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Effects of varied weight reduction training programme on physical fitness among college obese women

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Abstract

The study was designed to know about the importance of the effects of varied weight reduction training programme on physical fitness among college obese women. To achieve the purpose of the study 120 students were chosen from affiliated colleges of Bharathiar University viz., Navarasam Arts and Science College for Women and Vellalar College for Women, Erode, Tamilnadu using purposive sampling method. Those selected 120 students were fallen in over weight and obese category according to the body mass index metric score and its chart. Among 120 subjects, only 80 interested subjects and those who could attend the training program for the research were selected as subjects for the study. The age group of the subjects ranged from 18-25 years. The subjects were free to withdraw their consent in case of feeling any discomfort during the period of their participation but there was no dropout during the study. The control group was not given any treatment and the experimental group I was given aerobic dance training program, experimental group II was given aerobic dance training program, for three days per week, for a period of twelve weeks. Body Fat composition was assessed by Skinfold Caliper and the unit of measurement was in Millimeters, Cardio Respiratory Endurance was assessed by Cooper 12 min Run and walk and the unit of measurement was in Meters. The collected data on physical fitness parameters was analyzed by using 't' test, analysis of variance (ANOVA) for testing the significance of the difference between the post-test means of the experimental and control groups, and ANCOVA tests the significance of 'adjusted post-test mean' differences between the experimental and control groups for each variable. Whenever the 'F' ratio for adjusted post-test was found to be significant the scheffe's post hoc test was applied to find out difference between the paired adjusted mean at 0.05 level of confidence. The result of the present study explored that the Body Fat composition and Cardio Respiratory Endurance significantly improved due to the effect of weight reduction training programme on physical fitness among college obese women.

Keywords: weight reduction training, body fat composition and cardio respiratory endurance

Introduction

Weight Reduction can be healthily achieved through various physical activities and it also helps in reduction of disease risk. Increased physical activity is a healthy weight-reduction strategy for overweight adults which can be achieved by burning off some extra calories through regular work outs. Physical, Physiological, psychological problems due to obese among girls are very severe and sensitive. Aerobics, Yoga, and indoor Physical Activities help people to maintain their ideal weight. During pandemic situation, people are highly prone to live sedentary life and lagged with less physical work. Aerobics, Yoga, and indoor Physical Activities highly help to maintain healthy weight that refreshes physical health, physiological wellness and psychological well-being. Current international guidelines recommend people living with obesity should be prescribed a minimum of 300 minutes of moderately intense activity per week for weight loss.

Safe weight reduction takes time and effort, but by making lifestyle changes that incorporate proper nutrition and physical activity one can lose and maintain weight for the long-term. Weight reduction is basically based on how much calories one must burn. Basic body functions (e.g. breathing, manufacturing cells and maintaining body temperature) use 50-70% of your calories. The rate at which body uses calories for basic body functions is called the Resting Energy Expenditure (REE). It is determined by the age, gender and body composition. It is also determined by the amount of energy you burn each day also depends in part on how much exercise a human being is carrying out.

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Methodology

To achieve the purpose of the study 120 students were chosen from affiliated colleges of Bharathiar University viz., Navarasam Arts and Science College for Women and Vellalar College for Women, Erode, Tamilnadu using purposive sampling method. Those selected 120 students were fallen in over weight and obese category according to the body mass index metric score and its chart. Among 120 subjects, only 80 interested subjects and those who could attend the training program for the research were selected as subjects for the study. The age group of the subjects ranged from 18-25 years. The subjects were free to withdraw their consent in case of feeling any discomfort during the period of their participation but there was no dropout during the study. The control group was not given any treatment and the experimental group I was given aerobic dance training program, experimental group II was given aerobic dance training program, experimental group III Underwent three days per week with Indoor Physical Activity training program for three days per week, for a period of twelve weeks.

Design

Body Fat composition was assessed by Skinfold Caliper and the unit of measurement was in Millimeters, Cardio Respiratory Endurance was assessed by Cooper 12 min Run and walk and the unit of measurement was in Meters. The variables were measured at baseline and after 12 weeks of various weight reducing practice were examined.

Training Program

The selected training program was planned, fixed based on the pilot study conducted and with the help of the experts in the aerobic dance, yoga and fitness trainers for the period of twelve weeks fallen on three alternative days per week. Three different training such as Aerobics, Yoga and Indoor Physical Activity Training program was planned for the study to find out its effect on the selected obese college women.

Experimental group I: Underwent three days per week with aerobic dance training program.

Experimental group II: Underwent three days per week with Yoga training program.

Experimental group III: Underwent three days per week with Indoor Physical Activity training program.

In each training session, the training was imparted for a period of 60 minutes which included warm up to start the program and warm down at the end of the training program for three days per week for a period of twelve weeks. The training session were held between 6.30am to 8.00am during the weekdays such as Monday, Wednesday and Friday. The length of training intervention for this study was based on the fact that twelve weeks has shown to be sufficient to prove significant changes of college students investigated by Khattak, I.U *et al.* (2020). The experimental group underwent their respective training programs under the supervision of the investigator. The number of sets was gradually increased once in four weeks along with the intensity.

Table 1: Computation of 't' ratio on cardio respiratory endurance of Aerobic Dance Training Group, Yoga Training Group, Indoor Physical Activity Group and Control Group (Scores in meters)

Groups	Pre – test mean	Post - test mean	Mean Difference	Standard Error of the Mean	't' ratio
Aerobic Dance Group (AG)	710.75	739.00	28.25	1.41	19.92
Yoga Training Group (YG)	712.75	723.25	10.50	0.34	30.51
Indoor Physical Activity Group (PG)	716.75	741.25	24.50	2.85	8.58
Control Group(CG)	709.50	708.00	1.50	1.09	1.37

* Significant at 0.05 level for the degrees of freedom 1 and 19, 2.09

Table 1 shows that the 't' ratio's on cardio respiratory endurance of AG, YG, PG were 19.92, 30.51 and 8.58 respectively. Since these values were higher than the required table value of 2.09, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 19. The obtained 't' ratio between pre and post test of control group 1.37 was lesser than the required table value of 2.09, found to be not statistically significant.

From the results it was inferred that, the AG, YG, PG produced a significant improvement in cardio respiratory

endurance of obese women.

From the results, it was inferred that, the AG, YG, PG had significantly improved performance of the Cardio respiratory endurance whereas the control group did not improve significantly as they were not subjected to any specific training. Taking into consideration of the pre and post-test means on Cardio respiratory endurance, the adjusted post-test means were determined and analysis of covariance was computed for the selected groups and presented in Table 1.

Table 2: Analysis of Covariance on Pre, Post and Adjusted Post-test means of Aerobic Dance Training Group, Yoga Training Group, Indoor Physical Activity Group and Control Group on Variables of Cardio respiratory endurance (Scores in centimeters)

Test	Aerobic Dance Group (AG)	Yoga Training Group (YG)	Indoor Physical Activity Group (PG)	Control Group (CG)	Source of variance	df	Sum of Square	Mean Square	F-ratio
Pre-test Mean	710.75	712.75	716.75	709.50	7.70	3	603.43	201.14	0.14
					W / S	76	107696.25	1417.05	
Post-test Mean	739.00	723.25	741.25	708.00	7.45	3	14381.25	4793.75	3.28
					W / S	76	110807.50	1457.99	
Adjusted Post-test Mean	740.67	722.93	736.96	710.92	7.42	3	11150.15	3716.71	64.00
					W / S	75	4355.13	58.06	

* Significant at 0.05 level for the degrees of freedom (3, 76) and (3, 75), 2.72

Table 2 reveals the computation of 'F' ratios on pre test, post test and adjusted post test means of AG, YG, PG and CG on flexibility.

The obtained 'F' ratio for the pre test means of AG, YG, PG and CG on cardio respiratory endurance was 0.14. Since the 'F' value was less than the required table value of 2.72 for the

degrees of freedom 3 and 76, it was found to be not significant at 0.05 level of confidence.

Further, the post test 'F' ratio 3.28 after AG, YG, PG and CG on flexibility was higher than the required table value of 2.72 for the degrees of freedom 3 and 76, hence it was found to be statistically significant at 0.05 level of confidence.

The obtained 'F' ratio for the adjusted post test means of AG, YG, PG and CG on cardio respiratory endurance was 64.00. Since the 'F' value was higher than the required table value of 2.72 for the degrees of freedom 3 and 75, it was found to be

statistically significant at 0.05 level of confidence.

Hence, it is clear that the varied weight reduction training program significantly improved the cardio respiratory endurance performance of the experimental groups. Since significant improvements were recorded among the adjusted post-test means, the results were further subjected to post hoc analysis using Scheffe's confidence interval test to find out which of the three paired means had a significant difference. The results were presented in Table 2.

Table 3: Scheffe's Post Hoc Test for the differences between the Paired Adjusted Post-test means of cardio respiratory endurance

Aerobic Dance Group (ADTG)	Yoga Training Group (YG)	Indoor Physical Activity Group (PG)	Control Group (CG)	Mean difference	Confidence Interval
740.67	722.93	-	-	17.74	0.88
740.67	-	736.96	-	3.71	
740.67	-	-	710.92	29.75	
-	722.93	736.96	-	14.03	
-	722.93	-	710.92	12.01	
-	-	736.96	710.92	26.04	

* Significant at 0.05 level

Table 3 revealed that the mean differences between the paired adjusted post test means of all groups.

The mean differences between the AD with YG, AD with PA, AD with CG, YG with PA, YG with CG, PA with CG was 17.74, 3.71, 29.75, 14.03, 12.01, and 26.04 respectively. Since the value of mean difference was higher than the critical value of 0.88. Hence, it was found to be statistically significant at 0.05 level of confidence

From the result it was inferred that 12 weeks of ADG

program had improved muscular strength more significantly than the YTG, PA and CG.

From these results it was inferred that PA had showed better improvement on muscular strength when compared with AD and CG.

Mean values of pre, post and adjusted post test of AG, YG, PG and Control Group on cardio respiratory endurance was are graphically illustrated through bar diagram in figure 1.

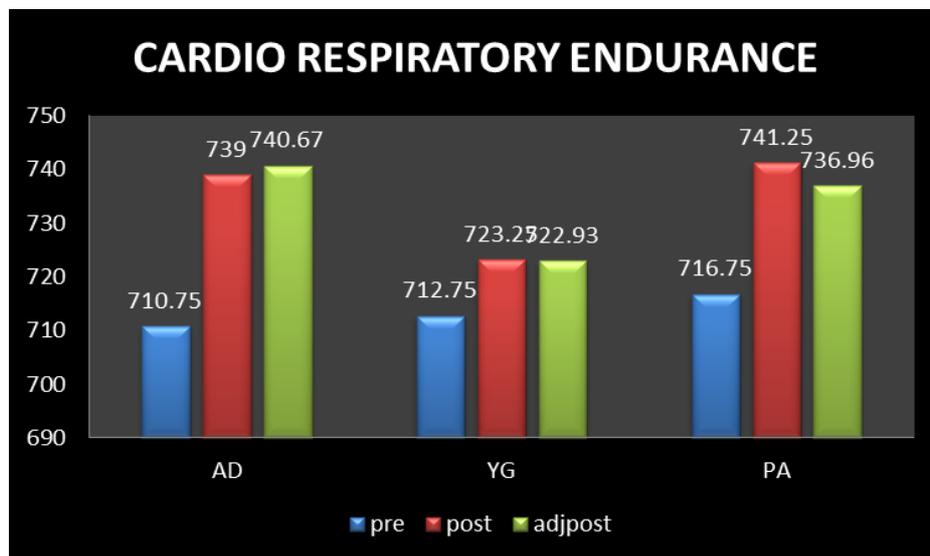


Fig 1: Bar diagram showing pre, post and adjusted post test means of Aerobic Dance Training Group, Yoga Training Group and Indoor Physical Activity Group and Control Group on cardio respiratory endurance

Results of Body Fat Composition

Table 4: Computation of 't' ratio on body fat composition of Aerobic Dance Training Group, Yoga Training Group, Indoor Physical Activity Group and Control Group (Scores in millimeters)

Groups	Pre - test mean	Post - test mean	Mean Difference	Standard Error of the Mean	't' ratio
Aerobic Dance Group (AG)	19.00	15.90	3.10	0.06	45.04
Yoga Training Group (YG)	19.10	18.00	1.10	0.06	15.98
Indoor Physical Activity Group (PG)	19.95	17.80	2.15	0.08	26.24
Control Group(CG)	19.150	19.30	0.15	0.08	1.83

* Significant at 0.05 level for the degrees of freedom 1 and 19, 2.09

Table 4 shows that the 't' ratio's on body composition of AG, YG, PG were 45.04, 15.98 and 26.24 respectively. Since these values were higher than the required table value of 2.09, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 19. The obtained 't' ratio between pre and post test of control group 1.83 was lesser than the required table value of 2.09, found to be not statistically significant.

From the results it was inferred that, the AG, YG, PG produced a significant improvement in body composition of

obese women.

From the results it was inferred that the AG, YG, PG had significantly improved performance of the Body fat composition whereas the control group did not improve significantly as they were not subjected to any specific training. Taking into consideration of the pre and post-test means on Body fat Composition, the adjusted post-test means were determined and analysis of covariance was computed for the selected groups and presented in Table 4.

Table 5: Analysis of Covariance on Pre, Post and Adjusted Post test means on body fat composition of Aerobic Dance Training Group, Yoga Training Group, Indoor Physical Activity Group and Control Group (Scores in centimeters)

Test	Aerobic Dance Group (AG)	Yoga Training Group (YG)	Indoor Physical Activity Group (PG)	Control Group (CG)	Source of variance	df	Sum of Square	Mean Square	F-ratio
Pre-test Mean	19.00	19.10	19.95	19.15	B / S	3	11.50	3.83	0.52
					W / S	76	559.30	7.35	
Post-test Mean	15.90	18.00	17.80	19.30	B / S	3	117.80	39.26	5.53
					W / S	76	539.20	7.09	
Adjusted Post-test Mean	16.19	18.19	17.16	19.44	B / S	3	116.78	38.92	350.52
					W / S	75	8.32	0.11	

* Significant at 0.05 level for the degrees of freedom (3, 76) and (3, 75), 2.72

Table 5 reveals the computation of 'F' ratios on pre test, post test and adjusted post test means of AG, YG, PG and CG on body fat composition.

The obtained 'F' ratio for the pre test means of AG, YG, PG and CG on body fat composition was 0.52. Since the 'F' value was less than the required table value of 2.72 for the degrees of freedom 3 and 76, it was found to be not significant at 0.05 level of confidence.

Further, the post test 'F' ratio 5.53 after AG, YG, PG and CG on body fat composition was higher than the required table value of 2.72 for the degrees of freedom 3 and 76, hence it was found to be statistically significant at 0.05 level of confidence.

The obtained 'F' ratio for the adjusted post test means of AG, YG, PG and CG on body fat composition was 350.52. Since the 'F' value was higher than the required table value of 2.72 for the degrees of freedom 3 and 75, it was found to be statistically significant at 0.05 level of confidence.

Hence, it is clear that the varied weight reduction training program significantly improved the Body fat composition performance of the experimental groups. Since significant improvements were recorded among the adjusted post-test means, the results were further subjected to post hoc analysis using Scheffe's confidence interval test to find out which of the three paired means had a significant difference. The results were presented in Table 5.

Table 6: Scheffe's Post Hoc Test for the differences between the Paired Adjusted Post-test means of body fat composition

Aerobic Dance Group (ADTG)	Yoga Training Group (YG)	Indoor Physical Activity Group (PG)	Control Group (CG)	Mean difference	Confidence Interval
16.19	18.19	-	-	2.00	0.03
16.19	-	17.16	-	0.97	
16.19	-	-	19.44	3.75	
-	18.19	17.16	-	1.03	
-	18.19	-	19.44	1.25	
-	-	17.16	19.44	2.28	

* Significant at 0.05 level

Table 6 revealed that the mean differences between the paired adjusted post test means of all groups.

The mean differences between the AD with YG, AD with PG, AD with CG, YG with PG, YG with CG, PG with CG was 2.00, 0.97, 3.75, 1.03, 1.25, and 2.28 respectively. Since the value of mean difference was higher than the critical value of 0.03. Hence, it was found to be statistically significant at 0.05 level of confidence

From the result it was inferred that 12 weeks of ADTG had

improved body fat composition more significantly than the YG, PG and CG.

From these results it was inferred that AG had showed better improvement on muscular strength when compared with YG, PG and CG.

Mean values of pre, post and adjusted post test of AG, YG, PG and Control Group on Body fat composition was are graphically illustrated through bar diagram in figure 2.

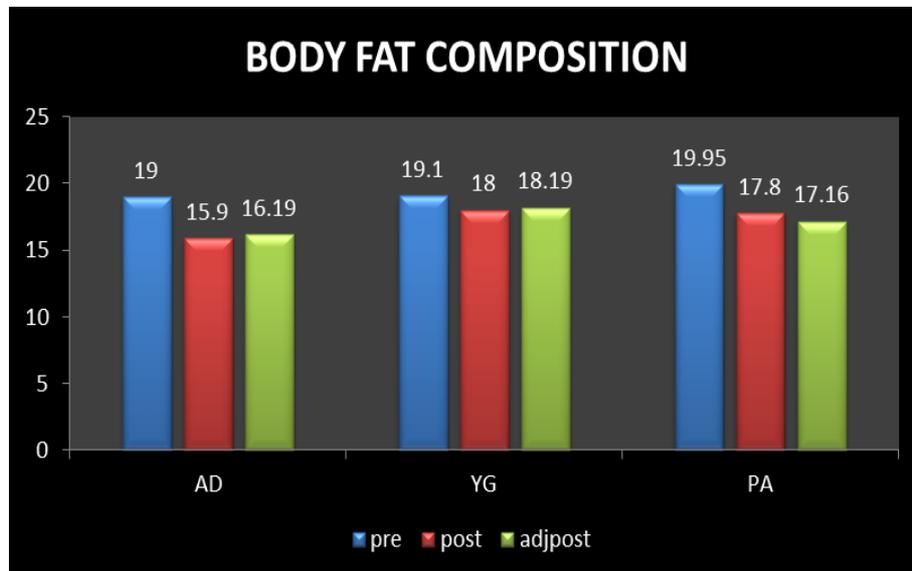


Fig 2: Bar diagram showing pre, post and adjusted post test means of Aerobic Dance Training Group, Yoga Training Group and Indoor Physical Activity Group and Control Group on body fat composition

Discussions on Findings

The results of the study indicated that the physiological parameters such as Body Fat composition and Cardio Respiratory Endurance significantly improved significantly after twelve weeks of weight reduction training programme on physical fitness among college obese women the changes in the selected variables were attributed the proper planning, preparation and execution of the training package given to the students. The findings of the present study had similarity with the findings of the investigations referred in this study.

The results as presented in dependent 't' test, analysis of variance and Scheffe's post-hoc test showed that the selected three experimental group namely aerobic group, yoga group and physical group significantly improved body fat composition due to twelve weeks of varied weight reduction training program. The obtained result also state that the three experimental groups were significantly differed when compared to control group.

However, statistically significant improvement in body fat composition was found in Aerobics Training Group than other three groups as the obtained mean differences were greater than the required Scheffe's confidence interval.

The results of the present study was supported by Wewege *et al.* (2017) compared the effects of high-intensity interval training (HIIT) and moderate-intensity continuous training (MICT) for improvements in body composition in overweight and obese adults. Short-term moderate-intensity to high-intensity exercise training can induce modest body composition improvements in overweight and obese individuals without accompanying body-weight changes. HIIT and MICT show similar effectiveness across all body composition measures suggesting that HIIT may be a time-efficient component of weight management programs.

Cardio Respiratory Endurance

The results as presented in dependent 't' test, analysis of variance and Scheffe's post-hoc test showed that the selected three experimental group namely aerobic group, yoga group and physical group significantly improved cardio respiratory endurance due to twelve weeks of varied weight reduction training program. The obtained result also state that the three experimental groups were significantly differed when compared to control group.

However, statistically significant improvement in cardio respiratory endurance was found in Aerobics Training Group than other three groups as the obtained mean differences were greater than the required Scheffe's confidence interval.

The results of the present study was supported by Xiaochen *et al.* (2015), conducted a study on the effect of exercise training on cardiorespiratory fitness and the analysis showed that exercise significantly improved cardiorespiratory fitness and some cardio metabolic biomarkers.

Khattak, I.U *et al.* (2020) investigated the effects of circuit training on cardiorespiratory endurance among college students. The results showed that circuit training of 12 weeks significantly improved cardio respiratory endurance in experimental group ($p < 0.05$) than control group. Hemavahthy Mani, Tri Damiati Pandji and Putri Teesa (2019) conducted a study to determine the cardiorespiratory endurance among young adults in Jatinangor, Bandung and it showed that there was no significant relationship ($p > 0.05$) between VO₂ max level and gender, BMI level, and smoking habit, but showed a significant relationship ($p < 0.05$) with exercising habit. Jui-Chuan Cheng *et al.* (2019) aimed to analyse the temporal trend in cardiorespiratory endurance (CRE) in urban Catalan adolescents over a 20-year period (1999–2019). Jui-Chuan Cheng, Chao-Yuan Chiu and Te-Jen Su (2019) proposed a fuzzy system based on the human heart rate to provide an effective cardiorespiratory endurance training program and the evaluation of cardiorespiratory endurance levels. Fitriana *et al.* (2018) determined the description of cardiorespiratory endurance and balance of elderly dementia patients in Nursing Home Ciparay Bandung Indonesia using a descriptive quantitative with purposive sampling technique. Jibi Paul and Khairul Nizam Bin Abdul Rahman (2017) tried to find out the effects of physical exercise on cardiac endurance among smokers through their study. The study concluded that physical exercise can improve cardiac endurance in smokers. Abbreviations: HR- Heart Rate, RHR- Resting Heart Rate, FIS- Fitness Index Score. Usharani (2017) found that cardio - respiratory endurance exercise helps the body be-come more efficient and better able to cope with physical challenges.

Conclusions

1. It was concluded that the varied weight reduction training had produced significant improvement on selected

physical fitness variables namely Body Fat composition and Cardio Respiratory Endurance among college obese women.

2. It was concluded that the Aerobics Training had more effective than the other weight reduction training program such as Yoga and Indoor physical Activity in improving the selected physical fitness variables namely Body Mass Index, Muscular Endurance, Body Fat composition, Cardio Respiratory Endurance among college obese women.

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