

**Research Article (Open access)**

## Comparative Study of Lipid Profile Levels in Vegetarian and Non-Vegetarian Person

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**ABSTRACT-** Previous studies have suggested an association between vegetarian persons and non-vegetarian persons, although this relationship positive correlation significant. The present study was designed to investigate comparative study of lipid profile levels in vegetarian and non-vegetarian person. The lipid profile is used to determine the risk of obesity, heart disease in myocardial infarction, atherosclerosis and help in deciding treatment has borderline or high risk. the present study was undertaken to compare case and control produce effect on individuals lipid profile, the parameters of lipid metabolism i.e. cholesterol, tri-glyceride, high density lipoprotein, low density lipoprotein of the age of 20-85 years and early aged 50 years and above males and females, divided categories i.e. vegetarian and non- vegetarian persons. the study was done on 20 cases in 10 control (non-vegetarians) and 10 cases (vegetarians) diet was significantly found to reduce the values of all the parameter lipid metabolism except HDL-Cholesterol( $45.02 \pm 9.595$ ;  $p < 0.0001$ ). when these parameters were analyzed for the category of middle and old age, most of the lipid parameters total cholesterol (TC) including were significantly increase among Non-vegetarian ( $224.02 \pm 18.85$ ;  $p < 0.0001$ ) from this study, it can be concluded that along with diet, sex and age factor also influence parameters of lipid metabolism.

**Key words-** Vegetarian persons, non-Vegetarian, Lipid profile

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### INTRODUCTION

A vegetarian diet pattern (VEG) is that where nothing implicating the death of animals should serve as food. Vegetarians do not eat meat or meat products, but may consume milk, dairy products and eggs. This diet, when appropriately planned and balanced, is healthful and provides health benefits, because it acts both in the prevention and in the treatment of diseases.<sup>1</sup>

Vegetarian diets also comply with the guidelines for the treatment of diabetes, and studies indicate that they reduce the risk for type-2 diabetes. In the "Adventists Health Study", the risk of development of diabetes among VEGs and OMNIs, adjusted for age, was implicated in the development of chronic diseases however; the mechanisms of action are not fully explained, particularly in relation to the cardiovascular risk.<sup>2</sup> 1 and 1.97 for men, and 1 and 1.93 for women respectively.

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Received: 16September 2015/Revised: 06 October 2015/Accepted: 22 October 2015

**Table 1:** Type of vegetarian diets<sup>3</sup>

Types	Diet
Demi-vegetarian (Semi-vegetarian)	Occasionally eats meat/poultry/fish
Pesco-vegetarian	Excludes meat and poultry, but includes fish(and possibly other seafood)
Lacto-ovo-vegetarian	Excludes all fish foods includes dairy produce and eggs
Ovo-vegetarian	Excludes all fish foods and eggs includes dairy product
Lacto-vegerarian	Excludes all fish foods and eggs includes diary produce
Vegan	Avoids all foods of animal origin

Cardiovascular diseases (CVD) are growing contributors to global disease burdens, with epidemics of CVD advancing across many regions of the world which are experiencing a rapid health transition. Diet and nutrition have been extensively investigated as risk factors for major CVD like coronary heart disease (CHD) and stroke and are also linked to other cardiovascular risk factors like diabetes, high blood pressure, and obesity<sup>4-6</sup>.

The three types of vegetarian diets are: restricted or total: with no animal product in their food (this type is also called vegan) lacto vegetarians: from animal products, only milk and by products are

included; and lactoovo which also allows the inclusion of eggs.<sup>7</sup>

Cholesterol is transported in the blood by lipoproteins. Among them are: very low density lipoproteins (VLDL), low density lipoproteins (LDL), and high density lipoproteins (HDL). Differently from VLDL and LDL, HDL does not contain the apolipoprotein B100, which is recognized by the tissues. Therefore, HDL reports fully distinctive behavior and function as compared to the others. It is responsible for reverse transportation, carrying basically the cholesterol from tissues to the liver<sup>8</sup>, and therefore helps protect individuals against atherosclerosis. Therefore, if an individual reports high ratio between high density and low density lipoproteins, the probability of developing atherosclerosis is significantly reduced<sup>9</sup>.

**MATERIALS & METHODS**

**Inclusion criteria**

1. Vegetarian persons and non-vegetarian persons in age group 20 to 74 years.
2. Control: 10 cases of age & sex matched control vegetarian patients were compared.

**Exclusion criteria**

1. Smokers
2. Alcoholics
3. Diabetics
4. Hypertensive
5. Familial hyperlipidemia

**Measurements and Blood Collection**

A total of 20 samples i.e. blood (in sterile sample bottles) were collected. Person need to fast for 9-12 hours before having your blood drawn; only water is permitted. For the estimation of biochemical parameters 5 ml of fasting venous blood was drawn from the respondents by a trained lab technician. The blood drawn was allowed to coagulated the serum was extracted by centrifuging and used for biochemical estimation. The name, age, sex, vegetarian / non- vegetarian was recorded in a predesigned Performa (annexure).

**Transport of samples**

Blood samples were transported in sterile sample bottles without anticoagulant.

**Preparation of Serum**

The blood was put into centrifuge tube. This was allowed to clot and then centrifuged at 3000 rpm for 3-5 minutes at room temperature.

**Biochemical analyses of lipid profile include:**

TG – Enzymatic colorimetric (End point) method<sup>10</sup>

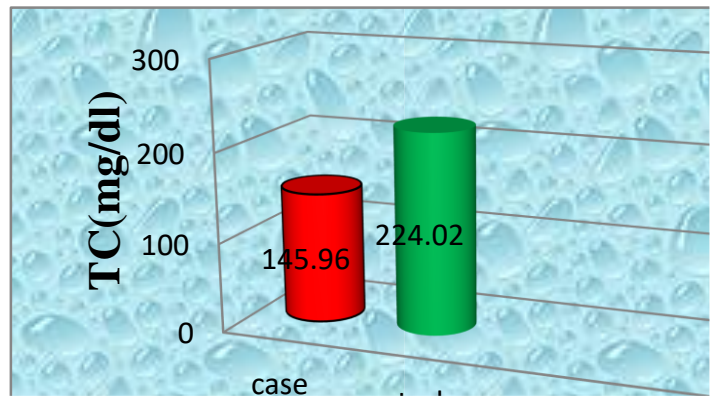
TCH -Enzymatic colorimetric (End point) method<sup>11,12</sup>

LDL & HDL - by precipitation method using a reagent that consists of modified polyvinyl sulfonic acid (PVS) and polyethylene-glycol methyl ether (PEGME)<sup>13</sup>

Low density lipoprotein cholesterol was using the formula by Friedewald's formula VLDL-C (mg/dl): Triglyceride/5

**Table 2: Total Cholesterol**

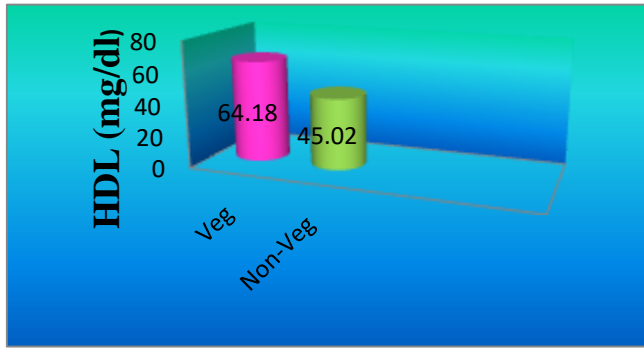
Groups	Case (N=10)	Controls (N=10)	t- value	p- value
TC (mg/dl)	224.02 ± 18.85	145.96 ± 21.32	8.8447	<0.0001



There was a significant difference between mean values of Total cholesterol among the vegetarian and non- vegetarian person. It was found that mean value of Total cholesterol in non-vegetarian was high as compared to vegetarian.

**Table 3: High density lipoprotein Cholesterol**

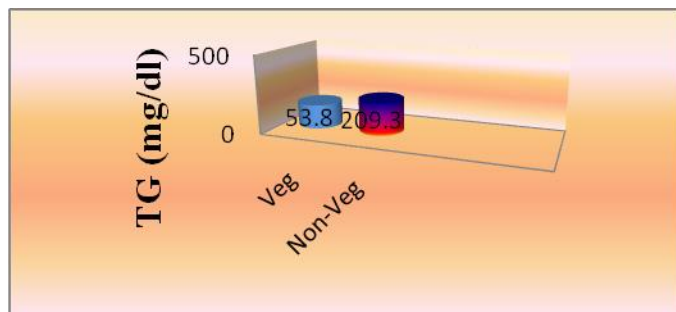
Groups	Case (N=10)	Controls (N=10)	t- value	p- value
HDL (mg/dl)	45.02± 9.595	64.18±4.046	5.8209	<0.0001



There was a significant difference between mean value of HDL cholesterol among the vegetarian and non- vegetarian person. It was found that mean value of HDL cholesterol in vegetarian was high as compared to non-vegetarian.

**Table 4:** Triglyceride

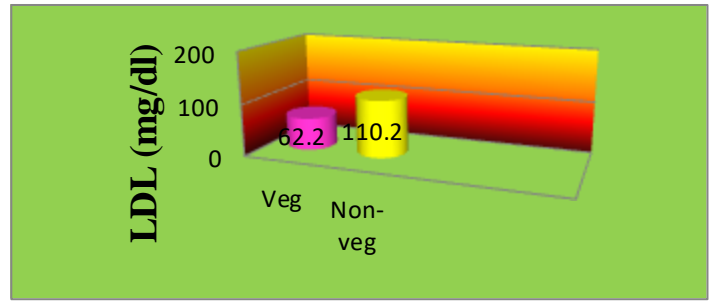
Groups	Case (N=10)	Controls (N=10)	t- value	p- value
TG (mg/dl)	209.35± 11.36	53.81±19.19	7.8701	<0.0001



There was a significant difference between mean value of triglyceride among the vegetarian and non vegetarian person. It was found that mean value of triglyceride in vegetarian was low as compared to non-vegetarian.

**Table 5:** Low-density lipoproteins Cholesterol

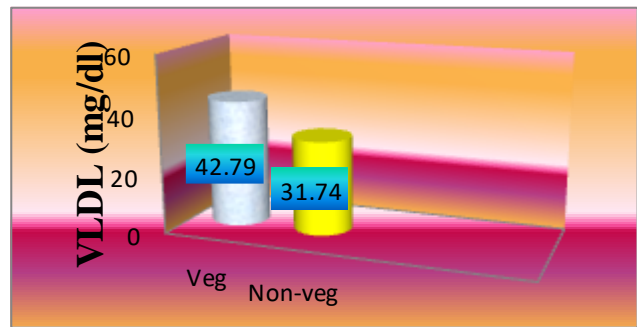
Groups	Case (N=10)	Controls (N=10)	t- value	p- value
LDL (mg/dl)	110.20± 22.64	62.20± 12.49	5.8704	<0.0001



There was a significant difference between mean value of LDL cholesterol among the vegetarian and non vegetarian person. It was found that mean value of LDL cholesterol in vegetarian was low as compared to non-vegetarian.

**Table 6:** Very low density lipoprotein cholesterol

Groups	Case (N=10)	Controls (N=10)	t- value	p-value
VLDL (mg/dl)	42.79±2.63	31.74 ± 4.17	7.0877	<0.0001



There was a significant difference between mean value of VLDL cholesterol among the vegetarian and non vegetarian person. It was found that mean value of VLDL cholesterol in vegetarian was low as compared to non-vegetarian.

**DISCUSSION**

Present study showed interesting differences in lipid profile between vegetarian and non- vegetarian person. However, it should be noted that while screening subjects to be included in the study, we noticed that fewer vegetarian person were at risk of overweight or obesity than non- vegetarian person.

In addition, we had a larger percentage of males than females in our study. In boys, pronounced centralization of fat tends to be stored in the abdominal region, with increases in subcutaneous fat and visceral fat this pattern is similar but less dramatic for girls. In adolescent and young adult girls, fat tends to be deposited

peripherally in the breasts, hips, and buttocks. According to another study, the risk of becoming overweight during adolescence appears to be higher among girls than it is among boys 10.

In our study we did not further investigate why more boys than girls were at risk of overweight or obesity. We perform lipid profile analyses on blood sample from fasting subject, due to the young age of the subjects and a strictly controlled time frame and examination schedule. A previous study suggests that predicting the risk of cardiovascular disease can be simplified by measuring the total cholesterol, HDL cholesterol or apolipoprotein levels without fasting and by disregarding the level of triglycerides.

We found vegetarian group had lower mean total cholesterol than the non-vegetarian group ( $224.02 \pm 18.85$ ). This result showed significantly increased mean total cholesterol levels (upper limit) in omnivorous person at risk for overweight and obesity. We also found a significantly lower mean triglyceride level in the vegetarian group. The hypocholesterolemic effect of fibers is probably due to an increase in bile-acid binding, fecal sterol excretion, and fermentation of soluble fibers which produce short-chain fatty acids that inhibit hepatic cholesterol synthesis.

Decreased levels of HDL and increased triglycerides in many studies of adults and adolescents. Abdominal obesity with increased visceral fat is associated with increased levels of circulating free fatty acids, insulin and insulin resistance, all of which lead to increased synthesis of triglycerides and VLDL secretion by the liver. A limitation of this study is that no preliminary Study was done due to time consternations. With a preliminary study, we could have had a general picture of the difference in mean and standard deviation (SD) of lipid profiles in vegetarian and non-vegetarians person who are at risk for overweight or obesity. In addition, this study did not involve a strictly-controlled diet analysis (Food record). A well conducted diet analysis would have provided a representation of the amount, type, and composition of nutrients (proteins, fats, and carbohydrates) consumed by the subjects.

Further study with a larger sample number may be able to demonstrate more completely and clearly the differences in lipid profiles of vegetarian and non-vegetarian person who are at risk

for overweight or obesity. In conclusion, in person who are at risk for overweight or obesity, the mean total cholesterol and triglyceride levels of vegetarian person were lower than that of non-vegetarian persons.

## CONCLUSIONS

We have been able to conclusively prove that there is in fact a cumulative effect of vegetarian and non-vegetarian person on lipid profile by showing our result tables. In comparison to vegetarian, non-vegetarian had higher rate of lipid profile. There is more dyslipidemia indicated by higher values of total cholesterol, triglycerides, LDL, VLDL, and lower value of cardiac protective HDL in non-vegetarian person.

We have also been able to prove that there is increased Lipid Profile and dyslipidemia in Non-vegetarian person which show Heart Failure, myocardial infarction, Atherosclerosis. The observation of our study suggests that there is more risk of CVD progression of atherosclerosis in non-vegetarian.

Vegetarian diet does not produce significant differences in blood pressure, body composition or resting heart rate. The lacto-ovo vegetarian diet may have contributed to the similar research data among the two groups; dairy products contain cholesterol, saturated fats, and some products are high in sodium. Cholesterol, saturated fats and excessive amounts of sodium have been identified as factors of high blood pressure and Cardiovascular disease.

## REFERENCES

- [1] Association Dietitians of Canada. Position of the American Dietetic: Vegetarian Diets. *J Am Diet Assoc.* 2000;103 (6):748-65.
- [2] Fraser GE. Associations between diet and cancer, ischemic heart disease, and all-cause mortality in non-Hispanic white California Seventh-day Adventists. *Am J Clin Nutr.* 1999; 70 (Suppl): S532-S538.
- [3] Robinson F & Hackett A (1995) Vegetarianism: What's in a name? *Vegetarianism and Health: a Discussion of Current Ideas.* Liverpool John Moores University, Liverpool.
- [4] Dai J, Lampert R, Wilson PW, Goldberg J, Thomas R, Vaccarino V. Mediterranean Dietary Pattern Is Associated With Improved Cardiac Autonomic Function Among Middle Aged Men :A Twin Study. *Circ Cardiovasc Qual Outcomes* 2010;3:36673.
- [5] Taylor WD. *The Burden of NonCommunicable Diseases in India.* Hamilton ON: The Cameron Institute; 2010.

- [6] Kohli P, Gulati M. Exercise Stress Testing in Women: Going Back to the Basics. *Circulation* 2010;122:257080.
- [7] Soares EDA, Burini RC, Vannucchi H. Dietas vegetarianas: tipos, origens e implicações nutricionais. *CadNutr.* 1990; 1: 318.
- [8] Santos RD, Spósito AC, Maranhão RC. Lipidemia pósprandiale risco de doença coronária. *Atherosclerosis.* 2001; 12: 138.
- [9] Rizos E, Mikhailidis DP. Are high density lipoprotein (HDL) and triglyceride levels relevant in stroke prevention? *Cardiovasc Res.* 2001; 52: 199207.
- [10] Teitz N. W., *Clinical guide to laboratory tests*, 3rd Ed (W. E. Saunders eds Philadelphia USA) (1995) 610.
- [11] Allan C. C. et al, *Clin Chem* (1974), 20, 470.
- [12] Teitz N. W., *Clinical guide to laboratory tests*, 3rd Ed (W. E. Saunders eds Philadelphia USA) (1995) 130.
- [13] Hongbing Xiao Method and composition for determining high density lipoprotein cholesterol, Chinese Patent CN1379235A (2002).