A Comparative Study of Relationship between Vegetarians and Non-vegetarians - Diet, Blood Pressure and Body Fat Composition

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Abstract- Vegetarian diets are now considered as nutritionally adequate and provides healthful benefits and helps in prevention of chronic diseases. Blood pressure and bioelectrical impedance are two tests used to determine the health level of individuals. The purpose of this study is to compare the blood pressure, resting heart rate, anthropometric measurements and body composition of vegetarians to non-vegetarians. The findings showed that vegetarians did not demonstrate a significant difference in body composition, systolic blood pressure and diastolic blood pressure compared to non-vegetarians.

Keywords- Vegetarian, Non-vegetarian, Body composition, Blood Pressure, Hypertension.

I. INTRODUCTION

In the past, many viewed vegetarianism as strange and faddish but appropriately planned vegetarian diets are now recognized by many, including the American Dietetic Association, as being nutritionally adequate, and providing healthful benefits in the prevention and treatment of chronic diseases [1]. A large body of scientific literature suggests that the consumption of a diet of whole grains, legumes, vegetables, nuts, and fruits, with the avoidance of meat and high-fat animal products, along with a regular exercise program is consistently associated with lower blood cholesterol levels, lower blood pressure, less obesity and consequently less heart disease, stroke, diabetes, cancer, and mortality. Hypertension can lead to stroke, blood vessel damage, heart attack, heart failure, and kidney failure [2,3].

Blood pressure and bioelectrical impedance are two tests used to determine the health level of individuals. Blood pressure is the force that blood exerts on arterial walls. Blood pressure is usually measured with a sphygmomanometer. Normal blood pressure is 120/80. Bio-electrical impedance is quick and non-invasive procedure that measures a person’s fat free mass, (FFM) or also referred to as lean body mass (LBM). Bioelectrical impedance measures body composition by calculating the body’s resistance to electrical flow. Body composition composed of >25% for men and >32% for women is typically indicates an increased risk of morbidity [4]. A heart rate of 60-100 beats per minute (BPM) is the normal range for adults. “Epidemiological data suggests that plant-based dietary patterns are associated with a significantly lower prevalence of hypertension”[5]. Past studies have found a correlation between diets high in fruits and vegetables and lower rates of hypertension compared to general populations. A study in the Journal of Nutritional Medicine found diets abundant in fruits and vegetables help to lower the significance of hypertension. This eight-week study found a 12-mmHg drop in systolic and diastolic blood pressures in the study group with no change in the control group. A 2003 study found that vegetable-based diets are associated by lower instances of hypertension and cardiovascular disease.

The purpose of this study is to compare the blood pressure, resting heart rate, anthropometric measurements and body composition of vegetarians to non-vegetarians. The hypothesis of this research study is that the vegetarians will have lower blood pressure, leaner bodies, and a lower resting heart rate compared to their omnivore peers.

II. METHODS

A. Subjects

Subjects for this study were adult age group people ranging from 20-40yrs. Twenty subjects were selected. The female subjects were randomly selected from the home science hostel, MPUAT, Udaipur and male subjects from the Hiranmagri area, sector-4, Udaipur. The samples were selected according to the convenience.

B. Dietary Measures

Subjects were given a comprehensive health questionnaire adapted from previous studies and scheduled for measurement of BP and anthropometrical characteristics within a two-day period. Subjects categorized themselves as vegetarian (no consumption of meat, fish, or poultry) or non-vegetarian and answered a food frequency questionnaire to which the subjects reported the amount and frequency of their usual consumption during the previous three months.

C. Blood Pressure Measurement

Following a five-minute rest, two seated BP measurements were taken for each subject using an automatic BP instrument. The left arm of subjects was used for blood pressure reading.
D. Anthropometric Measurements

Following the BP measurements, height, weight, waist and hip circumference were assessed. Height without shoes was measured to the nearest one-quarter inch using a hand made scale and converted to centimeters. Subjects were weighed wearing lightweight clothing on a balance beam scale and the waist circumference was measured in centimeters using a non-stretchable tape. Hip circumference was measured in centimeters at the widest hip girth. All circumference measurements were taken without removal of subjects’ clothing.

E. Body Composition

Bioelectrical impedance (BIA) was utilized to measure the subjects’ body composition. BIA instrument used in measuring body composition was a handheld model (Body Logic model HBF-306BL body fat analyzer).

F. Statistical analysis

This study compared a vegetarian to a non-vegetarian diet using mean and standard error. We compared diastolic, systolic and body composition data to determine if a vegetarian diet is healthier than a non-vegetarian diet. The sample size was equal number of vegetarian and non-vegetarian subjects.

III. RESULTS

As shown in Table I, non-vegetarians exhibit significantly greater waist and hip circumference but lower body weight and BMI.

| TABLE I | ANTHROPOMETRIC CHARACTERISTICS OF VEGETARIANS AND NON-VEGETARIANS |
|-----------------|-----------------|-----------------|
| Anthropometric characteristics | Vegetarian (n=10) | Non-vegetarians (n=10) |
| Weight (Kg) | 57.75 ± 1.2 | 55.75 ± 4.14 |
| Body Mass Index (Wt/Ht²) | 21.4 ± 0.7 | 19.87 ± 0.44 |
| Waist Circumference (cm) | 81.2 ± 1.84 | 81.8 ± 2.86 |
| Hip Circumference (cm) | 95.1 ± 1.4 | 96.3 ± 0.98 |
| Waist/Hip (WHR) | 0.85 ± 0.009 | 0.84 ± 0.08 |

There was no significant difference in fat per cent (V=13.53, NV=10.56) lean percent (V=44.93, NV=45.24) and total fat (V=58.54, NV=55.8) -- body composition between the vegetarian group and the non-vegetarian group.

There was no significant difference in systolic and diastolic blood pressure between the vegetarian group and the non-vegetarian group.

1) Eating Behaviour

Intake differences between vegetarians and non-vegetarians were as expected, but indeed non-vegetarian had more similar diet to the vegetarian. Despite similarities in age, anthropometric characteristics and exercise habits, vegetarians still exhibited a higher prevalence of diagnosed hypertension and a higher average systolic and diastolic blood pressure than non-vegetarians.

IV. DISCUSSION

The main objective of our study was to determine if a vegetarian diet led to lower blood pressure, lower W/H ratio and a healthier body composition. This study found no significant difference in systolic and diastolic blood pressure between the vegetarians and non-vegetarians.

1) Interpretation of Findings

The findings showed that vegetarians did not demonstrate a significant difference in body composition, systolic blood pressure and diastolic blood pressure compared to non-vegetarians. Possible explanations for the similar findings can include a more physically active non-vegetarian group, genetic predisposition for high or low blood pressure among subjects, or the frequency of consuming non-vegetarian foods were low among omnivores peers. The small numbers of subjects in each group could lead to inaccurate test means.

V. CONCLUSIONS

The purpose of the study was to determine if adults can improve their systolic and diastolic blood pressure and body composition by choice of diet. Looking at our findings a vegetarian diet does not produce significant differences in
blood pressure, body composition. There are a number of different versions of a vegetarian diet; some may be healthier than others. The vegetarian diet may have contributed to the similar research data between 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. Further research needs to be conducted with larger number of subjects to prevent possible skewing of data. Further research could be conducted looking a smaller age range, different types of vegetarian diets, or the effects of a vegetarian diet on cardiovascular Disease.

REFERENCES


