International Journal of Yoga, Physiotherapy and Physical Education
ISSN: 2456-5067
Impact Factor: RJIF 5.24
www.sportsjournal.in
Volume 3; Issue 5; September 2018; Page No. 44-46

Effects of aerobic training on resting heart rate in sedentary women

Rinsa Raj[1], Dr. D Sultana[2]
[1] Research Scholar, Department of Physical Education and Sports, Pondicherry University, Pondicherry, India
[2] Professor, Department of Physical Education and Sports, Pondicherry University, Pondicherry, India

Abstract
Background: The study was to examine the effect of step aerobic training (SAT) and floor aerobic training (FAT) on resting heart rate in sedentary women.
Methodology: Subjects were randomly assigned to step aerobic training (n=15), floor aerobic training (n=15) and control group (n=15). The subjects in the experimental groups performed scheduled aerobic training 3 times a week for 12 weeks. The heart rate monitor was used to measure resting heart rate. The test was conducted before and after initiation of the training programme to determine the effect training. Analysis of Variance (ANOVA) and Scheffe's Post –hoc Test was used for analysis of the results.
Result: Compared to the control group; resting heart rate was significantly decreased in both experimental groups.
Conclusion: According to the obtained results, SAT and FAT had beneficial effects on the resting heart rate, other than SAT have relatively more effective in resting heart rate as compared to FAT group.

Keywords: SAT, FAT, resting heart rate

1. Introduction
A routine physical exercise is an important factor to reduce the indexes of cardio vascular and all causes morbid morality. Resting heart rate is an easily measured cardiovascular parameter that considered an independent predictor of cardiovascular diseases and mortality in the general population [1]. Among mammals, the maximum number of heart beats per lifetime is surprisingly constant and same time it might be show variation in body size and resting heart rate. But among mammals human species are exceptional and they gain it through improvements in living conditions such as better hygiene, clean water, food supply, safe and sound accommodation, prevention and treatment of diseases and more [2]. However, there is apparently and independent benefits of the routine practice of physical exercise will improvement the level of aerobic condition [3]. The American Heart Association recommends individuals to practice physical exercises in most days of the week and every day if possible with intensity ranging from moderate to strenuous, according to their physical capability, for a period of half an hour or more [4]. Regular physical exercise is an important factor to reduce the indexes of cardiovascular and all causes morbimortality. The additional and independent benefits of the regular physical exercise are improvement in aerobic condition. Studies suggest that well-trained or physically well-fit (aerobically) individuals present a lower resting-HR [5]. A low resting HR reflects a good health condition, whereas higher values are apparently related to a higher mortality risk [6]. The normal range of heart rate was higher in younger men than women, but because of a more rapid decline with age in men, the older women had higher heart rates than the older men [7].

Therefore, the objective of the research was to examine the effects of SAT and FAT protocols to determine the optimum strategy to deliver resting heart rate benefits. And also the scope for research to examine the palatability of SAT and FAT as an exercise modality for middle aged sedentary women through investigating perceived enjoyment during and after, and consequent long-term exercise adherence.

2. Methodology
2.1 Subjects
To achieve these purpose 45 sedentary women were selected randomly, from Thamarassery Taluk, Kozhikode, Kerala. The participant age ranged between 36 to 40 years. They were simplified into three groups. Each group consists of 15participants, which were assumed to be appropriate for the purpose of the study. The experimental treatment assigned as step aerobics training and floor aerobics training to the two experimental groups.

2.2 Study design
The experimental design used for this study was formulated as random group design involving forty five subjects, who were divided randomly into three groups of fifteen each. They were be simplified into three group's namely experimental group I, experimental group II and control group. Each group consist of 15 subjects each, which are assured to be large enough for the purpose of the study. The experimental treatment assigned as step aerobics training(SAT) and floor aerobics training(FAT) were assigned as experimental group I and experimental group II respectively, which were demand for 12 weeks (3 alternate days per week) they participated in the research voluntarily and cheerfully without any compulsion.

Control group did not follow any structure training. All the subjects were tested prior and after the experimental treatment periods on resting heart rate.

2.3 Training Program
Subjects performed three training sessions per week over a 12 week period (36 sessions). The duration of the initial training session was 30 min. All subjects performed a gradual 10 minute warm up and 10 minute cool-down prior to and following the step aerobic training(SAT) and floor aerobic training(FAT). SAT comprised 30 min continuous step aerobic exercises at moderate intensity and FAT followed the floor aerobic training as same.

2.4 Measurements
The heart rate monitor is used to measure resting heart rate. Heart rate measurement is one of the very important parameters of the human cardiovascular system. The heart rate of a healthy adult at rest is around 72 beats per minute [8]. Heart rate is simply and traditionally measured by placing the thumb over the subject's arterial pulsation, and feeling, timing and counting the pulses usually in a 30 second period. Heart rate of the subject is then found by multiplying the obtained number by two. This method although simple, is not accurate and can give errors when the rate is high. More sophisticated methods to measure the heart rate utilize electronic techniques. Here the heart rate monitor was used as tool to measure resting heart rate.

2.4 Data analysis
The analysis of variance (ANOVA) was used to analyze the significant difference if any, between the groups on each selected variables separately. The confidence interval was fixed at P<0.05 in all cases.

3. Results

Table 1: Analysis of variance for the two experimental groups and the control group In Resting Heart Rate

	SAT	FAT	Control	SOV	Sum of squares	df	Mean squares	'F' ratio	Sig
Pre-test Mean SD	83.46	83.13	82.73	B	4.04	2	2.02	0.14	0.865
	2.99	4.71	3.23	W	584.40	42	13.91		
Post-test Mean SD	78.66	79.20	82.53	B	131.73	2	65.86	6.78	**0.003***
	3.33	3.27	2.69	W	407.46	42	9.70		

*p < 0.05

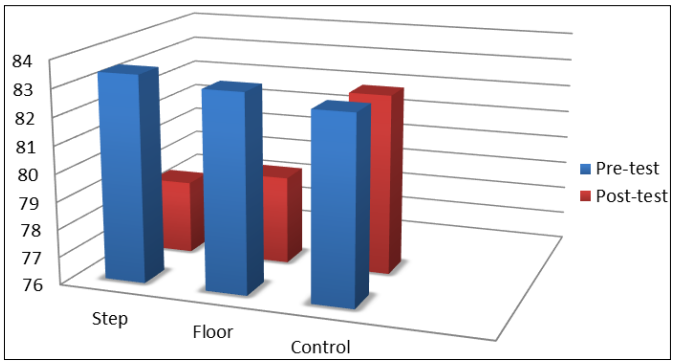

Fig 1: Mean Pre-test and Post-test scores of Resting Heart Rate

4. Discussion
In this study, a sample of 15 middle aged sedentary women took part in SAT, 15 sedentary women in FAT and 15 were control who was the part of 12-weeks programme. Based on the obtained descriptive parameters participants involved in SAT and FAT reported significant improvement on resting heart rate. The autonomic nervous system (ANS) is the part of the peripheral nervous system that serves as control mechanism to maintain the body under stable conditions (homeostasis) (Choi, J & Gutierrez-Osuna. R. 2009) [9]. The primary aim of aerobic training is the development of cardio respiratory fitness through various movement structures such as walking running dancing etc. (Mustedanagic. J. *et al.*, 2016) [10]. The specific type of exercises are very important to get major changes, who used walking but it may take more sessions and higher intensity to gain changes in HRV, whereas with step aerobics showed changes with short sessions. (Audette *et al.*, 2006) [11]. In addition, SAT prove more effective in increasing the relative peak oxygen uptake. An increasing in resting heart rate can be damaging to the heart because it can shorten the diastolic period in the cardiac cycle, increase cardiac workload due to decreased coronary flow (Perski. A. *et al.*, 1988) [12]. In count, aerobic training reduces foundation of the sympathetic nervous system while increasing the activity of the parasympathetic nervous system resulting in reduced resting heart rate (Gielen. S. *et al.*, 2001 [13]. Moreover approaching studies have suggest resting heart rate is an autonomous factor of cardio vascular disease, and high resting heart rate mostly lead high risk in subject. The present research reflects that aerobic training help to reduce resting heart rate in disciplined manner. And it also showing that important of aerobic training and its positive influence for a sound health (Kang. S. J. *et al.*, 2016) [14]. Improved physical fitness of a person may be the outcome in reduction of resting heart rate (Stein. P.K. *et al.*, 1999) [15]. In other words aerobic training had a great role to get changes in resting heart rate; apart it will influence cardio vascular diseases. Further resting heart rate related with physical fitness, and improved physical fitness is can be the reason for reduced resting heart rate (Plasqui. G & Westerterp. K.R., 2005) [16].

5. Conclusions
The results of the present study indicate that better levels of aerobic fitness are beneficial to the control of resting heart rate in middle aged sedentary women. Step aerobic training as well as floor aerobic training led to significant improvements in resting heart rate. Moreover, step aerobic training proved more effective result in resting heart rate, mutually step

aerobic training and floor aerobic training methods seem to encourage sedentary health. Though, the sedentary women can choose either step aerobic training or floor aerobic training all along with their additional activity session to improve their general health. The research definite that the implementation of various types of aerobic training can lead to changes in the space of cardio respiratory fitness.

6. Reference

1. Sharashova E. Decline in resting heart rate, its association with other variables, and its role in cardiovascular disease The Tromsø Study, 2017.
2. Bemelmans RHH. The effect of physical exercise and resting heart rate on cardiovascular risk, 2012.
3. Almeida MB, Araújo CGS. Effects of aerobic training on heart rate. Revista Brasileira de Medicina do Esporte. 2003; 9(2):113-120.
4. Pearson TA, Blair SN, Daniels SR, Eckel RH, Fair JM, Fortmann SP, *et al*. AHA guidelines for primary prevention of cardiovascular disease and stroke: 2002 update: consensus panel guide to comprehensive risk reduction for adult patients without coronary or other atherosclerotic vascular diseases. Circulation. 2002; 106(3):388-391.
5. Almeida MB, Araújo CGS. Effects of aerobic training on heart rate. Revista Brasileira de Medicina do Esporte. 2003; 9(2):113-120.
6. Greenland P, Daviglus ML, Dyer AR, Liu K, Huang CF, Goldberger JJ, *et al*. Resting heart rate is a risk factor for cardiovascular and noncardiovascular mortality: the Chicago Heart Association Detection Project in Industry. American journal of epidemiology. 1999; 149(9):853-862.
7. Hossack KF, Bruce RA. Maximal cardiac function in sedentary normal men and women: comparison of age-related changes. Journal of Applied Physiology. 1982; 53(4):799-804.
8. Ibrahim D, Buruncuk K. Heart rate measurement from the finger using a low-cost microcontroller. Near East University, Faculty of Engineering, TRN, 2005.
9. Choi J, Gutierrez-Osuna R. Using heart rate monitors to detect mental stress. In 2009 Body Sensor Networks. IEEE, 2009, pp219-223.
10. Mustedanagic J, Bratic M, Milanovic Z, Pantelic SD. The effect of aerobic exercise program on the cardiorespiratory fitness and body composition of female college students. Facta Universitatis, Series: Physical Education and Sport, 2016, 145-158.
11. Audette JF, Jin YS, Newcomer R, Stein L, Duncan G, Frontera WR. Tai Chi versus brisk walking in elderly women. Age and ageing. 2006; 35(4):388-393.
12. Perski A, Hamsten A, Lindvall K, Theorell T. Heart rate correlates with severity of coronary atherosclerosis in young postinfarction patients. American heart journal. 1988; 116(5):1369-1373.
13. Gielen S, Schuler G, Hambrecht R. Exercise training in coronary artery disease and coronary vasomotion. Circulation, 2001.
14. Kang SJ, Kim EH, Ko KJ. Effects of aerobic exercise on the resting heart rate, physical fitness, and arterial stiffness of female patients with metabolic syndrome. Journal of physical therapy science. 2016; 28(6):1764-1768.
15. Stein PK, Ehsani AA, Domitrovich PP, Kleiger RE, Rottman JN. Effect of exercise training on heart rate variability in healthy older adults. American heart journal. 1999; 138(3):567-576.
16. Plasqui G, Westerterp KR. Accelerometry and heart rate as a measure of physical fitness: proof of concept. Medicine and science in sports and exercise. 2005; 37(5):872-876.