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Dr. P Anandhan
Physical Director, Government
Arts College for Women,
Pudukkottai, Tamil Nadu, India

Effect of walking training on physiological changes among overweight women

Dr. P Anandhan

Abstract

The aim of the present study was to determine the influence of walking training program on physiological changes among overweight women. For this purpose, twelve overweight women (BMI ≥ 25 kg/m²) were randomly selected as subjects from Chidambaram, India. The selected subjects were age, height and weight ranged was 37 ± 7 years, 172 ± 8 cm and 85 ± 12 kg respectively. The duration of walking training program was 12 weeks and given about from 30 to 45 minutes per day. Physiological analyses were done on RHR, VO₂ max and Percentage of Body Fat to find out the significant effect of after training on women. The resting heart rate of the subjects was measured using radial pulse test and VO₂ max of the subject was measured through conducting cooper 12 minutes' walk/run test and then % body fat of the subjects was measured using skin fold thickness method. To analyses the collected data used "t" ratio at 0.05 level of confidence. The result of study show that the 12 weeks walking training is widely believed to induce changes in the resting heart rate, vo₂ max and % body fat level in overweight women. It was concluded that there was a significant decreased on resting heart rate and % body fat increased on vo₂ max after the 12 weeks walking training among overweight women.

Keywords: Resting heart rate, vo₂ max, percentage body fat and overweight

Introduction

Regular walking exercise of any kind can improve weight control and life expectancy and reduce stress. Life expectancy is also increased even for individuals suffering from obesity or high blood pressure. Excessive body weight is associated with various diseases. Obesity is not just a cosmetic consideration. Overweight and obesity cause serious health problems, including Coronary heart diseases, several forms of cancer, type 2 diabetes, Hypertension and Respiratory Difficulties. (Haslam DW, James WP, 2005) [2].

Walking is a great way to improve or maintain your overall health. Just 30 minutes every day can increase cardiovascular fitness, strengthen bones, reduce excess body fat, and boost muscle power and endurance. It can also reduce your risk of developing conditions such as heart disease, type 2 diabetes, osteoporosis and cancers. Unlike some other forms of exercise, walking is free and doesn't require any special equipment or training.

Physical activity does not have to be vigorous or done for long periods in order to improve your health. A 2007 study of inactive women found that even a low level of exercise around 75 minutes per week improved their fitness levels significantly, when compared to a non-exercising group. Hundreds of medical studies show that regular exercise is good for health very good, in fact. But many of these studies lump various forms of exercise together to investigate how the total amount of physical activity influences health. It's important research, but it doesn't necessarily prove that walking.

In a report that included findings from multiple well done studies, researchers found that walking reduced the risk of cardiovascular events by 31% cut the risk of dying by 32%. These benefits were equally robust in men and women. Protection was evident even at distances of just 5½ miles per week and at a pace as casual as about 2 miles per hour. The people who walked longer distances, walked at a faster pace, or both enjoyed the greatest protection.

Walking is low impact, requires minimal equipment, can be done at any time of day and can be performed at your own pace. You can get out and walk without worrying about the risks associated with some more vigorous forms of exercise.

Correspondence
Dr. P Anandhan
Physical Director, Government
Arts College for Women,
Pudukkottai, Tamil Nadu, India

Walking is also a great form of physical activity for people who are overweight, elderly, or who haven't exercised in a long time.

Overweight is most commonly caused by a combination of excessive food energy intake, lack of physical activity, and genetic susceptibility few cases are caused primarily by genes, endocrine disorders, medications or psychiatric illness. Evidence to support the view that some obese people eat little yet gain weight due to a slow metabolism is limited. Obese people have greater energy expenditure than their thin counterparts due to the energy required to maintain body mass. (Adams JP, Murphy PG, 2000) ^[1].

Heart rate, or heart pulse, is the speed of the heartbeat measured by the number of poundings of the heart per unit of time typically beats per minute. The heart rate can vary according to the body's physical needs, including the need to absorb oxygen and excrete carbon dioxide.

VO₂ max is the maximal oxygen uptake or the maximum volume of oxygen that can be utilized in one minute during maximal or exhaustive exercise. It is measured as milliliters of oxygen used in one minute per kilogram of body weight (ml/kg/min). VO₂ max or maximal oxygen uptake is one factor that can determine an athlete's capacity to perform sustained exercise and is linked to aerobic endurance. A high VO₂ max may indicate an athlete's potential for excellent aerobic endurance. (Costill, D.L. and Wilmore, J.H., 1994) ^[4].

The body fat percentage (BFP) of a human or other living being is the total mass of fat divided by total body mass, multiplied by 100; body fat includes essential body fat and storage body fat. Essential body fat is necessary to maintain life and reproductive functions. The percentage of essential body fat for women is greater than that for men, due to the demands of childbearing and other hormonal functions. Storage body fat consists of fat accumulation in adipose tissue, part of which protects internal organs in the chest and abdomen. The minimum recommended total body fat percentage exceeds the essential fat percentage value reported above. A number of methods are available for determining body fat percentage, such as measurement with calipers or through the use of bioelectrical impedance analysis.

The body fat percentage is a measure of fitness level, since it

is the only body measurement which directly calculates a person's relative body composition without regard to height or weight. The widely used body mass index provides a measure that allows the comparison of the adiposity of individuals of different heights and weights. Coronary heart disease has a number of well determined risk factors. The most common risk factors include smoking, obesity, and lack of exercise.

Specifically, exercise physiology dictates that low intensity, long duration exercise yields a larger percentage of fat contribution in the calories expended because the body does not need to quickly and efficiently produce energy to maintain the activity. On the other hand, high intensity activity utilizes a larger percentage of carbohydrates in the calories expended because its quick production of energy makes it the preferred energy substrate for high intensity exercise. High intensity activity also yields a higher total caloric expenditure. (Vehrs, P., 2011) ^[12].

Methodology

Selection of subjects

Twelve overweight women (BMI ≥ 25 kg/m²) were randomly selected as subjects from Chidambaram, India to participate in the study. Before participation, all subjects read and signed an informed consent form. The selected subjects were age, height and weight ranged was 37 ± 7 years, 172 ± 8 cm and 85 ± 12 kg respectively. Selected subjects acted as experimental group for walking training with no control group.

Walking Training

The 12 weeks walking training program was scheduled for only one session in the morning between 6-7 am for three alternate days. During the training session consisted of 30 to 45 minutes session was divided into five stages: warm-up; low intensity training; warm-down stretching. The investigator with the help of the guide designed such as walking, technical and injury for overweight men. This walking training program involved for subject called 50 - 60% intensity, the target heart rate range would be 80 - 120 bpm. The 12 weeks walking training schedule variation for presented in table I.

Table 1: 12 weeks walking training schedule

Weeks	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1 and 2	20 min	Rest	20 min	Rest	20 min	Rest	20 min
3 and 4	25 min	Rest	25 min	Rest	25 min	Rest	25 min
5 and 6	30 min	Rest	30 min	Rest	30 min	Rest	30 min
7 and 8	35 min	Rest	35 min	Rest	35 min	Rest	35 min
9 and 10	40 min	Rest	40 min	Rest	40 min	Rest	40 min
11 and 12	45 min	Rest	45 min	Rest	45 min	Rest	45 min

Testing Variables

The resting heart rate of the subjects was measured using radial pulse test and VO₂ max of the subject was measured through conducting cooper 12 minutes run / walk test. And then % body fat of the subjects was measured using skin fold thickness method.

Statistical Analysis

Resting heart rate, vo₂ max and Percentage body fat level were assessed before and after 12 weeks for both the experimental training programs. Statistical technique used for collected data in the study was analyses 't' ratio. The

significant of confidence was fixed at 0.05 levels.

Results

All subjects were tested in before and after training for Resting heart rate, vo₂ max and Percentage body fat level. The collected data were analyzed by 't' ratio with the level of significance set at .05. The mean, standard deviation and 't' ratio values analyzed each dependent variable separately.

The data obtained before and after 12 weeks walking training on Resting heart rate, vo₂ max and Percentage body fat level were analyzed by 't' ratio and presented in Table II.

Table 2: 't' ratio test

Variables	Test	Mean	SD	Std. Error Mean	df	't' ratio
RHR	Before training	73.13	0.76	0.22	11	124.32*
	After training	72.06	0.83	0.24	11	
VO ₂ Max	Before training	39.92	1.16	0.34	11	83.96*
	After training	41.33	1.71	0.49	11	
% body fat	Before training	21.76	1.24	0.51	11	4.72*
	After training	20.13	0.89	0.67	11	

*Significant at .05 level.

Table-II show that means RHR was 73.13 and 72.06 before and after training respectively. The obtained 't' ratio value was 124.32 on RHR it's greater than the table value of 2.2 for significance with df 11 at .05 level of confidence.

The result of the study shows that there was a significant decreased in RHR after the 12 weeks walking training. Also Table-II shows that means VO₂ Max was 39.92 and 41.33 before and after training respectively. The obtained 't' ratio value was 83.96 on VO₂ Max it's greater than the table value of 2.2 for significance with df 11 at .05 level of confidence. The obtained 't' ratio value was 4.72 on Percentage body fat it's greater than the table value of 2.2 for significance with df 11 at .05 level of confidence. The result of the study shows that there was a significant reduced in resting heart rate and Percentage body fat level and increased in VO₂ Max after the 12 weeks walking training.

Discussion

Regular exercise such as brisk walking results in reduced body weight and body fat among overweight and obese postmenopausal women. A significant dose response for greater body fat loss was observed with increasing duration of exercise. Women in the exercise group participated in moderate-intensity sports activity for a mean (SD) of 3.5 (1.2) d/wk for 176 (91) min/wk. Walking was the most frequently reported activity. Melinda L. Irwin *et al* (2003)^[8] we examine the effects of exercise on total and intra-abdominal body fat overall and by level of exercise.

Physical activity is a key contributor to health. Accumulating evidence indicates that sedentary a risk factor for cardiovascular and other major diseases Frankish C.J *et al*, (1998)^[5]. Even moderate levels of activity confer health benefits, and for most people, additional health benefits may be derived by becoming more active. Moderating factors for prevention of major diseases which may be accessed through moderate levels of activity include weight management and stress reduction Pate *et al*, (1995)^[9]. The role of lifestyle change with regard to diet, weight control, and physical exercise can be vastly important in management of abnormal blood lipids and lipoproteins. However, there are controversial studies related with the exercise type and duration leading to changes in the lipid metabolism.

Robert F and Zoeller Jr (2007)^[10] have investigated the prevalence of overweight and obesity is increasing at an epidemic rate. Increased adiposity and low levels of physical activity and/or fitness are risk factors for atherosclerotic disease and type2 diabetes, as well as the increased mortality associated with them. Increased physical activity/fitness reduces disease and mortality risk regardless of body mass index but does not completely abrogate the risks associated with obesity. Physical activity on the order of 2500 to 2800 kcal/wk may be necessary to prevent weight gain or maintain weight loss. Strength training is recommended as an adjunct to regular aerobic exercise but not as the primary mode of exercise for weight loss. Individuals are strongly encouraged

to engage in regular physical activity because of the known health benefits, regardless of whether that activity results in weight loss.

John M Jakicic and Amy D Otto (2005)^[7] have conducted a study on overweight and obesity present significant public health concerns because of the link with numerous chronic health conditions. Excess body weight is a result of an imbalance between energy intake and energy expenditure. Physical activity is the most variable component of energy expenditure and therefore has been the target of behavioral interventions to modify body weight. Physical activity also appears to have an independent effect on health-related outcomes when compared with body weight, suggesting that adequate levels of activity may counteract the negative influence of body weight on health outcomes. Thus, it is important to target intervention strategies to facilitate the adoption and maintenance of an adequate amount of physical activity to control body weight.

Practice of the specific yogic exercises is significantly effective in promoting desirable changes in pulse rate, vital capacity; percent body fat. Shenbagavalli and Divya (2010)^[11] we have investigated of the study was to find out the effect of specific yogic exercises programme and on selected physiological variables such as vital capacity, percent body fat of the college men students.

Conclusion

The present study was determined to influence of 12 weeks walking training program on resting heart rat, vo₂ max and percentage body fat among overweight women. It was concluded that there was a significant decreased on resting heart rate and percentage body fat and then increased on vo₂ max after the 12 weeks walking training among overweight women.

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