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Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.isrj.org

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INFLUENCE OF BRISK WALKING AND ELLIPTICAL TRAINING ON BASAL METABOLIC RATE AND RESTING PULSE RATE AMONG SEDENTARY WOMEN

P. Kannadasan[1], K. V. Balamurugan[2] and P. K. Senthilkumar[3]
[1]Assistant Professor, Department of Physical Education and Sports Science, Annamalai University
[2]Associate Professor, Department of Physical Education and Sports Science, Annamalai University
[3]Assistant Professor, Dept.of Exercise Physiology and Bio mechanics, TNPESU, Chennai.

ABSTRACT:

The aim of this study was to find out the influence of brisk walking and elliptical training on basal metabolic rate and resting pulse rate among sedentary women. To achieve the purpose, thirty (N=30) sedentary women were randomly selected and their age ranged between 30 and 40 years and they were assigned into three groups, brisk walking group (BWG), elliptical training group (ETG) and Control group (CG) consisting of 10 in each. After assessing the basal metabolic rate and resting pulse rate initially, the experimental groups underwent respective treatments for eight weeks. After the completion of eight weeks experimental period, all the subjects were measured of their selected variables. The results proved that brisk walking and elliptical training improved basal metabolic rate of sedentary women comparing to initial and final scores; brisk walking and elliptical training reduced

resting pulse rate. The differences were found to be significant P <0.05. The comparisons proved that elliptical training was significantly better than brisk walking group in improving basal metabolic rate and reducing the resting pulse rate. Thus, it was concluded that sedentary women may use elliptical training than brisk walking to improve their basal metabolic rate and resting pulse rate.

KEY WORDS: Brisk walking, Elliptical Training, Basal Metabolic Rate, Resting Pulse Rate

INTRODUCTION:

Sedentary lifestyle is threatening the health of every individual in every moment of life. In middle aged and elderly people such lifestyle, encourages or increases the risk of obesity, muscle weakness, postural deficiencies, diabetes, hypertension and coronary heart disease. A regular physical activity causes important changes that it shows in the increase of health related fitness and in the decrease of the risk factors in many of developing medical conditions in inactive people *(Physical Activity Guidelines Advisory Committee Report,2008).*

Human energy requirements are estimated from measures of energy expenditure plus the additional energy needs for growth, pregnancy and lactation. Recommendations for dietary energy intake from food must satisfy these requirements for the attainment and maintenance of optimal health, physiological function and well-being. The latter (i.e. well-being) depends not only on health, but also on the ability to satisfy the demands imposed by society and the environment, as well as all the other energy-demanding activities that fulfill individual needs.

Energy intake is essential for life. Energy is required to sustain the body's various functions, including the maintenance of core body temperature, respiration, circulation, deposition of tissues during growth and pregnancy, milk secretion, and physical work. Estimation of how much energy an individual needs is critical for nutritional planning and assessment in individuals and populations. "The energy requirement of an individual is a level of energy intake from food that will balance energy expenditure when the individual has a body size and composition, and level of physical activity, consistent with long-term good health; and that would allow for the maintenance of economically necessary and socially desirable physical activity".

In a normal, healthy individual the typical resting heart rate is between 60-80 beats per minute (BPM). It is not uncommon, however, to see significant fluctuations in these normal values with relatively healthy individuals. For example, sedentary individuals may have a resting heart rate of over 100 bpm while some conditioned athletes may have rates as low as 28-40 bpm. The vast discrepancies between the high and low values primarily reflect the efficiency of the heart. The heart of a trained individual has adapted to become capable of ejecting more blood with each beat. When one begins to exercise, the nervous and endocrine system respond by influencing the heart's beating frequency and force. In response to exercise, heart rate will rise in a predictable manner.

To our knowledge, no studies exist that have addressed the influence of Brisk walking and elliptical cross training on basal metabolic rate (BMR) and Resting Pulse Rate (RHR) in sedentary individuals. Many individuals participate in brisk walking and other type of endurance training programs, yet limited information is known about the influence of this type of training on metabolic rate and Resting Pulse Rate. Therefore, the purpose of this study was to examine the influence of brisk walking and elliptical cross training on basal metabolic rate (BMR) and Resting Pulse Rate (RHR) among sedentary women.

METHODOLOGY

Thirty sedentary women were selected from Chidambaram, Cuddalore district. They were in the age group of 30 – 40 years. The study was formulated as a true random group design consisting of a pre-test and post test. The subjects (N=30) were randomly assigned to three equal groups of ten sedentary women each. The groups were assigned as experimental group I – (Brisk walking exercises), Experimental Group II (Elliptical cross training) and control group respectively. Pre tests were conducted for all the 30 subjects on basal metabolic rate and resting pulse rate. Height was measured to the nearest 0.1 cm on a stadiometer with the participants shoeless. Body weight was measured to the nearest 0.1 kg using a pre-calibrated tanita electronic scale. Basal Metabolic Rate (BMR): Caloric expenditure was calculated based on the weight of the subject via the Harris-Benedict formula based on total body weight (BMR = 655 + (9.6 X wt in kg) + (1.8 X ht in cm) - (4.7 X age in years)). Resting pulse rate was measured through electronic heart rate monitor. After the experimental period of eight weeks post test were conducted and the scores were recorded. The differences between the initial and final scores were considered as the effect of brisk walking and Elliptical cross training on selected variables. The obtained data were statistically analysed using ANCOVA.

Exercise Program:

The program included 1) warming up and stretching, 2) Brisk walking part, 3) cool down and stretching. Warming-up phase for 5 minutes of stretching exercises, 30 minutes walking at 60-80% of maximum heart rate and cooling-down phase for 5 minutes of stretching, three times a week for 2 months. The brisk walking exercise accompanied by music. The exercise intervention was not limited with any nutrition restriction or modification. A target heart rate ranged between 60-80% of age adjusted maximum heart rate, intensity was calculated by each walker from her age and walking supine resting heart rate. Heart rate was measured with an electronic polar heart rate monitor. Walking is the most significant physical activity in the lives of most persons, walking was taken as the reference activity. The control group did not participate in any activity aerobic dance exercise program during the eight-week period in two months.

Elliptical training:

Following the warm up, the training programme was applied alternately with intensive and relaxed effort. The intense muscular effort was set with the pedal rates of 50 to 55 revolutions per minute (rpm) were repeated 5 times on the elliptical cross trainer. Every intense effort lasted for 2 minutes. Initial loading was set at approximately 60% of the maximum ability. The resistance of the load was checked by the corresponding heart rate. Loads were then increased every two week by 5 % and were estimated by the maximum load every individual performed at the end of the week testing. For the first two weeks the target intensity was 60%- 65% of maximum heart rate (MHR) for 20 minutes. For 3-4th weeks the intensity progressively increased 65% - 70% of MHR for 25 minutes. For 5-6th weeks the intensity increased 70% - 75% of MHR for 30 minutes and for 7-8th weeks the intensity increased 75% - 80% of MHR for 35 minutes.

RESULTS

Tab I: Effects of brisk walking and elliptical cross training on basal metabolic rate and resting pulse rate among sedentary women

BASAL METABOLIC RATE (Scores in kcl)								
	BWG	**ECT G**	**CG**	**S V**	**SS**	**df**	**MS**	**Obtained F**
Pre Test	104.30	102.70	103.40	B	12.87	2	6.43	1.01
				W	172.60	27	6.39	
Post Test	127.50	125.00	106.40	B	2658.07	2	1329.03	**166.98***
				W	214.90	27	7.96	
Adjusted	126.76	125.68	106.46	B	2606.71	2	1303.36	**426.52***
				W	79.45	26	3.06	
Mean Gain	23.20	22.30	3.00					
RESTING PULSE RATE (Scores in beats per minute)								
Pre Test	77.40	77.20	79.80	B	41.87	2	20.93	1.21
				W	465.60	27	17.24	
Post Test	73.40	72.60	78.90	B	235.27	2	117.63	**8.32***
				W	381.70	27	14.14	
Adjusted	73.96	73.31	77.63	B	99.53	2	49.77	**11.65***
				W	111.03	26	4.27	
Mean Gain	4.00	4.60	0.90					

*Significant at 0.05 level of confidence for 2 and 27 (df) = 3.35, 2 and 26 (df) = 3.37

The results presented in Table I proved that there was significant variation due to brisk walking and elliptical cross training on basal metabolic rate and resting pulse rate. The obtained adjusted post test F values 426.52 and 11.65 were greater than the required F value of 3.37 to be significant at 0.05 level. Since significant results were obtained multiple comparisons of adjusted means on basal metabolic rate and resting pulse rate comparing the effects of brisk walking and elliptical cross training were presented in Table II.

Tab II: Multiple Comparison of Paired Adjusted Means of basal metabolic rate and resting pulse rate due to brisk walking and elliptical cross training

BASAL METABOLIC RATE				
ADJUSTED MEANS			Mean Difference	Required . C I
Brisk walking Group	Elliptical cross Training Group	Control Group		
106.46	126.76		**20.30***	1.62
106.46		125.68	**19.22***	1.62
	126.76	125.68	1.08	1.62
RESTING PULSE RATE				
77.63	73.96		**3.67***	1.91
77.63		73.31	**4.32***	1.91
	73.96	73.31	0.65	1.91

* Significant at 0.05 level.

DISCUSSIONS

The results presented in Table I proved that there was significant improvement on basal metabolic rate and resting pulse rate due to brisk walking and elliptical cross training. Brisk walking improved basal metabolic rate of sedentary women 23.20 kcl, elliptical cross training improved 22.30kcl and control group 3 kcl, comparing to initial and final scores. The ANCOVA results proved that these differences were significant at 0.05 level. The comparison of effects of brisk walking and elliptical cross training (Table II) proved that both the experimental protocol significantly improved basal metabolic rate of sedentary women, it was found that elliptical cross training was significantly better than brisk walking. Similarly elliptical cross training stabilized resting pulse rate 4.60 and brisk walking stabilized 4.00 beats per minutes and the control group, there was a slight increase of 0.90. These differences were found to be significant at 0.05 level. The comparison of effects of brisk walking and elliptical cross training among sedentary women proved that elliptical cross training significantly better in reducing resting pulse rate. The findings of this study are in agreement with the findings of Habibzadeh and Rahmani-nia, (2010), Evrim Cakmakc, et al., (2011) and Mark Watsford and Aron Murphy, (2008), Egana, and Donne, (2004).

CONCLUSIONS

It was concluded that sedentary women may use brisk walking and elliptical cross training to improve their physiological levels of Basel Metabolic rate and Resting pulse rate. The exercise is intimately connected with our State of Health and improper Basel Metabolic Rate will often reflect various disturbances of body and mind. The brisk walking and elliptical cross training had significant effect on the Basel Metabolic rate. Basel metabolic Rate is one of the indicators for Person's calories expenditure level which increases through various exercises. Resting pulse rate is an effective, non-invasive assessment of cardiovascular fitness and also allows adaptation to aerobic training.

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