



ORIGINAL RESEARCH PAPER

Physical Education & Sports

A COMPARATIVE STUDY ON THE EFFECTS OF DIFFERENT TRAINING PROGRAMMES ON SYSTOLIC BLOOD PRESSURE OF OVERWEIGHT COLLEGE GIRLS

KEY WORDS: Overweight, weight training, aerobics, graded circuit training, blood pressure, systolic blood pressure

Dr. Dilip Biswas

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

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 Body systolic 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 Systolic Blood Pressure of overweight college girls.

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. systolic 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 millimeters 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 and Obesity related complications and about thirty percent (30%) of hypertensive individuals can be classified as being Overweight. ≥ 140 mm Hg for S.B.P (Systolic Blood Pressure) and ≥ 90 mm Hg for D.B.P (Diastolic Blood Pressure) are the general margin of hypertension.

Statement OfThe 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 Circuit Training on systolic blood pressure and

compare the results to identify the impacts of those training on Overweight college girls.

MATERIALS AND METHOD

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 systolic 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, systolic 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 No. 1: Analysis Of Co-variance On Systolic 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	128.8 ±	130.85 ±	127.5 ±	126.00 ±	AMG	253.6375	(K-1)=3 (N-K)=76	84.5483	1.5398
	SD	7.2008	4.2087	7.6674	9.5531	WI	4172.75		54.9046	
POST TEST	Ms	118.85 ±	120.55 ±	122.65 ±	128.9 ±	AMG	1157.6375	(K-1)=3 (N-K)=75	385.8791	9.1308
	SD	9.6968	4.7514	3.6602	6.2483	WI	3211.85		42.2611	
ADJUSTED POST TEST Ms		118.6082	119.3411	123.0215	129.9791	AMG	1553.2938	(K-1)=3 (N-K)=75	517.7646	17.0081
						WI	2283.1605		30.4421	

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

Above table presented the evidence that Pre-Test "F" ratio '1.5398' was found lower than table value [1.5398 < $tab_{0.05}(3,76)=2.72$]. The Post Test "F" ratio '9.1308' was higher than table value [9.1308 > $tab_{0.05}(3,76)=2.72$]. The calculated Adjusted Post Test Mean "F" value '17.0081' was found statistically significant [$F_{0.05}(3, 75) < 17.0081$]. To identify the critical difference of Adjusted Post Test Means, LSD test has used and it has been analysed in Table no. 2.

Table No. 2 Analysis Of Critical Difference Of Adjusted Post Test Means Of Systolic Blood Pressure On Overweight College Girl Students

WTG	ATG	GCTG	CG	MD	CD (5%)
118.608	119.3411			0.7329NS	3.4546
118.6082		123.0215		4.4133*	
118.6082			129.9791	11.3709*	
	119.3411	123.0215		3.6804*	
	119.3411		129.9791	10.638*	
		123.0215	129.9791	6.9576*	

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

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

Finding of Systolic Blood Pressure has revealed that (Table no. 1) the differences between WTG and GCTG, WTG and CG, ATG and GCTG, ATG and CG, GCTG and CG were significant. This finding on Systolic Blood Pressure has also reflected that (Table no. 2) the difference between WTG and CG has confirmed highest significant result. Besides, the results of the present study were supported by some related findings of various researchers (Tremblay MS, et al., -2010, Mengistic, A. B., -2013, Myers J, et al., -2015). It has pointed out that the level of Systolic Blood Pressure improves if organised training is employed. Overweight female with a greater body mass index would experience larger reductions in resting systolic blood pressure after systematic training (George A. Kelley DA, et al., -2007). Decrease in both systolic and diastolic blood pressure was observed after aerobic and strength training may be due to favourable changes in vascular compliance, thus could reduce peripheral resistance and may lower blood pressure (Kravitz L, -2000). On the contrary, Christou M, et al., (2006) stated that it is difficult to explain the exact explanation beyond the gains of blood pressure in overweight female, since the resistance training may induce adaptations are mainly neurological meaning increased motor unit recruitment and coordination. Aerobic circuit training also has improved the systolic blood pressure and the possible factor interpreting the cardiovascular gains may be the growth in type II fibers (Steele J et al., -2012). On the other hand, the systolic and diastolic pressures were found to be decreased in remarkable rate after the practice of zumba dance (S.Jitesh and Gayatri Devi., -2016). A larger variation of mean difference among the groups may be the reason beyond the larger range of between group's differences. In the present study, weight training group has shown better result than other two experimental groups may be due to the training stimulus alter the left ventricular size, which should enhance pumping mechanics, total heart volume, and maximum cardiac output, (Astorino TA, et al., -2000) and/or may be due to the pressure of excess blood flow, biochemical, neural and hormonal changes in the blood vessel walls induce an acute and long-term blood vessel relaxation (Kravitz L., 2000). In contrary, no significant difference in systolic blood pressure has been found between the WTG and ATG may be owing to training exercises load applied on these

two groups were equivalent and statistically the improvement of the groups was almost identical. Therefore, different types of specific training programmes may be enough to develop the Systolic 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 Systolic Blood Pressure of overweight college girls.

REFERENCES

- Astorino TA. (2000). Is the ventilatory threshold coincident with maximal fat oxidation during submaximal exercise in women? *J Sports Med Phys Fitness.* 40:209-216.
- Christou M, Similios I, Sotiropoulos K, Volaklis K, Piliandis T, Tokmakididis SP. (2006). Effects of resistance training on physical capacities of adolescent soccer players. *J Strength Cond Res.* 20:783-791
- George A. Kelley DA, Kristi S. Kelley Med, Zung Vu Tran Phd . (2007). The Effects of Exercise on Resting Blood Pressure in Children and Adolescents: A Meta Analysis of Randomized Controlled Trials. <https://doi.org/10.1111/j.1520-037X.2003.01224.x>
- Kravitz Len., (2000) exercise and resting blood pressure. [https:// www.unm.edu/~lkravitz/Article%20folder/restingbp.html](https://www.unm.edu/~lkravitz/Article%20folder/restingbp.html). Mengistic, A. B. (2013). The effects of combined aerobic and resistance exercise training on obese adults. *Research Journal of Recent Sciences,* 2(1), 59-66.
- Myers J, McAuley P, Lavie CJ, Despres JP, Arena R, Kokkinos P. (2015). Physical activity and cardiorespiratory fitness as major markers of cardiovascular risk: their independent and interwoven importance to health status. *Prog Cardiovasc Dis.*;57:306-314.
- S.Jitesh and Gayatri Devi. (2016). Effect Of Zumba Dance On Blood Pressure . *J.Pharm.Sci. & Res.* Vol. 8(6), 501-505
- Steele J, Fisher J, McGuf D, Bruce-Low S, Smith D. (2012). Resistance training to momentary muscular failure improves cardiovascular fitness in humans: a review of acute physiological responses and chronic physiological adaptations. *J Exerc Physiol Online.* 15(3):53-80
- Tremblay MS, Colley RC, Saunders TJ, Healy GN, Owen N. (2010). Physiological and health implications of a sedentary lifestyle. *Applied Physiology, Nutrition, and Metabolism.* 35(6):725-740.