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Research Paper

A STUDY ON THE ANAEROBIC POWER AND BODY COMPOSITION OF ATHLETIC TRAINED VEGETARIANS AND NON-VEGETARIANS

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ABSTRACT

The purpose of the present study was to find the anaerobic power, percentage Body fat and Body surface area of trained vegetarian and non-vegetarian college girls. The subjects selected for the study were 30 vegetarian (n=30) and 30 non-vegetarian (n= 30) athletic trained girls whose age ranged between 16 and 20 years. They were randomly picked up from different girl's degree colleges of Osmania University .

The height and weight were measured to calculate the body surface area by using the Monsteller body surface area chart and four locations skin fold thickness were measured to find percent body fat. Vertical jumping ability and body weight were also measured to find out the anaerobic power by using Lewis Nomogram (Fox & Mathews, 1981). Mean, Standard Deviation, 't 'ratio and Pearson product Moment Correlation were used as the statistical tools for the study. The level of confidence set for the significance was 0.01 level (Clarke & Clarke, 1990).The results of the study showed that the non-vegetarians have more body surface area, percentage of body fat and aerobic power than the vegetarians. From these results it is concluded that non-vegetarians are dominating in body surface area, percentage of body fat and anaerobic power when compared to the vegetarian **subjects.**

Key Words: Anaerobic power, Percentage of body fat, Body surface area.

INTRODUCTION

Sports are replete with nutritional faddism and misinformation propagated by coaches, athletes and the media. A well balanced diet should provide all the nutritional and caloric needs of an individual. Since an athlete is constantly burning up calories and breaking down tissues, the food that he or she needs is the food that supplies all the nutrients necessary for repair, growth and energy (Steven & Irwin, 2003). The emphasis of diet should be on so called “live” or 'vital” foods. Fresh salads, fruits, vegetable juices , whole grain food, wheat germ, soya beans, oat flakes, fresh milk, cheese, yoghurt, raw meat are examples of vital food(Peter Konopka, 1998). Most fats whether in the form of butter, margarine, salad dressings, shortenings or natural fasts contained in the meal or other natural sources are digested at about the same slow rate. The athletes' diet should contain a normal amount of fat but not so much that it causes overweight or replaces the essential amount of carbohydrate and protein. Only small amounts of fat should be consumed during the day of competition (Jenson & Fisher, 1999).

Men are stronger and better on a vegetarian diet. Recently in many athletic contests, the vegetarians have proved themselves the strongest and most enduring than the non-vegetarians. In

the cycling races held in Germany, the top honours taken were all vegetarians (Leadbeater, 2006). High intake of animal protein is largely responsible for more saturated fat and cholesterol. The biologic value of food refers to the competence with which the food supplies essentials amino acids. Food of high quality protein is largely of animal origin whereas most vegetable proteins are incomplete in terms of one or more essential amino acids and thus have a relatively lower biologic value. All of the essential amino acids can be obtained by consuming a variety of vegetable foods, each with different quality and quantity of amino acids (Ardle, et.al., 1998).

There are however champion athletes whose diet consists predominantly of nutrients from varied vegetable sources as well as some dairy products. In fact two thirds of the people in the world are adequately nourished on essentially vegetarian diets using only small amounts of animal protein. With few exceptions, a strict vegetarian's nutritional problem is one of getting sample high quality proteins (Ardle, et.al., 1998).

From observing athletes in practice it would be seen that they mostly behave correctly quite spontaneously; but there are also so many errors that lead to deficiency states. There are situations especially during intensive training programmes there is a loss of appetite and the athlete does not feel hungry just when his body needs a large intake of nutrients (Konopka, 1998). The body composition and energy turnover are highly inter-related and closely linked with the functional capacity of the organism. Therefore, evaluation of one's body composition is considerably useful for the understanding of the functional aspect of the children as well as adults. In adults there is a very close relationship between lean body mass and maximal oxygen consumption both absolutely and per kilogram of body weight (H.S.Sodhi, 1991).

Power is the functional application of both strength and speed (Jenson & Garth, 1977). It is an

integral part of the training programmes, for most of the sports activities and much more difficult component to measure. Several field tests of power have been devised , including the vertical jump, standing long jump and softball throw for distance and these tests are repeatable and reliable (Wilmore, 1977). Exercise physiologists and dieticians have different opinion with regard to vegetarian and non-vegetarian diet and their effects on the physical and physiological performance. In this study body composition and anaerobic power were assessed and compared between athletic trained vegetarian and non-vegetarian college girls. This study may conclude the facts of the contribution of the vegetarian and the non-vegetarian diet towards the under investigated variables.

METHODOLOGY

For this study thirty vegetarian (n=30) and thirty non-vegetarian (n=30) active girl athletes from different women degree colleges of Osmania University were selected as subjects. The age of the participants ranged between sixteen and twenty years. The subjects were actively participating in the physical activities, inter-collegiate, university, interuniversity and state level competitions. The variables of Body surface area – in square meters (M^2), Percentage Body Fat – in percent (%) and Anaerobic Power- in kilogram-meters/seconds (Kg-m/sec) were measured. By using steadiometer and weighing machine , the subjects height and weight were measured and to calculate the body surface area Dubois Body surface area chart was used (Fox & Mathews, 1981) Skin fold caliper was used to measure the skin fold thickness in the Biceps, Triceps, Sub scapular and Supra illac locations. Percentage of body fat was calculated by using percentage of Body fat (Monsteller, 1987). Vertical jumping ability and body weight were also measured to find out the anaerobic power (Fox & Mathews, 1981). Skin fold caliper was used to measure the skin fold thickness of Biceps, Triceps, Subscapular and Supra illac locations. Percentage body fat was calculated by using percentage of body fat (Four locations) chart for women (Monsteller, 1987). Vertical Jumping ability and Body weight were also measured to find out the anaerobic power. The Lewis Nomogram was used to determine the anaerobic power (Fox & Mathews, 1981).

For the two tests, nine subjects were taken to determine the reliability of the measurements and correlate the data used in the study. Tester's competency was evaluated by determining reliability of the tests, height, vertical jump, percentage of body fat were measured twice and Pearson Product Moment Correlation was computed between the two SD measures on each test and the reliability coefficient were tabulated below in Tabl-1. The coefficients of reliability were significant at 0.01 levels for all the tests under investigation (Clarke & Clarke, 2003).

Table – 1

Reliability Co-efficient of Test Retest Scores

Test	Co-efficient of Reliability N = 9
Body Surface Area	.962
Percentage of Body Fat	.958
Anaerobic Power	.896
For df = 7, 'r' required for significance at .01 level = 0.798	

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For the purpose of the testing the validity of these groups and to test the significance of difference between the means of the vegetarians and non-vegetarians groups't' ratio was calculated. The level of confidence set for the significance was 0.01 levels (Clarke & Clarke, 2003).

RESULTS

The data was analyzed using the statistical tools which give a clear picture of the results of the study and is represented in the Table-2

Table- 2

Mean, Mean Difference, Standard Deviation and't' Ratio of Body Surface Area, Percentage of Body Fat and Anaerobic Power of Vegetarians and Non-Vegetarians

Variable	Mean & S.D. Vegetarians	Mean & S.D. Non-Vegetarians	Mean Difference	't' Ratio
Body Surface Area	1.34± 0.12	1.49 ± 0.12	0.15	4.50**
% of Body Fat	24.42 ± 2.85	27.57 ± 3.94	3.15	3.53*
Anaerobic Power	47.0 ± 8.63	55.67± 9.17	8.67	3.79*

*p < 0.01 ** p < 0.05

In table -2 the result of the body surface area has shown a mean of 1.34 for vegetarians and the non-vegetarians mean is 1.45 and the difference of the mean is 0.15. The't' ratio obtained is 4.50 which is significant at 0.05 level of confidence. The results points that the non-vegetarians have more body surface area than the vegetarians. The mean with regard to the percent of body fat for the vegetarians was 24.42 and that of the non-vegetarians was 27.57 with a mean difference of 3.15 and the calculated't' ratio was 3.53 which is significant at 0.01 level of confidence confirming that the non-vegetarians have high percentage of body fat than the vegetarians. The results of the anaerobic power shown in the table -2 had a mean value of 47.00 kg.m/sec for vegetarians as compared to 55.67 kg.m/sec for the non-vegetarians. The mean difference was 8.67 kg.m/sec. and calculated't' ratio was 3.79 which was significant at 0.01 level of confidence between the two groups which shows that the non-vegetarians have more anaerobic power than the vegetarians.

DISCUSSION

The study revealed that the non-vegetarians have more body surface area when compared to the vegetarians. The area of research has no scientific evidence to support this finding. The increase in the above variable may be due the reason of the dietary life style and the type of routine physical activities of the non-vegetarians.

Further with regard to the percent of body fat the results have indicated that non-vegetarians had a high amount of body fat than the vegetarians. According to Nieman (1989) the vegetarian women tend to have less body fat and mid upper arm muscle than the non-vegetarians. When healthy vegetarians are compared with closely matched non-vegetarians peers, the vegetarian diet is associated with several benefits, primarily lower blood lipid levels. Sodhi (1991) says that athletes who had substantial amount of adipose tissue have permanently increased energy demands owing to the inert fat. The body composition and energy turnover are highly inter-related and closely linked with the functional capacity of the organism. Polumin (1981) opined that vegetarians can have several advantages over those who eat meat dishes and their diet is often lower in saturated fats and higher in fiber. Hence many investigators have found that the non-vegetarians take a high saturated fat in their food, which

may be the reason for the presence of more fat in the boy of non-vegetarians.

The results of the anaerobic power showed that the non-vegetarians had greater significance than the vegetarians. According to Wilmore (1977), power is the functional application of both strength and speed. Bunn on the other hand stated that in Sargent jump the stronger the mind, the greater the crouch to obtain greatest height in jump and the effective angle at which the muscle operates is solely dependent on the strength of the muscles. Apart from this there is no evidence which will scientifically support the above results However, based on this results non-vegetarians dominate vegetarians in anaerobic power.

CONCLUSION

In the end, on the basis of the above discussion it is concluded that the non-vegetarians were dominating in all the three variables which were investigated. However there is no scientific proof to support these findings. Besides it is important to specify that further research may be conducted to draw a firm conclusion.

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