

**TO STUDY ASSOCIATION BETWEEN LIPID PROFILE IN VEGETARIANS AND NON-VEGETARIANS IN THE LOCAL POPULATION**Seemadevi Patil<sup>1</sup>, J. Prabhakaran<sup>2</sup>, Sheena Nazar<sup>3</sup>, Abaya K<sup>4</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: BACKGROUND:** To Study Association between Lipid Profile in Vegetarians and Non-Vegetarians in the Local Population. **MATERIALS AND METHODS:** Descriptive study was conducted in the area Chittur from April 2014 to April 2015. One hundred and fifty (75 vegetarians and 75 non-vegetarians) healthy individuals, aged 30 – 60 years were studied in the central lab of Karuna Medical College. Overnight fasting venous blood samples were collected for estimating. Fasting Blood Sugar (FBS), Serum Alanine Transaminase (ALT) and, Serum lipid profile. **RESULTS:** The mean age of the study subjects was 38 and 37 of the vegetarians and non-vegetarians respectively with normal serum ALT. The vegetarians subjects had significantly lower mean serum Total Cholesterol (TC) [mean difference (95% CI)] [-0.42 (-0.78, -0.06)] and LDL [-0.45 (-0.75, -0.15)] compared to non-vegetarians. However, triglyceride, HDL, FBS, were identical. In Pearson's correlation, consumption of vegetable diet significantly correlated with serum TC, LDL. **CONCLUSION:** In our study the vegetarian study have a lower lipid profile status as compared to the non-vegetarian subjects. Therefore consumption of a vegetarian diet has to be encouraged.

**KEYWORDS:** Chittur; Vegetarian; Non Vegetarian Lipid Profile.

**INTRODUCTION:** Diets rich in animal protein having higher amounts of fatty acids, are converted to various lipoproteins in the liver leading to increased formation of adipose tissue, facilitating atheromatous plaques inside the arteries.<sup>[1]</sup> As a result, there is narrowing of the arterial wall leading to increased risk of hypertension, stroke and coronary arterial diseases.<sup>[1,2]</sup> Vegetarians usually consume more fruits and vegetable than non-vegetarians and because of their restricted consumption of animal foods. They have lower intake of saturated fatty acids and increased intake of fiber and antioxidant as compared to those of non-vegetarian diet.<sup>(3)</sup> Consumption of vegetable-based diets not only lowers blood lipoprotein but also reduces the risk of Cardiovascular Diseases (CVD) resulting in; reduced risk of deaths.<sup>[4,5]</sup> leading to higher life expectancy among vegetarians.

Serum lipids are important determinant of cardiovascular risks behaviors associated with urbanization and increased saturated fat. Consumption and decreased physical activity have been well cited and are associated with adverse changes in lipid profile.<sup>(6)</sup> Consumption of fatty food with hypercholesterolemia (prevalence of 50%) was also observed among Indian adolescents.<sup>[7]</sup> It has already been reported that in South Asian countries, CVD has become a major clinical as well as public health problem<sup>[8]</sup> and considering Ischemic Heart Disease.

The prevalence of dyslipidemias, high triglyceride and LDL cholesterol and low HDL cholesterol appeared to be higher in the rural individuals.<sup>[9]</sup> Although tobacco consumption and hypertension and central obesity were found to be the risk factors among rural population <sup>[10]</sup>; but, there is no documented evidence of influence of veg and non-veg diet on lipid profile among people living in rural Chittur.

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The objectives of our study are to study the association of vegetarian-and non-vegetarian diet with serum lipid profile on people living in rural Chittur. Among adult vegetarians and compare them with that of non-vegetarians.

**STUDY DESIGN:** Descriptive study was conductive by April 2014 to January 2015. Selection of a vegetarian individuals was done based on a whether the person was consuming vegetable based diet atleast for the past three years. Milk and dairy products were considered to be a part of the vegetarian diet. Patient attending the outpatient departments of various specialties of Karuna Medical College and those fulfilling the inclusion criteria for this study were selected.

The Participant was examined to exclude any respiratory ailment. Any current or previous history of Hypertension and Diabetes mellitus was also asked for. Hepatic impairment was ruled out by estimating serum ALT. After ruling out, smoking & hypertension, 75 vegetarian and 75 non-vegetarian individuals were identified for our study. The nature of our study its objectives and methodology were explained to the participants. Informed consent was taken and significance of the outcome was explained to them.

**DATA ANALYSIS:** For categorical variables of interest, differences in the proportions were compared by Chi-square test, and strength of association was determined by estimating odds ratios (OR) and their 95% Confidence intervals (CI). For continuous variable of interest, the statistical significance of the differences in the group means was compared by Student's test. In the event of non-normal distribution of data, equivalent non-parametric tests were applied. Pearson, s correlation test was used to assess the correlation between different lipoproteins.

**RESULTS:** Of 150 participants, half (35 males and 40 females) of them were vegetarians and other half (35 males and 40 females) were non-vegetarians. The mean±SD age (years) of the vegetarians and non-vegetarians were 38±12 (age span; 31 to 73 years) and 37±9 years (age span; 33 to 65 years), respectively. All subjects were identical with optimal hepatic function without much variation in height and weight.

Majority of the participants were non-alcoholic although a small percentage gave a history of smoking. TC and LDL-C were significantly lower among vegetarian than non-vegetarians. The ratio of TC: HDL and LDL: HDL was significantly lower among non-vegetarians. Serum HDL levels and FBS level were similar between vegetarian and non-vegetarians.

	Over All	Vegetarian	Non-Vegetarian
TC (mmol/L)	170±30	165±28	176±28.6
HDL (mmol/L)	45±10	39±8	38.46±12
LDL (mmol/L)	106±15	97±10	118.24±15.5
Triglyceride (mmol/L)	60±10	64±12	53.72±9.8
FBS (mmol/L)	105±15	102±13	108±14
ALT (U/L)	18.06±10.33	18.38±9.51	17.75±11.16

Table 1

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Consumption of vegetable diet significantly correlated with serum TC and LDL-C. FBS was found to be correlated with TC LDL and ALT. TC significantly correlated with LDL and TG. Significant correlation was seen between HDL with its TC: LDL

	FBS	TC	LDL	HDL	TG	ALT
Group	NS	0.20 P=0.02	0.27 P<0.01	NS	NS	NS
FBS		0.34 P<0.01	0.33 P<0.01	NS	NS	0.18 P=0.04
TC			0.90 P<0.01	NS	0.39 P<0.00	NS
LDL				NS	0.18 0.04	NS
HDL				NS		NS
TG						NS

Table 2

**DISCUSSION:** The individuals consuming non-vegetarian diet had a higher level of total cholesterol and LDL cholesterol as compared to those individual consuming a vegetarian diet who had significantly lesser levels of TC and LDL-C. The serum lipoproteins like TGL were higher in non-vegetarians than vegetarians. A lacto vegetarian diets and triglycerides supplying high fiber antioxidants and minerals is associated with lower LDL levels in our study correlating with similar findings in some earlier studies<sup>(11,12)</sup> has shown a positive correlation between FBS and TC our study also shows a positive correlation between FBS and TC. It is a well-known fact that serum HDL, a lipoprotein, transports cholesterol from body tissues to the liver and thus helps in reducing TC levels.<sup>(13,14)</sup>

LDL on the other hand transport cholesterol from the liver to the peripheral tissues causing its depositing here there by contributing atherosclerosis. Serum cholesterol increases till the age of 60-70years irrespective of sex, due to increase in LDL cholesterol. Suppression of LDL receptors activity due to aging along with sustained intake of fats increases the age depended risk of increasing atherogenic lipoprotein in the circulation.<sup>(15)</sup> This age depended changes in the elderly population have been observed in several cross sectional studies. Results of our study shows that a predominantly vegetarian diet lowest the TC and LDL-C there by reducing the risk of developing atherosclerosis and microvascular diseases. This is constituent with a study done in Brazil which compared level of TG, TC and LDL-C it was concluded that vegetarian diet was associated with lower levels of these parameter than the non-vegetarian diet.<sup>(16)</sup>

High TC, increased LDL and decreased HDL increase the risk of coronary artery disease and are considered major risk factors besides smoking and hypertension. Reduction in HDL 1mg/dL resulted in 3-4% increase in prevalence of coronary heart disease. Studies suggest that vegetarian diet is associated with longevity a longitudinal study observed the life expectancy of healthy vegetarians to be 3.6 years longer than the general adult population. In our study vegetarian diet included milk and dairy products which is truly animal protein in the real sense of the term.

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Moreover there was no control on the nature of the dietary intake, calorie intake and physical exercise. The sample size is also small and the study is done in a rural area which could contribute as a limiting factor to our study.

**CONCLUSION:** There is no question about the general beneficial effects of a vegetarian diet compared to the non-vegetarian diet. In our study the vegetarian study have a lower lipid profile status as compared to the non-vegetarian subjects. Therefore consumption of a vegetarian diet has to be encouraged for a favorable lipid profile status and prevent the harmful effects of altered lipid levels.

### **BIBLIOGRAPHY:**

1. Walker P, Rhubart-Berg P, McKenzie S, Kelling K, Lawrence RS (2005) Public health implications of meat production and consumption. *Public Health Nutr* 8: 348-356.
2. Sauvaget C, Nagano J, Hayashi M, Yamada M (2004) Animal protein, animal fat, and cholesterol intakes and risk of cerebral infarction mortality in the adult health study. *Stroke* 35: 1531-1537.
3. Rauma, A. L. and Mykanan, H., 2000. Antioxidant status in vegetarians and nonvegetarians. *Journal of American Nutrition*, 16: 109 -119.
4. Marlow, H. J., Hayes, W. K., Soret, S., Charter, R. L., Schweb, E. R., and Sabate. (2009). Diet and the environment: Does what you eat matter? *Journal American Clinical Nutrition*, 59: 16995 – 17035.
5. Richter V, Rassoul F, Hentschel B, Kothe K, Krobara M, et al. (2004) Agedependence of lipid parameters in the general population and vegetarians. *Z Gerontol Geriatr* 37: 207-213.
6. Shepherd J (2001) Issues surrounding age: vascular disease in the elderly. *Curr Opin Lipidol* 12: 601-609.
7. Dholpuria R, Raja S, Gupta BK, Chahar CK, Panwar RB, et al. (2007) Atherosclerotic risk factors in adolescents. *Indian J Pediatr* 74: 823-826.
8. Ramaraj R, Chellappa P (2008) Cardiovascular risk in South Asians. *Postgrad Med J* 84: 518-523.
9. Mostafa Zaman M, Choudhury SR, Ahmed J, Yoshiike N, Numan SM, et al. (2006) Plasma lipids in a rural population of Bangladesh. *Eur J Cardiovasc Prev Rehabil* 13: 444-448.
10. Zaman MM, Choudhury SR, Ahmed J, Numan SM, Islam MS, et al. (2004) Non-biochemical risk factors for cardiovascular disease in general clinic-based rural population of Bangladesh. *J Epidemiol* 14: 63-68.
11. Djousse L, Arnett DK, Coon H, Province MA, Moore LL, et al. (2004) Fruit and vegetable consumption and LDL cholesterol: the National Heart, Lung, and Blood Institute Family Heart Study. *Am J Clin Nutr* 79: 213-217.
12. Taku, K., Umegaki, K., Sato, Y., Taki, Y. and Wantanabes. F. (2007). Soy isoflavons lower serum total and LDL cholesterol in humans: A meta-analysis of II randomized contrail trial. *American Journal of Clinical Nutrition*, 66: 1148
13. Sharma RK, Singh VN, Reddy HK (2009) Thinking beyond low-density lipoprotein cholesterol: strategies to further reduce cardiovascular risk. *Vasc Health Risk Manag* 5: 793-799.
14. Gardner CD, Coulston A, Chatterjee L, Rigby A, Spiller G, et al. (2005) The effect of a plant-based diet on plasma lipids in hypercholesterolemic adults: a randomized trial. *Ann Intern Med* 142: 725-733.

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15. Pyorala K (1996) CHD prevention in clinical practice. *Lancet* 348: s26-28 Fraser GE (1999) Associations between diet and cancer, ischemic heart disease, and all-cause mortality in non-Hispanic white California Seventh-day Adventists. *Am J Clin Nutr* 70: 532S-538S.
16. Cariappa, M., Poorima, K., Nandin, M. and Kadilaya, H. (2005). Oxidant status and Lipid profile in vegetarians and fish eaters. *Indian Journal of Clinical biochemistry*, 20: 103 – 108.

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