



ORIGINAL RESEARCH PAPER

Physical Education & Sports

THE EFFECTIVENESS OF 12 WEEKS TRAINING ON BODY FAT PERCENTAGE OF COLLEGE STUDENTS

KEY WORDS: Overweight, overweight, weight training, aerobics, graded circuit training, Body Fat percentage.

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ABSTRACT

Overweight is one of the today's most important public health problems. The purpose of the present study was an attempt to find out 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. Separately designed 12 weeks training programme for the groups 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 Fat Percentage of the subjects. The collected data were statistically analyzed by using the analysis of Co-variance ($p < 0.05$) to determine differences and 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 reducing Body Fat Percentage of overweight college girls.

INTRODUCTION

Today, our mode of living is extremely synthetic, pseudo-active and for that, we pay with years of life for the premature loss of our youthfulness. We have observed that physical work and the daily exercising of the body was a part of livelihood of primitive man. Hunting and gathering food and water were the basic activity of Nomadic lifestyles to survive on that hostile world where in every moment they have to depend on the physical power and technique. High level of fitness led them physically active form of life that they express in the form of run for subsistence, pursuit, and celebration, and it was one of the keys of healthy living in an uncanny and dangerous world. But today's life is fully different from those days. Now life is comparatively easier and more sophisticated than those days. The easiness of life style lead the human being to be overweight. Overweight related problem is, now a days, a common scenario to our society. **Body Fat Percentage** is one of the items that determines the overweight level of a person. **Body Fat Percentage (B.F.P)** of our body is a determining factor of Body Composition which varies depending on our level of fitness or physical activity. According to the American Council on Exercise, a non-athletes men should have a total Body Fat Percentage in fourteen (14%) to twenty four (24%) percent whereas non-athletes women should be in twenty one (21%) to thirty one (31%) percent. Higher body fat percentage can leads a person to coronary artery disease, type 2 diabetes, high blood pressure, hormone imbalances, stroke, pregnancy complications, liver disease, kidney disease, cancer. Our body will function optimum level with an appropriate overall fat percentage.

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 Circuit Training on Body Fat Percentage 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. 80 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 **Body Fat Percentage** 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. **Bio electrical impedance** 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, **Body Fat Percentage** 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:2 Analysis Of Co-variance On Body Fat Percentage

TEST		WT G	AT G	G C T G	C G	Sourc e of Varia nce	Sum of Squ are	Deg ree of Free dom	Mea n Squa re	F
PRE TEST	Ms	37.1 205 ±3.0 709	37.3 7±3. 415 3	36.0 2±2. 8149	36. 195 ±3. 517 3	AMG	26.8 188	(K- 1) =3 (N- K) =76	8.93 94	0.86 38
	S D					WI	786. 4331		10.3 478	
POST TEST	Ms	33.1 25± 4.22 90	33.0 9±3. 050 4	31.8 96± 2.63 36	36. 509 ±3. 463 3	AMG	236. 7904		78.9 301	6.84 54
	S D					WI	876. 3019		11.5 302	
A D J U S T E D P O S T T E S T Ms		32.8 031	32.5 873	32.3 716	36. 857 8	AMG	273. 7851	(K- 1)= 3 (N- K-1) =75	91.2 617	14.7 723
						WI	463. 3400		6.17 78	

* 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 the Pre-Test "F" ratio

'0.8638' was found lower than table value [0.8638 < tab_{0.05}(3,76)=2.72] . The Post Test "F" ratio '6.8454' was higher than table value [6.8454 > tab_{0.05}(3,76)=2.72]. The calculated Adjusted Post Test Mean "F" value '14.7723' was found statistically significant [F_{0.05} (3, 75) < 14.7723]. To identify the critical difference of Adjusted Post Test Means, LSD test has been used and it has been analysed in Table no. 2.

Table No. 3 Analysis Of Critical Difference Of Adjusted Post Test Means

WTG	ATG	GCTG	CG	MD	CD (5%)
32.8031	32.5873			0.2158NS	1.5562
32.8031		32.3716		0.4315NS	
32.8031			36.8578	4.0547*	
	32.5873	32.3716		0.2157NS	
	32.5873		36.8578	4.2705*	
		32.3716	36.8578	4.8462*	

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

The Adjusted Post Test Mean analysis of **Body Fat Percentage** presented at above table has confirmed that the differences between WTG and CG, ATG and CG, GCTG and CG were significant. The results of the above table have also provided evidence that Adjusted Post Test Mean difference between GCTG and CG was higher significant than pair groups.

DISCUSSION OF THE FINDINGS

The finding on Body Fat Percentage has reflected that the difference between GCTG and CG has confirmed highest significant result. Besides, the results of the present study were supported by some related findings of various researchers (**Ji-Woon Kim, et al .,-2018, Ismail I, et al.,-2012, Willis LH, et al.,-2012, A- Jafari A, et al.,-2017**). Significant decrease of mean body fat percentage may be due to systematic planned training (**Toy,-2008**). Though there have various other factors influencing the reduction of fat including genetics, food and gender, physical activities is considered useful in dealing excess body fat (**Abe,-1997**). Although the mechanism is not clear, the ability of female subjects to use more fat during exercise may be due to differences in levels of circulating hormones and catecholamine, a more oxidative muscle fiber type distribution, an increased sensitivity to catecholamine-stimulated lipolysis, or increased activity of hormone-sensitive lipase, (**Chten J, et al.,-2004**). The weight training creates a predisposition for additional increase of daily energy expenditures at rest for 12–36 h after training bouts, (**Stanis aw Sawczyn et al.,-2015**) whereas a recent study of **Van Der Heijden GJ, et al., (2010)** showed that a 12-week controlled resistance exercise programme; increased weight, lean body mass, and hepatic insulin sensitivity in 12 obese adolescents, with no effect on the metabolically active fat tissue. **Wang L, et al., (2011)** and **Davis-Miller, Tonya Lee, (2016)** found that graded circuit training signalled the ability of the muscle to aerobically produce ATP by using excess adipose tissue.

The study of **Pantelic, S, et al., (2013)** on aerobics, the mechanisms, which might possibly lead to the decrease in body fat during the realization of physical exercise which leads to lipolysis, are most probably caused by the increased consumption of energy. Here, GCTG has shown better result than other two experimental groups may be due to the ability to use fat and carbohydrates at a wide range resulting fat reduction. In contrary, no significant difference in Body Fat Percentage has been identified between the experimental training groups 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 decrease the Body Fat Percentage 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 reducing Body Fat Percentage of overweight college girls.

REFERENCES

1. Abe T, Kawakami Y, Sugita M, Fukunaga T. (1997). Relationship between training frequency and subcutaneous and visceral fat in women. *Med Sci. Sports Exerc.*;29(12):1549-53.
2. Chten J, Jeukendrup, AE. (2004). Optimizing fat oxidation through exercise and diet. *Nutrition*. 20:716–727.
3. Davis-Miller, Tonya Lee. (2016). "The Effect of Exercise Order on Body Fat Loss During Concurrent Training". Graduate Theses and Dissertations. <http://scholarcommons.usf.edu/etd/6217>
4. Ismail I, Keating SE, Baker MK, Johnson NA. (2012). A systematic review and meta-analysis of the effect of aerobic vs. resistance exercise training on visceral fat. *Obes Rev* 13:68–91.
5. Jafari A, Moradi MR, Salimi A, et al. (2007). Comparison of the number of walking sessions per week on body composition changes in female athletes and nonathletes. *Olampic J*;12(1):27-36.
6. Ji-Woon Kim, Yeong-Chan Ko, Tae-Beom Seo, Young-Pyo Kim . (2018). Effect of circuit training on body composition, physical fitness, and metabolic syndrome risk factors in obese female college students. *J Exerc Rehabil.* ;14(3):460-465. doi: <https://doi.org/10.12965/jer.1836194.097>
7. Pantelic, S.; Milanovic, Z.; Sporis, G. & Stojanovic-Tosic, J. (2013). Effects of a twelve-week aerobic dance exercises on body compositions parameters in young women. *Int.J.Morphol.*,31(4):1243-1250.
8. Stanis aw Sawczyn, Viktor Mishchenko, Waldemar Moska, Micha Sawczyn, Marina Jagie o, Tatiana Kuehne, Dorota Kostrzewa-Nowak, Robert Nowak, Pawe Ci szczyk. (2015). Strength and aerobic training in overweight females in Gdansk, Poland. 10(1):152–162. doi: 10.1515/med-2015-0021
9. Toy CT. (2008). Effect of aerobic dance training on VO2 Max and Body composition in Early Middle Age Women, *Journal of physical education and exercise Science*. 1:69.
10. Davis-Miller, Tonya Lee, "The Effect of Exercise Order on Body Fat Loss During Concurrent Training" (2016). USF Tampa Graduate Theses and Dissertations. <https://digitalcommons.usf.edu/etd/6217>
11. Van der Heijden GJ, Wang ZJ, Chu ZD, Sauer PJ, Haymond MW, Rodriguez LM, Sunehag AL. A 12-week aerobic exercise program reduces hepatic fat accumulation and insulin resistance in obese, Hispanic adolescents. *Obesity (Silver Spring)*. 2010 Feb;18(2):384-90. doi: 10.1038/oby.2009.274. Epub 2009 Aug 20. PMID: 19696755. DOI: 10.1038/oby.2009.274
12. Wang L, Mascher H, Psilander N, Blomstrand E, Sahlin K. (2011). Resistance exercise enhances the molecular signaling of mitochondrial biogenesis induced by endurance exercise in human skeletal muscle. *J Appl Physiol.*; 111:1335-1344.
13. Willis LH, Slentz CA, Bateman LA, Shields AT, Piner LW, Bales CW, Houmard JA, Kraus WE. (2012). Effects of aerobic and/or resistance training on body mass and fat mass in overweight or obese adults. *J Appl Physiol.*;113:1831-1837.