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Original Research Article

Effect of a plant versus animal based diet on lipid profile of yoga practicing medical students: a pilot study

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ABSTRACT

Background: Foods play an important role in human health. An excess accumulation of cholesterol in the body is one of the main causes of cardio vascular disease, hypertension, type 2 diabetes mellitus, dyslipidemia and mortality. In the interests of food safety and public health, plants and their compounds are now re-emerging as an alternative approach to treat gastrointestinal diseases. The present study was designed to discuss changes in blood cholesterol levels after the consumption of animal based (non vegetarian) and plant based (vegetarian) food on yoga practising medical students.
Methods: Of 81 subjects, a total of 60 subjects within the age group 18 to 22 years were selected for the study and were divided into two groups, non-vegetarian diet group (group A; n=30) and vegetarian diet group (group B; n=30). Subjects in the group A were given a non vegetarian diet and group B a vegetarian diet for a period of 10 days. Assessments were done at baseline and after 10 days.
Results: There were no statistically significant changes seen in the lipid profiles of group B and group A after the application of a paired t test. In this study the mean value of total cholesterol, serum triglyceride, serum LDL and serum VLDL were found to be slightly higher in vegetarian group than the non-vegetarian group. Mean value of serum HDL was found to be higher in non-vegetarian group than the vegetarian.
Conclusions: The present study concludes that there are more changes in the pre and post lipid profile assessments of the vegetarian group in comparison to the non-vegetarian group.

Keywords: Lipid profile, Non-vegetarian, Vegetarian

INTRODUCTION

Human life style has changed dramatically over time. The consumption of meat and meat products have increased radically throughout the world. Vegetarianism dates back to a time before recorded history. Many anthropologists believe that early humans ate mainly plant based foods, being more like gatherers than hunters. According to them, the natural diet of man consists of fruits, nuts and grains, and not meat.[1] This view is supported by the fact that the human digestive system resembles that of other plant eaters rather than meat eaters.[2] Vegetarianism involves the practice of following a diet that includes fruits, vegetables, cereals, grains, nuts and seeds with or without dairy products or eggs. A vegetarian does not eat meat including poultry, fish, and shellfish. He/She may also abstain from byproducts of animal slaughter such as animal derived rennet and gelatin.[3,4] Attraction towards non vegetarian food is high in the modern era. The tendency of eating non vegetarian fast food in hotels,

restaurants and at home has now become extremely common. Serum total cholesterol, low density lipoprotein (LDL) cholesterol is significantly lower in vegetarians than omnivores in several studies.[5,6] Vegetarian diets tend to be low in Saturated Fatty Acids (SFA) and rich in Poly Unsaturated Fatty Acid 6 (PUFA), which is shown to have favorable effects on blood lipid fractions. When intake of SFA is replaced by PUFA, the risk of Chronic Heart Disease (CHD) is decreased.[7]

The health benefits of vegetarian diets are not necessarily unique. As outlined previously, modest fish and dairy consumption as well as occasional meat intake have also been associated with reduced risk of CHD when compared with regular meat-eaters. These sources are rich in proteins, vitamins and other essential fats, which are required for the day to day life activity of an individual. However, carefully planned vegetarian and vegan diets can provide adequate nutrients for optimum health.[8] Nutrients most likely to be deficient in an unbalanced or very restrictive vegetarian diet are iron, vitamin D, vitamin B12 and n-3 fatty acids. It is recognized that over-reliance on one single food, or food group, will not provide the range of nutrients required for optimum health and well-being. This is the case for all diets-omnivorous, vegetarian or vegan. All dietary practices should aim to meet current nutritional guidelines to reduce risk of chronic disease development.[9] Hence the study is conducted to know and compare the effects of vegetarian and non vegetarian diet on lipid profile in young medical students who have an additional daily schedule of practicing yoga.

METHODS

Subjects

Students of Shri Dharmasthala Manjunatheshwara College of Naturopathy and Yogic Sciences**,** Ujire.

Criteria for diagnosis

Since the study involved healthy volunteers, no diagnostic criteria were applied to the present study.

Inclusion criteria

- Vegetarian and non-vegetarian individuals within the age group of 18 to 22 years.
- Both the genders.

Exclusion criteria

- Smokers and Alcoholics
- Type 2 Diabetes Mellitus
- Hypertension
- Familial hyperlipidemia
- Any underlining morbid conditions and metabolic disorders
- Psychological disorders.

Study design

Out of 81 subjects from Shri Dharmasthala Manjunatheshwara College of Naturopathy and Yogic Sciences (SDMCNYS), a total of 60 subjects (male 24, female 36) within the age between 18 to 22 years were recruited for the study and were divided into two groups, non-vegetarian diet group (group 1; n=30) and vegetarian diet group (group 2; n=30).

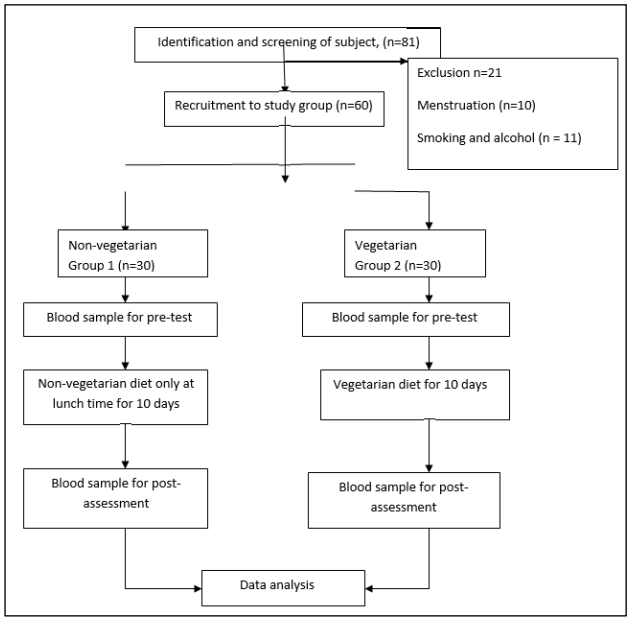

Figure 1: The illustration of study plan.

Intervention

The group 1 was given a non vegetarian meal only at lunch time for 10 days consists of chicken and fish approximately 150 grams each, whereas group 2 was given a vegetarian diet for 10 days, which usually consists of foods like steamed rice cakes, rice pancakes, chapatis, boiled rice, vegetable gravy with different lentils, pulses, butter milk, curd, puri, Indian sweets, fruits etc. The assessments were done at baseline and after 10 days. An ethical consideration was obtained from the institution and an informed signed consent form was obtained from every subject.

Assessment

Lipid profile test

Lipid profile is a group of blood tests. Tests included in lipid profile are Total Cholesterol, Serum Triglycerides, HDL, LDL, VLDL and Total Cholesterol-HDL ratio.

Measurements and blood collection

A total of 60 samples i.e. Blood (in sterile sample bottles) were collected. Each subject would need to fast for 9-12 hours before having the blood drawn; only water for oral

consumption was permitted. For the estimation of biochemical parameters 5ml of fasting venous blood was drawn from the respondents by a qualified lab technician. The samples were transported in sterile sample bottles without anticoagulant; the blood was put into centrifuge tube. This was allowed to clot and then centrifuged at 3000rpm for 3-5minutes at room temperature.[10]

Cholesterol test

Cholesterol was determined after enzymatic oxidation in the presence of cholesterol oxidase into cholestenone and hydrogen peroxide. The hydrogen peroxide produced reacted under the catalytic action of peroxidase (POD) with phenol and 4-aminophenazone to form a pink coloured product quinoneimine which was measured at 500nm. The intensity of the colour produced was directly proportional to the cholesterol concentration.

All samples were allowed to thaw at room temperature. Samples were run on an A25 Biosystems auto analyzer. Quality control samples obtained from Biosystems were run to ensure accuracy of results.[11]

Data extraction and analysis

The pre and post data of the lipid profile were collected at baseline and at the tenth day of intervention. The data later were statistically analyzed by using SPSS version 16.0.

RESULTS

Results of lipid profile of subjects who have undergone animal based diet shows non-significant decrease in total Cholesterol, serum Triglycerides, LDL, VLDL and non-significant increase in HDL-cholesterol following intervention. Results are shown in Table 1.

Table 1: Pre and post assessment of group 1 (non-vegetarian/animal based diet).

Parameters	Pre	Post	P-value
Total cholesterol (mg/dl)	163±25.91	162±27.71	0.91
Triglyceride (mg/dl)	83.86±19.40	83.53±25.72	0.96
HDL-cholesterol (mg/dl)	54.93±11.42	57.733±11.84	0.5
LDL-cholesterol (mg/dl)	90.66±22.61	86.4±21.92	0.6
VLDL-cholesterol (mg/dl)	16.7±3.87	16.69±4.20	0.9

Table 2: Pre and post assessment of group 2 (vegetarian / plant based diet).

Parameters	Pre	Post	p-value
Total cholesterol (mg/dL)	171.86±33.16	159.66±26.13	0.2
Triglyceride (mg/dL)	138.2±52.70	124.66±58.55	0.5
HDL-cholesterol (mg/dL)	41.26±8.58	38.86±9.61	0.4
LDL-cholesterol (mg/dL)	103.4±35.54	96.33±28.35	0.5
VLDL-cholesterol (mg/dL)	27.66±10.58	25±11.74	0.5

Results of lipid profile of subjects who have undergone plant based diet shows non-significant decrease in total Cholesterol, serum Triglycerides, LDL, VLDL and HDL-cholesterol following intervention. Results are shown in Table 2.

DISCUSSION

Present study showed minimal differences in total cholesterol, serum triglycerides, serum HDL, serum LDL and serum VLDL between vegetarian and non-vegetarian diet schedules. However, it was noted that on screening subjects to be included in the study, fewer vegetarian subjects were at risk of overweight or obesity than non-vegetarian ones; In addition, there were larger numbers of females than males in the study.

The mean score of the pre and post intervention assessments show some changes. The post assessment of total cholesterol, serum triglyceride, serum HDL, serum LDL and serum VLDL were low as compared to baseline in case of the vegetarian group. The post assessment of serum HDL and serum VLDL of non-vegetarian became higher than the pre assessment but total Cholesterol, serum triglyceride, S.LDL are lower in post assessment than the pre assessment. It was also found that the vegetarian group had lower post mean total cholesterol than the non-vegetarian group (159±26.13).

Most epidemiological studies on the lipid profile of vegetarians and non- vegetarians concluded that vegetarians had a favorable lipid profile than non-vegetarians.[12,13] This study hypothesized that there will be no significant difference between lipid profile of vegetarians and non-vegetarians. Results from the present study support the hypothesis that consumption of fruits and vegetables has consistently been inversely associated with risk of cardiovascular diseases and this has been

confirmed by meta analyses.[14-16] This may be because of Indian diets, which are essentially high carbohydrate diets; their staple being cereal and leguminous products with an inclusion of 3-4 exchanges of vegetables and fruits each and moreover adding to the prevalence of vegetarianism which is high among the Indian population.[17,18]

Limitations of the study is the Larger sample size would have given more authenticated results. Limited duration of the study. his 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.

CONCLUSION

The result of this present study showed that there is no much significant change in the lipid profile in between two different diet patterns. However, there is a reduction in the mean score of total cholesterol in vegetarians than non-vegetarians. The mean score of serum HDL of non-vegetarian has shown to be more than the vegetarians. Studies suggest that there is more risk of cardiovascular disease progression by atherosclerosis in non-vegetarians. Consumption of a plant based diet should be encouraged to reduce high incidences of cardiovascular diseases. The present study is not able to clearly conclude whether a vegetarian or a non vegetarian diet improved the serum lipid status of an individual. A healthy diet does not stem merely from eliminating meat and fat, but it is of essential importance to stress the benefits of a diversified diet rich in fruits and vegetables, fiber and antioxidants for a desirable lipid profile.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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