and atherosclerosis (Freeman, DJ et al., 1993) are: dislipidemia, diabetes, family history with coronary heart disease and dislipidemia, cigarette smoking, overweight or obesity and physical inactivity. When smoking acts with other factors greatly increases the risk for coronary heart disease. Smoking decreases HDL-ch (good cholesterol) (Grundy et al., 2004) and increases T-cholesterol and triglycerides level. Smoking combined with a family history (Wilson PW et al., 1998) with heart disease or dislipidemia also greatly increase the risk. The aim of our study is to create a general idea for the role of cigarette smoking and the happening of CHD and atherosclerosis in Elbasan district. The aim of this study is to tell that cigarette smokers have a higher risk for developing atherosclerosis (fatty buildups in arteries) than nonsmokers.

Material and Methods

A random sample of 350 persons from Elbasan district was taken in examination. A questionnaire-short form was applied in addition to lab tests for evaluating lipid profile. To assess the effect of smoking on the lipid profile level present in serum we studied 150 persons, that were smokers

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previously or current smokers who had fasted for 12 hours and 200 persons were nonsmokers. The measurements were realized in the central laboratory of Hospital Center in Elbasan and in the laboratory of the private clinic "Jon" in Elbasan. The outcome measures: total cholesterol, triglycerides, HDL-cholesterol and LDL-cholesterol were realized using serum. None of the patients were on hypolipidaemic drug therapy, and they that were suffering from family history with dislipidemia or coronary heart disease were excluded from the study. The main analyses were carried out for establishing the possible risk factors associated with heart diseases. Smoking status and other history about cardiovascular diseases or CHD were obtained by a standard questionnaire (Table 1) which gives us information about weight, height, smoking habit, consumption of alcohol, family history with coronary heart diseases and dislipidemia. First was determined the level of total cholesterol and triglycerides with colorimetric, enzymatic, endpoint method. For HDL-cholesterol, was used the precipitation method, using Acid Fosfotungistic and Mg^{2+} ion and then the determination of HDL-cholesterol level that is present in the supernatant, with enzymatic, colorimetric, endpoint method. For LDL-cholesterol was used the formula [*9,10*]: LDL-ch = Total cholesterol - (Trig/5 + HDL-ch).

NCEP (National Cholesterol Education Program) has decided these values as risk for coronary heart diseases: T cholesterol:< 200 mg/dl normal, risk >240 mg/dl. Triglycerides: < 150 mg/dl normal, risk > 200 mg/dl, HDL >60 mg/dl low risk, HDL < 40 mg/dl high risk. The smoker group was characterized from higher levels of triglycerides than nonsmoker group. As at the other studies (Durrington P, 2003; Naito H.K, 2003) and in our study at smokers group was presented a low HDL-ch than at the nonsmokers. We sow the association between HDL-ch values and smoking. We estimated the mean value and the standard deviation for all values. The Hi squares test and p-value were used to see significance between variables. The statistical package SPSS V20 was used to perform the correlation between pairs of variables.

Results and Discussion

In our study were examined 350 persons; from them 150 had the smoking habit. Table 2 shows the mean values and standard deviation for lipid profile values for two groups smokers and nonsmokers. We clearly see that as in the other studies (Durrington, 2003; MCGill, et al., 1997) smokers group is characterized from higher values of triglycerides, T.cholesterol and LDL-cholesterol than nonsmokers group. The value of HDL-cholesterol is lower at smokers so they have a high risk about CHD. The results observed in this study are consistent with different studies about correlation between coronary heart diseases and levels of lipid profile (Durrington, 2003; NCEP, 2002). The prevalence of high triglycerides combined with a low HDL-cholesterol is increased in groups who are cigarette smokers (Naito, 2003) , diabetics and them who have a family history with dislipidemia or coronary heart disease and in the alcoholic persons.. In our sample 21.5% had the smoking habit. To see the association between two variables smoking and triglycerides levels we found the value of chi square Hi^2 =6.865 with significance level

p=0.05, which is higher than the critical value Hi^2=3.84 (for p=0.05 probability level) which shows the area of acceptance or rejection for H_o hypothesis, (H_o - means that between two variables has no correlation). In this case H_0 is not accepted. So between two variables has association (Figure 1). As we know from the other studies (Bruckert *et al*., 2005; Lloyed *et al.*, 1999) smoking tends to elevate the triglycerides levels. When smoking acts with other factors, it greatly increases the risk for CVD. In our study 6% was using alcohol and had the smoking habit. We compared the lipid profile values for two groups, smoking group and smoking and alcoholic group and resulted that the second group was characterized from higher values of T. cholesterol and triglycerides than the first group and lower levels of HDL-ch (Table 3). A lot of evidence now suggests (Grundy SM, et al., 2004; Yamaguch *et al*., 2005; Wilson PW, et al., 1998) that higher HDL-cholesterol levels are associated with a lower risk of heart disease and conversely that low HDL-cholesterol levels are associated with an increased risk. In different studies result that between triglycerides and total cholesterol variables has an association. We found out that there is a high association between both variables (Hi^2 =9.473, p=0.008 that is too small than p=0.05). So, high levels of triglycerides are related with high levels of total cholesterol, and the risk for coronary heart diseases and atherosclerosis is elevated.

The prevalence of high levels of triglycerides and total cholesterol more than 200 mg/dl was increased in smoking group. High level of triglycerides was associated with high level of total

cholesterol and low level of HDL cholesterol. Cardiovascular risk factors in this population revealed similar patterns to those found in the other regions which have shown epidemiological and demographic transition, as reported by national and local health services. These findings thus strongly suggest the need for implementing opportune health promotion and should consider smoking controls program especially in our country where smoking is increasing in prevalence.

Table 1.The Questionnaire

Name Surname	Age	Adress	Weight Kg	Hight cm	Profession	Smoking	Alchool
Sh. Doksan	55	Elbasan	69	161	Officer	Yes	No
D. Dervishi	58	Cerrik	60	160	Worker	No	No
V. Bico	46	Elbasan	80	167	Worker	No	No
B. Sadi	52	Elbasan	70	173	Cooperator	Yes	No
F. Elezi	39	Kat.ri	90	165	Housewife	No	No
K. Zekthi	69	Xibrak	100	165	Storekeeper	No	Yes

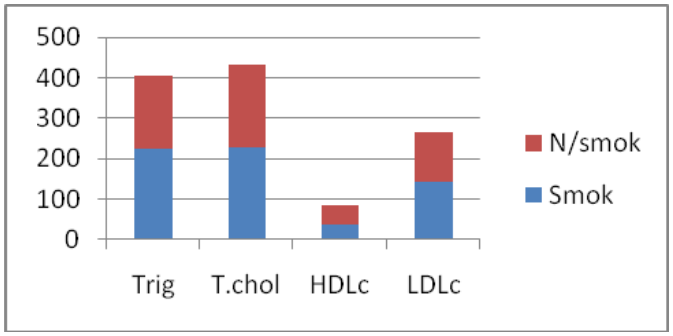

Figure 1. Lipid profile for smokers and non-smokers groups

Table 2. The lipid values for smokers and non-smokers group.

Groups	HDL-c	LDL-c	T. cholesterol	P-value
Smokers	39.2±9.8	148±23.7	222±110.2	p<0.01
Non-smokers	45.3±8.5	124±30.8	168±96.3	p<0.05

Table 3. Lipid profile for smoking group and smoking & alcohol group

Lipid values in mg/dl	Smoking	Smoking & Alcohol group	Normal values
Triglycerides	215 ± 114.2	252 ± 133.1	< 150
Total Cholesterol	222 ± 110.2	221 ± 126.2	< 200
HDL-ch	39.2 ± 9.8	38 ± 6.4	> 60
LDL-ch	140 ± 38.7	133 ± 37.3	< 160

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