DIFFERENCES IN BODY MASS INDEX AND SERUM LIPID PROFILE AMONG VEGETARIANS & NON VEGETARIANS

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AIM: To study the body mass index (BMI) and serum lipid profile in vegetarians compared to non-vegetarians. **MATERIALS AND METHODS:** This is a cross sectional study designed to study the correlation of BMI and serum lipid profile among vegetarians and non-vegetarians (n=25 in each group) aged between 18-40 years. BMI was measured and fasting blood sample was drawn for analysis of lipids. Information was obtained on personal and family health history, health-related habits including leisure-time physical activity and dietary intake. **RESULTS:** Vegetarians have a lower mean BMI and lower dietary intakes of protein, saturated fat and cholesterol compared to non-vegetarians. Vegetarians have significantly lower concentrations of serum total cholesterol (TC), low density lipoprotein (LDL), triglycerides (TG), TC/high density lipoprotein (HDL) and LDL/HDL than the non-vegetarians.

KEYWORDS: Body mass index, Lipid profile, Vegetarians, Non-Vegetarians

INTRODUCTION: Overweight and obesity are the new global health threats. This is mainly due to sea change in our food habits. There is excessive intake of imbalanced and calorie rich foods among children and adolescents. This can lead to chronic ailments like hypercholesterolemia, hypertension, diabetes mellitus and major depressive disorder¹. According to World Health Organization (WHO) ², globally around 2.8 million people die every year as a consequence of being overweight or obese; and in the last 30 years, the prevalence of obesity has nearly doubled worldwide. This study makes a small attempt in understanding one of the many dimensions of the effects produced by the type of dietary intake, by studying the BMI and serum lipid profile in vegetarians compared to non-vegetarians.

MATERIALS AND METHODS: This cross sectional study was carried out in A J institute of Medical Sciences and Research Centre, Mangalore between June 2010 and September 2010. Fifty apparently healthy subjects aged between 18-40 years were included in the study. Subjects with family history of hypercholesterolemia, subjects on drugs that affect the lipid profile were excluded from the study. Subjects were assigned to two groups: vegetarians (veg) and non-vegetarians (non-veg) based on the diet consumed. Ethical clearance was obtained from institute's ethical committee and written informed consent was obtained from all the subjects. History of dietary habits, physical activity, family history and any health disorders were documented. Height was measured to the nearest 0.1 centimeters using wall mounted stadiometer and weight was measured to the nearest 100g using a standard weighing scale. BMI was calculated using the Quetelet's index: weight (kg) /height (metre)². The subjects were divided into three categories: obese, overweight and normal according to WHO guidelines³. An early morning blood sample was collected from all the subjects after an overnight fast of 10 hours to assess serum lipid profile. Serum TC, LDL, TG, HDL, TC/HDL, and

LDL/HDL levels were analyzed using a semi automated analyzer. All tests were conducted free of cost for the study subjects. Chi square was done to test the difference in BMI and lipid profile between veg and non-veg group.

RESULT: The average age of the subjects in the study group was 23.4 years in veg and 26.6 years in non-veg group. Table 1 shows the mean height, weight and BMI in veg and non-veg group. The mean height in veg and non-veg group was 1.63m and 1.62m respectively. The weight comparison done in both the groups showed a statistically significant difference between the two groups. The mean BMI (Graph 1) was significantly higher ($p=0.002$) in non-veg group compared to veg group. Moreover, non-veg group had poorer dietary patterns like high intake of fat and processed meat at least thrice a week with frequent visit to restaurants, they had lesser consumption of vegetables, fruits and fiber rich foods, they had energy intake higher than the estimated energy requirement for age and gender. Among the veg group: 20 subjects were in normal weight range, 2 subjects were underweight, 3 subjects were overweight. Among the non-veg: 15 subjects were in normal range, 9 subjects were overweight and 1 subject was obese. There was a statistically significant association between BMI and dietary pattern between two groups. Non-veg group had a higher risk of being overweight and obese compared to veg.

Table 1: Comparison of height, weight, BMI in vegetarians and non-vegetarians

Group Statistics					
	GROUP	N	Mean	Std. Deviation	t
HT	Veg	25	1.6272	.08080	.31100 $p=.757$ ns
	Non veg	25	1.6200	.08287	
WT	Veg	25	58.2400	8.97348	2.20100 $p=.033$ sig
	Non veg	25	64.5200	11.09474	
BMI	Veg	25	21.9108	2.38064	3.25600 $p=.002$ hs
	Non veg	25	24.4672	3.12111	

Graph 1: BMI in vegetarians and non-vegetarians

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Among the non-veg group, TC (Graph 2) and LDL (Graph 3) values were higher compared to veg group which was statistically significant. The other parameters viz TG, VLDL, TC/HDL, LDL/HDL showed higher values in non-veg group but was not statistically significant. HDL level remained within normal range in both the groups. (Table 2)

Table 2: Comparison of lipid profile in vegetarians and non-vegetarians

Lipid profile (mg/dl)	Veg (n=25)	Non-veg (n=25)	x²	p
Total cholesterol				
<150	11	03	7.63	0.022(sig)
150-250	14	20		
>250	00	02		
Triglyceride				
<48	02	01	1.22	0.542(not sig)
48-180	19	22		
>180	04	02		
LDL				
<70	07	03	7.77	0.021(sig)
70-130	18	16		
>130	00	06		
VLDL				
<10	02	01	0.357	0.837(not sig)
10-50	21	22		
>50	02	02		
HDL				
35-75	25	25		
LDL/HDL				
<2.5	19	20	1.168	0.558(not sig)
2.5-3.5	03	01		
>3.5	03	04		
TC/HDL				
<3.7	20	17	1.354	0.508(not sig)
3.7-4.3	04	05		
>4.3	01	03		

Graph 2: Total Cholesterol in vegetarians and non-vegetarians

Graph 3: LDL in vegetarians and non-vegetarians

DISCUSSION: According to Johansson et al⁴, obesity seems to be the new global pandemic in the present century. It is estimated that 1.5 billion people are suffering from the effects of obesity and overweight. Variety of factors including unhealthy food habits like high intake of processed food rich in trans fats, sugar and empty calories are implicated. Gradual reduction in healthy habits has compounded the problem⁴. The study on vegetarians by Jacka et al⁵ has shown that consumption of nutrient rich foods have positive effects on redox status and immune system functioning.

The present study attempts to understand the correlation between increased intake of non-vegetarian food, weight gain and lipid levels. Studies by Zhang et al⁶, Delisle et al⁷ and Uusitupa et al⁸ have shown positive correlation between diet, obesity and BMI. The present study is in agreement with the previous studies. In this study we found that obesity and overweight is more common in subjects with non-vegetarian diet. Frazier-wood et al⁹, Jitnarin et al¹⁰ and Delisle et al¹¹ have studied the association between BMI and diet. They have found that it is attributable to multiple factors in addition to diet, like genetic factors, sedentary life style and urbanization. Increased BMI is associated with atherogenic factors like higher TC and LDL level. Our study conclusively proves this

point. In the present study; we found that the HDL levels were within the normal range in both veg and non-veg group. In contrast, the HDL levels were lower in non-veg group, in a study done by Bobbioni et al¹².

Large scale studies by Múnera et al¹³ and Molina et al¹⁴ have shown that obesity is a contributing factor to cardio metabolic risk in younger age group. In the present study, simple measures like assessment of BMI have been found to be contributory to metabolic screening in adolescent population. Study by Cugnetto et al¹⁵ have found out strong association between diet and coronary artery diseases in adolescents.

CONCLUSION: In the present study, there is a positive correlation between BMI, serum lipid profile and the type of diet. So, there is a need to encourage healthy dietary patterns, enhanced physical activity and regular assessment of biochemical parameters among young adults.

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