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A COMPARATIVE STUDY OF THE EFFECTIVENESS OF EIGHT WEEK EQUAL DISTANCE WALKING AND RUNNING IN REDUCING BODY FAT OF YOUNG MALE STUDENTS MEASURED BY SKIN FOLD THICKNESS

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ABSTRACT

Objectives: To know about the effectiveness of walking and running in reduction of body fat mass, to know about the better method in reduction of body fat mass and to improve the fitness of the general people and sports person by reducing body fat mass.

Subjects: A sample of 30 students between 15 to 17 years were selected from the population by selection criteria and randomly allotted into two groups.

Methods: Two groups of 15 each assigned for walking and running with pre and post evaluation of BMI and skin fold thickness and compared.

Results: The result shows that Body mass index (BMI) value reduced in walking (0.78) and running (0.74)groups. Percentage of body fat reduced in walking (4.66%) & running groups (2.94%). When comparing the effectiveness between walking and running group, higher significant level seen with the walking group (0.001) than running group (0.01).

Conclusion: Walking and running reduces the body weight and both can be prescribed to the healthier younger individuals to reduce body weight as fat mass.

Key words: Body fat mass, Skin fold thickness, Walking, Running

INTRODUCTION

"Practice Does Not Make Perfect, Perfect Practice Makes Perfect"

Every sports person must be fit enough for an event selection. Fitness can be defined easily in a single word as a person's fitness, but it consists of cardio respiratory fitness, muscular strength, endurance, flexibility and range of motion, body composition and nutrition. A person is considered to be fit if only he fulfills all categories.

Professional athletes and sports persons are adequately fit when comparing with the other persons, who exercise occasionally. Obesity is one of the common problems among these groups of amateur players. For example professional athlete's average body fat is less when comparing with the college runners.

Obesity is a commonest problem among peoples, who are sedentary in their life style. Obesity is an independent risk factor for the development of coronary artery disease and is frequently a predecessor of type II diabetes and causes risk for weight related problems like hypertension hyper cholesterolemia, hyper insulinemia and hyper triglyceridemia all of which

increases the risk for cardio vascular disease.

Development of obesity in adolescence has been shown to correlate very strongly with obesity in adulthood and also the increased risk of disease. Lack of exercise and nutrition are significant factors in adolescence obesity. In active person any chronic imbalance on the energy input results in increased body mass (Energy input> Energy output). [1-2]

Early intervention in adolescence obesity will prevent the adulthood obesity and its related disease. It is important to establish an ideal effective treatment in reducing adolescence obesity. Reduction of obesity will increase their self-esteem, psychological well being, and a positive feedback to be active and fit throughout their life. Alteration in fat mass can be achieved in two ways,

1. Modification of early nutrition and
2. Exercise

Regular aerobic exercise like walking, jogging, running, cycling reduces body fat mass and preserves the lean body mass by burning fat for energy. But dieting reduces both the body fat mass and lean body mass. To maintain body composition, younger and healthier individuals can be involved in any one of activity but not advisable in case of old age and unhealthy individuals. Exercise prescription to maintain body composition should be a practicable, valuable and should consider according to the individual.

Nowadays adolescent obesity emerges as a social problem and needs necessary action to be taken to prevent the social stigma. This should be properly controlled to avoid adulthood obesity and to reduce morbidity rates. [3]

Walking and running are the most common activities followed by many people to reduce their body fat. Both walking and running has their own merits and demerits. Running requires less time to cover a distance than walking but cannot be followed by all for a long duration. Theories supports that fast walking requires more energy than running. Increased energy expenditure utilizes fat for energy and results in better weight reduction as fat mass and is useful for maintaining a good body composition.[4-5]

Walking, running are the common form of aerobic exercise followed by people to reduced their body weight by increased caloric expense by the exercise. Review of literature shows that walking at faster speeds requires higher energy expense than running. If walking is better than running, then the people can follow the walking to reduce their body weight, which is comparatively easier, and risk free than running.

Sports persons also can use the better method to maintain their body weight in the off-season period along with their routine specific exercise.

The understanding of the effectiveness of walking and running will guide the physiotherapists to select the better method for the needed person to reduce their body fat mass.

METHODOLOGY

Research Design

Single Blinded Randomized study

Setting of the study

This study was conducted on eleventh standard boys of T V S Higher secondary School, Madurai.

Sample

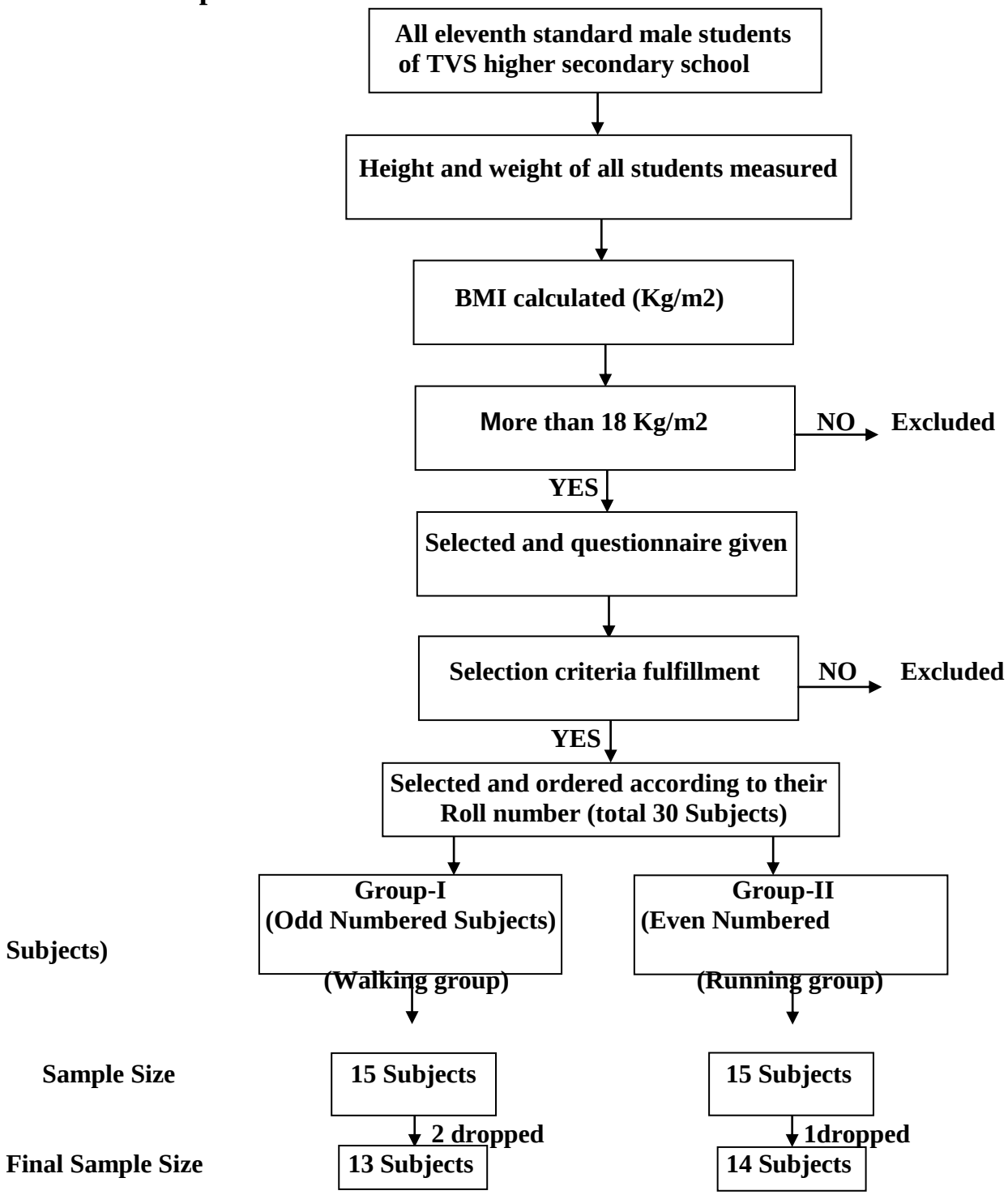
A sample of 30 students were selected from the population by selection criteria and randomly allotted into two groups.

Criteria for sample selection

1. Male students
2. Age group 15 to 17 years
3. Students without any medical problem

4. Not on regular exercise and diet control
5. Sedentary students, not participating in any sport activities
6. BMI more than or equal to 18.

Method of sample selection



OUTCOME MEASURES

1. Body Mass Index

Body Mass Index (BMI) is calculated by using the following formula before and after intervention.

BMI = Weight (Kg) / (Height)^2 in meter

2. Percent of Body fat

Percent of body fat is calculated based on skin fold thickness and the equation for less than or equal 18 years males is,

Percent of Body fat = 0.735 (Σ 2 SKF triceps, sub scapular) + 1.6

Skin fold thickness (SKF)

All skin folds should be taking on the dominant side. 2 to 3 measurements should be taken at each site averaging those within 1mm of one another. The site shall be Abdominal, Biceps, Triceps, Chest/Pectoral, Mid axillary, Subscapular, Suprailiac, Thigh and Medial calf.
These two outcome measures were been used to collect data before and after eight weeks of intervention.

Tester

The tester of this study was a sports physical therapist working in a fitness center with 5 years of fitness testing experience.

PROCEDURE

Both running and walking group were taught to do their workout in the following sequence. After each session the subjects were asked for their difficulty in running/walking.

1. Warm up (Stretching) - 5 to 10 Minutes
2. Walking/Running
3. Cool down (Stretching) - 5 to 10Minutes

1. Warm up

- All 30 students were taught to do warm up daily before their work out.
- Gentle movements of upper and lower limb (2-3 minutes)
- Calf and hamstring stretching in stride standing.
- Calf stretching on the edge of step.
- Quadriceps stretching in one leg standing.
- Stretching maintained for 10-20 seconds and repeated 3 times each.

2. Walking/Running

A. Walking

Randomly allotted 15 students in Group I were asked to walk briskly a distance as in the following manner.

First Week: Distance – 1.5 Km, Frequency – 4 days/week, Speed – 8-9 Km / hour.

Second to Eighth Week: Distance – 1.75 Km, Frequency – 4 days / week

Speed – 8-9 Km / hour

B. Running

Randomly allotted 15 students in Group II were asked to run a given distance as in the following manner.

First Week: Distance - 1.5 Km, Frequency - 4 days / week, Speed - 11-12 Km / hour

Second to Eighth Week: Distance - 1.75 Km, Frequency - 4 days / week

Speed - 11-12 Km / hour

Cool Down

- All 30 students were taught.
- Stretching maintained for 10-20 seconds and repeated 3 times each.

DATA ANALYSIS

Distribution of subjects according to Pre & Post-training BMI

BMI Level	Group – I		Group – II	
	Pre-training	Post-training	Pre-training	Post-training
=18	0	0	0	1
18.1-19	0	3	1	2
19.1-20	6	5	5	2
20.1-21	5	2	3	5
21.1-22	1	2	1	2
>22	1	1	4	2
Total Subjects	**13**	**13**	**14**	**14**

Distribution of subjects according to pre & Post-training percentage of body fat

% of Body Fat	Group – I		Group – II	
	Pre-training	Post-training	Pre-training	Post-training
11-20	1	1	2	4
21-30	8	9	7	6
31-40	4	3	4	3
41-50	0	0	1	1
Total Subjects	**13**	**13**	**14**	**14**

Mean Values of BMI levels

Mean Values		Group - I	Group - II
BMI	Pre training	20.55	22.02
	Post training	19.77	21.28

Mean values and significant level of percentage of body fat

Mean Values		% of Body Fat	t-value	Significance
GROUP - I	Pre training	27.82	5.60	0.001
	Post training	23.16		
GROUP - II	Pre training	28.34	5.124	0.01
	Post training	25.40		

RESULTS

The result shows that

- Body mass index (BMI) value reduced in walking and running groups.
  - Group I (Walking) – 0.78
  - Group II (Running) – 0.74
- Percentage of body fat reduced in walking & running groups.
  - Group I (Walking) – 4.66%
  - Group II (Running) – 2.94%
- Both walking and running significantly reduced the body weight as fat mass.
  - Group I (Walking) – 0.001 level of significance
  - Group II (Running) – 0.01 level of significance

When comparing the effectiveness between walking and running group, higher significant level seen with the walking group (0.001) than running group (0.01).

DISCUSSION

Percent of body fat measurement

The selected subjects were sedentary and they had greater fat mass even they were in the normal body mass index (BMI) level. This supported by ACSM's resource manual that BMI is a poor predictor of percent of body fat. So in this study BMI is used as a tool to exclude the students who were very low in weight to their height.

To predict percentage of body fat in children there are two formulas given by SLAUGHTER[5]. One formula uses triceps and subscapular skin fold thickness and the other is triceps and medial calf.

The subjects of this study goes to school by bicycle or walk, rarely by motorized vehicle and they were very minimally shown the medial calf skin fold thickness, but all the subjects showed the greater thickness in sub scapular site when comparing with Triceps & calf.

To minimize the bias caused by skin fold thickness of medial calf, as it is already on regular aerobic exercise, the upper body sites of sub scapular and triceps were measured to calculate percent of body fat by Slaughter's formula.

Intensity of training

The first day of first week the students were asked to complete the distance of 1.5km. After the session the subject's pulse rate and respiratory rate were checked and asked about their difficulty feeling. They were able to complete the task with little difficult. Then they were advised to cover the same distance for the whole first week. At the end of last session of first week they said that their difficulty level is reduced. From second week onwards they were advised to complete 1.75km. This distance continued until the end of whole schedule for 8 weeks.

Every week after completing the first session they were asked about their difficulty level orally and pulse rate and respiration was checked. The heart rate shown that they have achieved the 80 percent of their Target Heart Rate.

BMI changes

The results show the reduction of weight and BMI in both groups. This supported by CRAIG BW et al, MC ARDLE WE and TONER MM, WILMORE JH statements that endurance exercise reduces body weight[6]. But there was no significant difference between the two groups this supported by POLLOCK ML et al[7].

In this study, the subjects were free from diet control; even though they reduced their body weight this support by MILESIS CA et al and GETTMAN CR et al[8].

Changes in percent of body fat

The study results show the walking group reduced the percentage of body fat higher than the running group. This significant

difference may be due to the increased caloric expense at the faster speed walk (> 8 km/hour) than walking at slower speed.

The economy of walking at faster than 8km/hour was one half of that for running at similar speeds and it is more economic to jog/run rather than to walk at speeds greater than 8km/hour so the study results, the walking group significantly reduced their body fat mass than the running group.

Clinical implication

- Walking is one of the easier ways of doing aerobic exercise, which can be followed by anyone.
- The results of this study showed that walking reduces greater fat mass when comparing with running.
- So we can prescribe the walking to reduce the storage fat mass for all categories of people.
- Risk of injury is high in running when comparing with the walking group.

CONCLUSION

Walking and running reduces the body weight and both can be prescribed to the healthier younger individuals to reduce body weight as fat mass. According to the individual's need and physique proper advice should be given to reduce the body weight. Walking at greater speeds reduces the body weight by greatly reducing the body storage fat in the young male students who were sedentary in their lifestyle. This walking type of exercise provides better start for endurance training with reduced risk of injury.

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