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Effects of different training on diastolic blood pressure of female college level students

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Abstract

The World Health Organization (WHO) describes overweight as one of the today's most important public health problems, which is escalating as a global epidemic. The purpose of the present study was an endeavor to the best method of handling overweight. Out of 96 selected participants from fluvio coastal zone of west Bengal, India on the basis of BMI, 80 overweight girls (average age:20) were consider 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 Diastolic Blood Pressure of the subjects. The collected data were statistically analyzed by using the analysis of Co-variance ($p < 0.05$) 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 improvement of Diastolic Blood Pressure of overweight college girls.

Keywords: Overweight, weight training, aerobics, graded circuit training, blood pressure, diastolic blood pressure

Introduction

According to W.H.O, 'Overweight is the unusual or unnecessary too much fat gathering in human body which is harmful to health.' It may be clarified as accumulation of excessive fat in the body than optimally should have to be existed. Equation of overweight in relevance to the food and lifestyle may be outlined as Overweight = plentiful food provides + inactive lifestyles. A healthy body necessitates the least amount of fat for the right functioning of our secretion system, immune systems, genital system, and beside of these activities, it conjointly executes the absorption and insulation of our body and stores up energy for a future emergency. However, once the gathered fat becomes excessive, it adversely affects our physiology. Most of all, overweight alters a human physiological function. Diastolic blood pressure is one of the physiological items that indicates the risk issues due to overweight of a person. Blood pressure (B.P) can be defined as the pressure of blood on the walls of blood vassals. This pressure is owing to effort done by the heart by pumping blood during the circulatory system. Generally, blood pressure indicates the pressure in great arteries. It is expressed in the Systolic pressure (Maxm pressure /heartbeat) over Diastolic pressure (minimum pressure in between two (2) heartbeats) and is calculated in millimetres of mercury (mm Hg). In case an adult individual, normal resting blood pressure is about 120 mmHg for systolic and 80 mmHg for diastolic. It is expressed as '120/80 mmHg.' Hypertension is one of the most common Overweight related complications.

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) Weight Training ii) Aerobics Training and iii) Graded

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Circuit Training on Diastolic Blood Pressure and compare the results to identify the impacts of those training on Overweight college girls.

Materials and Methods

96 overweight female students of “Fluvio-Coastal morphological zone” at Purba Medinipur district of West Bengal, India, were chosen randomly from Bajkul Milani Mahavidyalaya, Kadmbini Women’s College of Education, Vivekananda College of Education, and Sri Ramkrishna College of Education. 18 - 22 years old subjects were selected using B.M.I of the subjects. Out of 96 chosen overweight students eighty were finalised as “selected subject” and their average age was 20 years. 4 groups namely – WTG, ATG, GCTG and CG were formed at random and there have 20 girls in each group. Students underwent Weight Training (WT), Aerobics (AT) and Graded Circuit Training (GCT). All the tests of diastolic blood pressure were conducted in the gymnasium of Bajkul Milani Mahavidyalaya before the beginning of the training (Pre-Training), after every four

weeks to assess and determine the rate of increment of load 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. Automatic blood pressure monitor was used for testing the variables. 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, diastolic blood pressure was measured. 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 diastolic blood pressure of overweight college girl students

Test	WTG	ATG	GCTG	CG	Source of Variance	Sum of Square	Degree of Freedom	Mean Square	F
Pre test	Ms	78.7	80.6	77.15	76.25	AMG	218.25	(K-1)=3 (N-K) =76	72.75
	S D	± 7.8008	± 5.6326	± 8.1645	± 7.5035	WI	3651.3		48.0434
Post-test	Ms	72.25	71.75	72.15	80.25	AMG	1011.4	(K-1)=3 (N-K) =76	337.1333
	S D	± 7.6010	±6.0426	±6.1496	±6.7268	WI	3369.8		44.3394
Adjusted Post-Test Ms		71.9925	71.0228	72.4573	80.8271	AMG	1188.5826	(K-1)=3 (N-K-1) =75	396.1942
						WI	3041.5369		40.5538

* 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 evidence that the Pre-Test “F” ratio ‘1.5142’ was found lower than table value [$1.5142 < \text{tab}_{0.05}(3, 76) = 2.72$]. The Post Test “F” ratio ‘7.6034’ was higher than table value [$7.6034 > \text{tab}_{0.05}(3, 76) = 2.72$]. The calculated Adjusted Post Test Mean “F” value ‘9.7695’ was found statistically significant [$F_{0.05}(3, 75) < 9.7695$]. To identify the critical difference of Adjusted Post Test Means, the LSD test has been used and it has been analysed in Table no. 2.

Table 2: Analysis of critical difference of adjusted post-test means of diastolic blood pressure on overweight college girl students

WTG	ATG	GCTG	CG	MD	CD (5%)
71.9925	71.0228			0.9697NS	3.9873
71.9925		72.4573		0.4648NS	
71.9925			80.8271	8.8346*	
	71.0228	72.4573		1.4345NS	
	71.0228		80.8271	9.8043*	
		72.4573	80.8271	8.3698*	

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

The above table has confirmed that the differences between WTG and CG, ATG and CG, GCTG and CG were significant and difference between ATG and CG was higher significant than other pair groups.

Discussion of the findings

Finding of this research work has revealed that (Table no. 1) the differences between WTG and CG, ATG and CG, GCTG and C G were significant. This finding on Diastolic Blood Pressure has also reflected that (Table no. 2) the difference between ATG and CG has confirmed highest significant result. Besides, the results were assisted by some related findings of various researchers (Carpiro-Rivera *et al.*, -2016,

Seo *et al.*, -2011, Moraes WM, *et al.*, -2012, Skrypnik D, *et al.*, -2015) [7, 9, 7, 11]. Possible mechanisms involved in decreasing blood pressure after a certain period of weight training may be due to lower renal and muscle sympathetic nerve activity, lower norepinephrine spillover, less renal and cardiac baroreflexes, and lower heart rate variability (Sharman JE, *et al.*, -2015, De Sousa EC, *et al.*, -2017) [10, 3]. Endurance circuit training on cardiovascular parameters in overweight elderly women also included a significant decrease in resting systolic blood pressure and resting diastolic blood pressure, (Seo DI, *et al.*, -2011, Braz NF, *et al.*, -2012, Monteiro LZ, *et al.*, -2010, Park SK, *et al.*, -2003) [9, 1, 6, 8] may be attributed to a reduced vascular resistance relating to the improved endothelial function and structure (Heffernan *et al.*, -2009, Taaffe *et al.*, -2007) [5, 12]. In contrast, no significant changes in resting systolic blood pressure and resting diastolic blood pressure has been seen following 6 months of training in a group of postmenopausal women, (Swift DL, *et al.*, -2012) [4] whereas significantly decreased resting SBP, DBP, and HR was observed by Skrypnik D. *et al.*, (2015) [11] may therefore be a consequence of the 3-month planned exercise programme. Here, ATG has shown better result than other two experimental groups may be due to the subjects’ enthusiasm and involvement in the exercise as well as the proper training programmes. In contrary, no significant difference in Diastolic Blood Pressure has been identified between the Experimental Training Groups (WTG and ATG, WTG and GCTG, ATG and GCTG) may be due to the trainings applied for all the different 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 Diastolic Blood Pressure of the Overweight college girl students.

Conclusion

From the obtaining result, it was concluded that weight training, aerobics and graded circuit training are found to be effective for improvement of Diastolic Blood Pressure of overweight college girls.

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