



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2020; 5(1): 218-219

© 2020 Yoga

www.theyogicjournal.com

Received: 15-02-2020

Accepted: 28-04-2020

Dilip Biswas

Assistant Professor & Head,
Department of Physical
Education, Bajkul Milani
Mahavidyalaya, West Bengal,
India

A comparative study on the effects of organised training on resting heart rate of under graduate physical education male college students

Dilip Biswas

DOI: <https://doi.org/10.22271/yogic.2020.v5.i1c.1558>

Abstract

A major goal in healthcare is to increase life expectancy and eminently improve healthy and happy aging by compressing morbidity into a shorter period in a later stage of the lifespan. Resting heart rate (RHR) is positively related with mortality. Regular exercise causes a reduction in Resting heart rate. It's a decent parameter of cardiovascular capability and healthiness of an individual. Lower heart rate in resting state is an indicator of sound health and physiological condition. Sports training might be helpful to have lower heart rate at resting and after exercise conditions (Sil P.) The purpose of the present study was an endeavor to the best method of handling resting heart rate which is one of the physiological attributes. Out of 96 selected participants from fluvio coastal zone of west Bengal, India on the basis of BMI, 80 under graduate physical education male students (average age:20) were considered for the study. The subjects were divided into four groups (20 for each group) randomly namely Weight Training Group (WTG), Aerobic Training Group (ATG), Graded Circuit Training Group (GCTG) and Control Group (CG). Separately designed 12 weeks training programme for WTG, ATG and GCTG was applied on the subjects at morning between 8.00 am to 9.15am for three alternative days per week. After every four weeks, total load was increased. Pre and post-test on the groups were conducted to measure the training effect on resting heart rate. The collected data were statistically analyzed by using the analysis of Covariance ($p < 0.05$) to determine differences, the LSD test was applied as a post hoc test to find out the paired mean differences. From the obtaining result, it was concluded that weight training, aerobics and graded circuit training are found to be effective for improving the resting heart rate of under graduate physical education male students.

Keywords: Physical education students, weight training, aerobics, graded circuit training, resting heart rate

Introduction

According to the World Health Organization (WHO), more people die annually from cardiovascular diseases (CVD) than from any other cause (WHO-2012) [15]. In particular, an estimated 17.3 million people died from CVD in 2008, representing 30% of all global deaths. Of these 17.3 million deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke. Almost 23.6 million people are expected to die from cardiovascular diseases in 2030, mainly due to heart disease and stroke (WHO-2012) [15]. A major goal in healthcare is to increase life expectancy and eminently improve healthy and happy aging by compressing morbidity into a shorter period in a later stage of the lifespan (Tesch-Römer C. *et al.* 2009) [14]. Life expectancy has increased rapidly during the last century and disability-adjusted life expectancy has been extending as well. Regular exercise and physical activity throughout a lifespan can improve life expectancy (Reimers C.D. *et al.* 2012, Samitz G. *et al.* 2011) [11, 13] and disability-adjusted life expectancy, as shown in many studies (May A.M. *et al.* 2015, Bronnum-Hansen H. *et al.* 2009) [7, 2]. One possible mechanism explaining increases in life expectancy through exercise and physical activity might be the mediating effect of resting heart rate (RHR): possibly, regular exercise and/or physical activity cause a reduction in RHR (Huang -2005, Zheng G. *et al.* 2015, Cramer H. *et al.* 2014) [6, 16, 13],

Corresponding Author:

Dilip Biswas

Assistant Professor & Head,
Department of Physical
Education, Bajkul Milani
Mahavidyalaya, West Bengal,
India

and RHR seems to be inversely related with life expectancy and positively related with cardiovascular and all-cause mortality (Aune D. *et al.* 2017) [1] Heart rate is the number of times the heart beats per minute. Heart rate can be judged through counting heart rate both at rest and during exercise conditions. Heart rate is markedly decreased as a result of physical training. Various studies indicates that After 10-12 weeks of organised training, resting heart rate can come down. The more intense the activity, the more calories will burn. Here the author has tried find out some path for improving the resting heart rate level of the college students who are directly associated with the department of physical education.

Statement of the problem

The intention of the research work was to find out the effects of 12 weeks separately designed three different types of training-i.e., i) Weight Training ii) Aerobics Training and iii) Graded Circuit Training on resting heart rate and compare the results to identify the impacts of those training on under graduate physical education male college students.

Materials and Methods

Ninety-six male physical education students who opted the subject as a general subject, of “Fluvio-Coastal morphological zone” at Purba Medinipur district of West Bengal, India, were chosen randomly from Bajkul Milani Mahavidyalaya. Eighty

students were finalised as “selected subject” and their average age was 20 years. 4 equal groups namely – WTG, ATG, GCTG and CG were formed at random. Students underwent Weight Training (WT), Aerobics (AT) and Graded Circuit Training (GCT). All the tests of resting heart rate were conducted in the gymnasium of Bajkul Milani Mahavidyalaya before the beginning of the training (Pre-Training) and at the end of training (Post Training). The training programmed was scheduled at 8.00 A.M to 9.15 A.M including warm up and cool down in order to minimize the effect of diurnal variation. Separately designed 12 weeks training programmes for all the independent variables were applied on subjects for three alternative days per week. Resting heart rate was measured by using the automatic electric blood pressure measuring monitor (Omron HEM7130L). After every 4 weeks of the experimental period, further load was increased by considering individual ability through test-retest method for all the experimental groups. After end of 12 weeks’ training programme, resting heart rate data was collected. Co-variance (ANCOVA) was used to analyse the collected data to determine the differences (if any) among the groups of dependent variables. LSD test is applied for post hoc test to identify difference between paired mean. 0.05 level of confidence was set as the level of significance.

Result of the study

Table 1: Analysis of co-variance on Resting Heart Rate of under Graduate Physical Education college male students

Test		WTG	ATG	GCTG	CG	Source of Variance	Sum of Square	Degree of Freedom	Mean Square	F	
Pre-Test	Ms	74.35±3.13	77.05±3.87	75.5±5.18	75.8±4.96	AMG	73.85	(K-1) = 3	24.61	1.28	
	S D					WI	1451.1		19.10		
Post-Test	Ms	70.85±3.39	74.95±4.13	73.3±4.81	75.85±5.02	AMG	289.23		(N-K) = 76	96.41	5.00
	S D					WI	1464.25			19.26	
Adjusted Post Test Ms		72.12	73.62	73.46	75.72	AMG	131.49	(K-1) = 3 (N-K-1) = 75	43.83	29.05	
						WI	113.14		1.50		

* Significant table value: $F_{0.05}(3, 76) = 2.72$; $N = 80$ ($N =$ subjects’ number); $F =$ ‘F’ ratio; Ms = Means; S D = Standard Deviation; AMG = Among; WI = within.

Above table presented the Pre-Test “F” ratio ‘1.28’ was found lower than table value [$1.28 < tab_{0.05}(3, 76) = 2.72$]. The Post Test “F” ratio ‘5.00’ was higher than table value [$5.00 > tab_{0.05}(3, 76) = 2.72$]. The calculated Adjusted Post Test Mean “F” value ‘29.05’ was found statistically significant [$F_{0.05}(3, 75)$

< 29.05]. To identify the critical difference of Adjusted Post Test Means, LSD test has been used and it has been analysed in Table no. 2.

Figure No.1 Graphical presentation of result on Resting Heart Rate of under Graduate Physical Education male students

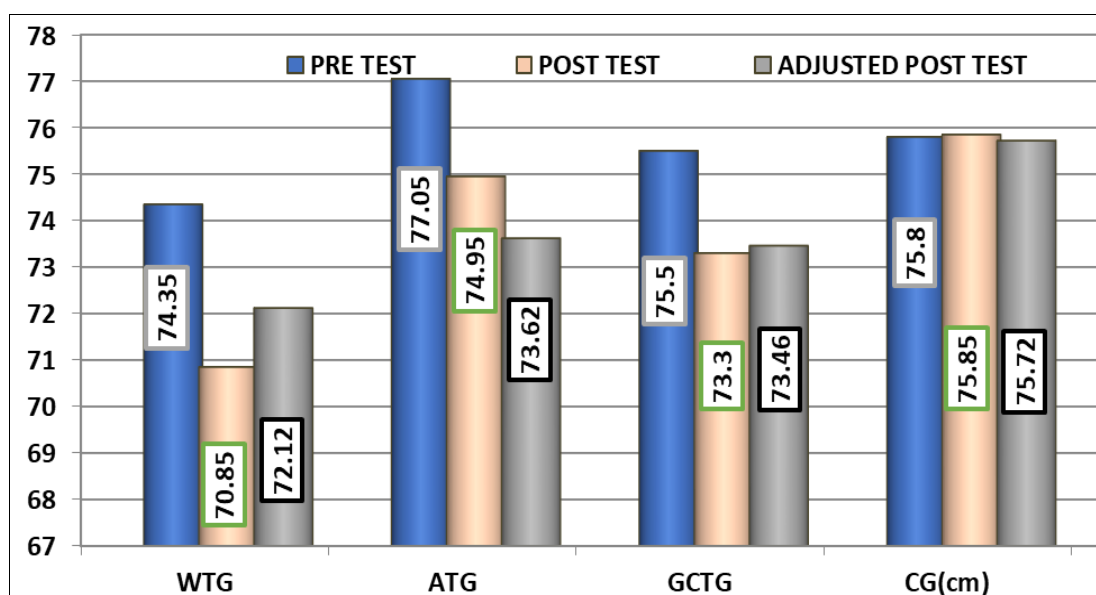


Fig 1: Mean of Resting Heart Rate on different training groups of under graduate physical education male students.

Table 2: Analysis of critical difference of adjusted post-test means on Resting Heart Rate of under Graduate Physical Education male students

WTG	ATG	GCTG	CG	MD	CD (5%)
72.12	73.62			1.49*	0.76
72.12		73.46		1.34*	
72.12			75.72	3.60*	
	73.62	73.46		0.15NS	
	73.62		75.72	2.10*	
		73.46	75.72	2.26*	

Significant level: 0.05; NS = Not Significant; MD = Mean Difference; CD = Critical Difference

The Adjusted Post Test Mean analysis of Resting Heart Rate presented at above table has confirmed that the difference between all the groups, except ATG and GCTG, were significant. The results of this table have also provided evidence that Adjusted Post Test Mean Difference between WTG and CG was higher significant than other pair groups.

Discussion of the findings

Finding of this research work has revealed that (Table no. 2) the significant differences between all the groups, except ATG and GCTG, were found. This finding on resting heart rate has also reflected that (Table no. 2) the difference between WTG and CG has confirmed highest significant result. Besides, the results were assisted by some related findings of different researchers (Cramer H. *et al.* 2014) [3]. After endurance training, the mean decrease of RHR of the exercising participants as compared to the non-exercising was depending on the sexes of the participants (4.5% to 9.0% and 2.7 to 5.8 bpm, resp.). These results are a little bit smaller than those found by Huang *et al.* (Huang G. *et al.*). Circuit training or sports training caused Bradycardia of the Heart in which condition RHR decreased Mathew, D.K. and Fox, E. L. -1971, Gavin. *et al.* 2005) [8, 4]. Study reported that few weeks circuit training might improve fitness of the subjects (M. Sudhakar Babu, Paul Kumar, P. P. S -2013) [9]. Findings show that indigenous aerobic dance music positively affected the physiological variables tested. Therefore, exercise treatment was effective in reducing resting heart rate, systolic and diastolic blood pressure than not exercising at all (Grace O. Otinwa & Jane S. Akinyemi-2019) [17]. The result corresponds with that of Otinwa (2010) [10] which reported that aerobic dance performed within a target heart rate of between 60% and 70% of the maximal heart rate (MHR) has demonstrated cardiovascular and metabolic benefits. Here, in case of resting heart rate, WTG has shown better result than other two experimental groups may be due to the application of proper load that improve the cardiac muscle and its activity. The improvement of ATG and GCTG group also impressive and this result also indicates that the activity opted for those training is suitable for improvement of heart related parameters. In contrary, no significant difference in resting heart rate has been identified between the weight training groups (WTG) and Aerobic Training group (ATG) may be due to the trainings applied for those two groups of this study were suitable and statistically the improvement of all the groups were almost identical. Therefore, different types of specific training plans may be enough to improve the resting heart rate of under Graduate Physical Education male college students.

Conclusion

From the obtaining result, it was concluded that weight

training, aerobics and graded circuit training are found to be effective for improving the resting heart rate of under Graduate Physical Education male students.

References

1. Aune D, Sen A, o'Hartaigh B, Janszky I, Romundstad PR, Tonstad S, *et al.* Resting heart rate and the risk of cardiovascular disease, total cancer, and all-cause mortality-A systematic review and dose-response meta-analysis of prospective studies. *Nutr Metab Cardiovasc Dis.* 2017;27:504-517. doi: 10.1016/j.numecd.2017.04.004.
2. Bronnum-Hansen H, Juel K, Davidsen M, Sorensen J. Impact of selected risk factors on quality-adjusted life expectancy in Denmark. *Scand J Public Health.* 2007;35:510-515. doi: 10.1080/14034940701271908.
3. Cramer H, Lauche R, Haller H, Steckhan N, Michalsen A, Dobos G. Effects of *yoga* on cardiovascular disease risk factors: A systematic review and meta-analysis. *Int J Cardiol.* 2014;173:170-183. doi: 10.1016/j.ijcard.2014.02.017.
4. Gavin RHS, Paul DB, David AB. Effects of exercise on heart rate variability: Inferences from meta-analysis. *Med Sci Sports Exerc.* 2005;37:P433-P439. doi: 10.1249/01.MSS.0000155388.39002.9D.
5. Otinwa GO, Akinyemi JS. Effects of indigenous aerobic dance music on physiological. *Educ Resour Information Center.* 2019, 10(2).
6. Huang G, Shi X, Davis-Brezette JA, Osness WH. Resting heart rate changes after endurance training in older adults: A meta-analysis. *Med Sci Sports Exerc.* 2005;37:1381-1386. doi: 10.1249/01.mss.0000174899.35392.0c.
7. May AM, Struijk EA, Fransen HP, Onland-Moret NC, De Wit GA, Boer JM, *et al.* The impact of a healthy lifestyle on Disability-Adjusted Life Years: A prospective cohort study. *BMC Med.* 2015;13:287. doi: 10.1186/s12916-015-0287-6.
8. Mathew DK, Fox EL. *Physiological Basis of Physical Education and Athletics.* Philadelphia: W.B. Saunders Co; c1971.
9. Sudhakar Babu M, Kumar P, PPS. The effect of selected circuit training exercises on sprinters of high school girls. *Int J Sci Res.* 2013;2(11):401-407.
10. Otinwa GO. *Walking for fitness.* Lagos: ARTiviit Communications; c2010.
11. Reimers CD, Knapp G, Reimers AK. Does physical activity increase life expectancy? A review of the literature. *J Aging Res.* 2012;2012:243958. doi: 10.1155/2012/243958.
12. Sil P. Effect of six weeks circuit training on resting heart rate among active adult women. *Int J Res Rev.* 2015;2(6):379-382.
13. Samitz G, Egger M, Zwahlen M. Domains of physical activity and all-cause mortality: Systematic review and dose-response meta-analysis of cohort studies. *Int J Epidemiol.* 2011;40:1382-1400. doi: 10.1093/ije/dyr112.
14. Tesch-Römer C, Wurm S. Wersind die Alten? Theoretische Positionenzum Alter und Altern. In: Robert Koch Institut, editor. *Gesundheit und Krankheit im Alter.* Berlin, Germany: Robert Koch Institut; c2009. p. 7-30.
15. World Health Organization. *Cardiovascular Disease.* Geneva: WHO; 2012. Available from: <http://www.who.int/>.
16. Zheng G, Li S, Huang M, Liu F, Tao J, Chen L. The

effect of Tai Chi training on cardiorespiratory fitness in healthy adults: A systematic review and meta-analysis. PLoS One. 2015;10:e0117360.
doi: 10.1371/journal.pone.0117360.

17. Otinwa GO, Akinyemi JS. Effects of indigenous aerobic dance music on physiological. Educ Resour Information Center. 2019, 10(2).