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EFFECT OF SPECIFIC NUTRITIONAL SUPPLEMENTATION, DESUPPLEMENTATION AND RESUPPLEMENTATION ON SELECTED HEMATOLOGICAL VARIABLES AMONG COLLEGE WOMEN

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Abstract

The iron deficiency anemia is very common among women, which affects their health and health related physical fitness. It is the interest of the investigator to find out the effect of nutritional supplementation, desupplementation and resupplementation on selected hematological variables among college women. Through this research the investigator aimed at finding out whether, specific nutritional supplementation experimented improve anemic status of the college women. To achieve the purpose of the study, the investigator conducted a sample survey to assess the symptoms of the anemic condition. Based on the survey, the investigator selected 15 anemic college women students as subjects. The selected anemic college women we are provided with specific nutritional supplementation (Lotus Stem and Egg) for eight weeks. After the completion of 8 weeks nutritional supplementation, they were stopped the nutritional supplementation for 8 weeks and this phase was considered as desupplementation phase. After the completion of desupplementation period of 8 weeks the subjects were started providing with nutritional supplementation and this phase of 8 weeks was considered as resupplementation phase. Prior to the experimental treatments, all the subjects were measured of their hematological variables such as, Hemoglobin and Red Blood Cell. The differences among means of initial, nutritional supllementation, desupplementation and resupplementation scores were subjected to statistical treatment using repeated analysis of variance (Repeated ANOVA). When the F ratio was found to be significant, Scheffe's post hoc test was used to find out the paired mean significant difference. The results of the study proved that there was significant improvement due to specific nutritional supplementation, desupplementation and resupplementation on animic status of the college women on Hemoglobin and Red Blood Cell.

Keyword: Hemoglobin and Red Blood Cell

Introduction

Nutritional deficiency is almost impossible to avoid in these modern times. With our busy lifestyle, the ever-tempting convenience of fast food, it is now very difficult to enjoy excellent daily nutrition.

Iron deficiency anemia is the common type of anemia, and is known as sideropenic anemia. It is the most common cause of microcytic anemia. Iron deficiency anemia occurs when the dietary intake or absorption of iron is insufficient, and hemoglobin, which contains iron, cannot be formed. The principal cause of iron deficiency anemia in premenopausal women is blood lost during menses. Iron deficiency anemia can be caused by parasitic infections, such as hookworms. Intestinal bleeding caused by hookworms can lead to fecal blood loss and heme/iron deficiency. Chronic inflammation caused by parasitic infections contributes to anemia during pregnancy in most developing countries.

Almost two-thirds of iron in the body is found in hemoglobin, the protein in red blood cells that carries oxygen to tissues. Smaller amounts of iron are found in myoglobin, a protein that helps supply oxygen to muscle, and in enzymes that assist biochemical reactions. Iron is also found in proteins that store iron for future needs and that transport iron in blood. Iron stores are regulated by intestinal iron absorption.

Nutrition supplementation is a preparation intended to supplement the diet and provide nutrients, such as vitamins, minerals, fiber, fatty acids, or amino acids that may be missing or may not be consumed in sufficient quantities in a person's diet.

The best source of iron is red meat, especially beef and liver. Chicken, turkey, pork, fish, and shellfish also are good sources of iron. The body tends to absorb the iron from meat better than iron in other foods. However, other foods also can help to raise the iron levels (Fox 1988).

Statement of the Problem

The purpose of the study was to find out the effect of specific nutritional supplementation, desupplementation and resupplementation on selected hematological variables among college women.

Hypothesis

It was hypothesized that the nutritional supplementation, desupplementation and resupplementation would significantly alter selected hematological variables among college women.

Methodology

The purpose of the study was to investigate the effect of specific nutritional supplementation, desupplementation, and resupplementation on selected hematological variables among college women. To achieve the purpose of the study, the investigator conducted a sample survey to assess the symptoms of the anemic condition. Based on the survey, the investigator selected 15 anemic college women students as subjects. For this study, Random group design was followed. The selected anemic college women we are provided with specific nutritional supplementation (Lotus Stem and Egg) for eight weeks. After the completion of 8 weeks nutritional supplementation, they were stopped, the nutritional supplementation for 8 weeks and this phase was considered as desupplementation phase. After the completion of desupplementation period of 8 weeks the subjects were started providing with nutritional supplementation and this phase of 8 weeks was considered as resupplementation phase. Prior to the experimental treatments, all the subjects were measured of their anemic status such as, Hemoglobin and Red Blood Cell. The data obtained were considered as initial scores of the selected hematological variables. Data were obtained at the end of nutritional supplementation phase (completion of 8 weeks of nutritional supplementation), end of desupplementation (completion of 16 weeks), and end of resupplementation phase (completion of 24 weeks). The differences among means of initial, nutritional supllementation, desupplementation and resupplementation scores were subjected to statistical treatment using repeated analysis of variance (Repeated ANOVA). When the F ratio was found to be significant, Scheffe's post hoc test was used to find out the paired mean significant difference.

Results of the Study

The descriptive statistics on Hemoglobin due to specific nutritional supplementation desupplementation and resupplementation on college women is presented in Table I. The nutritional supplementation and resupplementation were done under the supervision of dieticians.

Table I
Descriptive Statistics on Hemoglobin

S.No	Different Phases of Training	Mean	Standard Deviation
1	Initial Scores (IS)	15.19	0.87
2	After Supplementation (ANS)	16.55	0.38
3	After Desupplementation (ADS)	14.79	0.64
4	After Resupplementation (ARS)	16.74	0.35

As shown in Table I, the initial Hemoglobin mean score (IS) of the college women was 15.19, after 8 weeks nutritional supplementation (ANS) mean score of Hemoglobin was 16.55, the scores obtained after 8 weeks desupplementation (ADS) mean was 14.79, the scores obtained after 8 weeks resupplementation (ARS) mean was 16.74. The statistical significance of the differences in means due to nutritional supplementation, desupplementation and resupplimentation was tested through repeated measures of ANOVA and the results are presented in Table II.

Table II
Computation of Repeated Measures ANOVA on Hemoglobin

Source	Sum of Squares	df	Mean Squares	F
Subjects	6.73	14		6.07*
Trials	42.67	3	14.22	
Residual	98.49	42	2.35	
Total	62.55	59		

* Significant 0.05 level 2.76

The obtained F value 6.07 is greater than the required table F value of 2.76 to be significant at 0.05 level. Hence, it was proved that there was a significance difference in Hemoglobin due to nutritional supplementation, desupplementation and resupplementation.

Since significant differences were found, the obtained results were further subjected to post hoc analysis using Scheffe's test and results are presented in Table III

Table III

Multiple Comparisons Showing Pairs of Means Scores on Hemoglobin under Different Phases

Mean Scores Under Different Phases				Mean Difference	Required C.I
IS	ANS	ADS	ARS		
15.19	16.55			1.36	1.61
15.19		14.79		0.41	1.61
15.19			16.74	1.55	1.61
	16.55	14.79		1.77*	1.61
	16.55		16.74	0.19	1.61
		14.79	16.74	1.95*	1.61

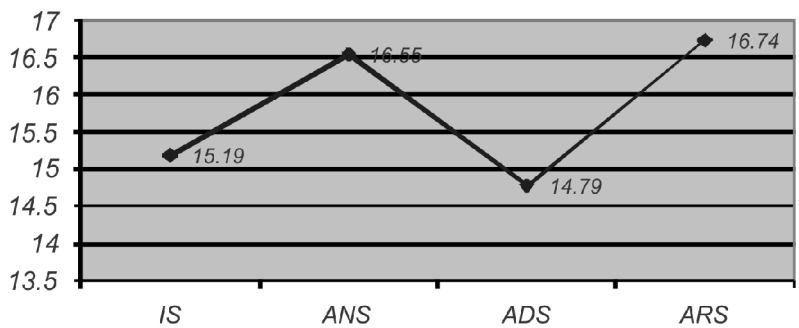
* Significant at 0.05 level

(IS: Initial Score; ANS: After Nutritional Supplementation Score; ADS: After Desupplementation Score; ARS: After Resupplementation Score)

Table III shows the following paired mean comparisons were significant at 0.05 level as the obtained mean differences between after nutritional supplementations and desupplementation 1.77 was greater than the required value of 1.61. It also compared between after nutritional desupplementation and resupplementation scores 1.95 was greater than the required value of 1.61. However, when compared between other groups there was no significant at 0.05 level. The mean gains under different phases of supplementation are presented through line graph for better understanding of the results of the study in Figure I.

Figure I

Showing Line Graph on Mean Scores of Hemoglobin under Different Phases of Supplementation among College Women



Results on Red Blood Cells

The descriptive statistics on Red Blood Cells due to specific nutritional supplementation desupplementation and resupplementation on college women is presented in Table IV. The nutritional supplementation and resupplementation were done under the supervision of dieticians.

Table IV
Descriptive Statistics on Red Blood Cells

S.No	Different Phases of Training	Mean	Standard Deviation
1	Initial Scores (IS)	5.15	0.30
2	After Supplementation (ANS)	6.32	0.31
3	After Desupplementation (ADS)	5.69	0.48
4	After Resupplementation (ARS)	6.50	0.39

As shown in Table V, the initial Red Blood Cells mean score (IS) of the college women was 5.15, after 8 weeks nutritional supplementation (ANS) mean score of Red Blood Cells was 6.32, the scores obtained after 8 weeks desupplementation (ADS) mean was 5.69, the scores obtained after 8 weeks resupplementation (ARS) mean was 6.50. The statistical significance of the differences in means due to nutritional supplementation, desupplementation and resupplimentation was tested through repeated measures of ANOVA and the results are presented in Table V.

Table V
Computation of Repeated Measures ANOVA on Red Blood Cells

Source	Sum of Squares	df	Mean Squares	F
Subjects	2.59	14		6.07*
Trials	17.23	3	5.74	
Residual	39.73	42	0.95	
Total	25.09	59		

* Significant at 0.05 level 2.76

The obtained F value 6.07 is greater than the required table F value of 2.76 to be significant at 0.05 level. Hence, it was proved that there was a significance difference in Red Blood Cells due to nutritional supplementation, desupplementation and resupplementation.

Since significant differences were found, the obtained results were further subjected to post hoc analysis using Scheffe's test and results are presented n Table VI.

Table VI
Multiple Comparisons Showing Pairs of Means Scores on Red Blood Cells under Different Phases

Mean Scores Under Different Phases				Mean Difference	Required C.I
IS	ANS	ADS	ARS		
5.15	6.32			1.17*	1.02
5.15		5.69		0.54	1.02
5.15			6.50	1.35*	1.02
	6.32	5.69		0.63	1.02
	6.32		6.50	0.18	1.02
		5.69	6.50	0.81	.02

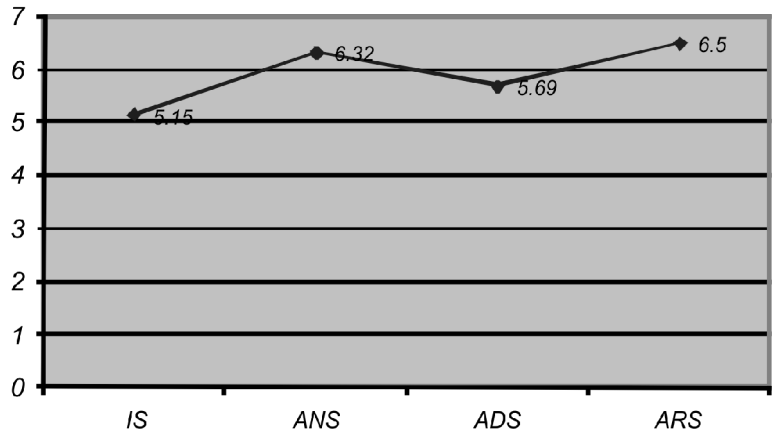
* Significant at 0.05 level

(IS:Initial Score: ANS: After Nutritional Supplementation Score; ADS: After desupplementation Score; ARS: After Resupplementation Score)

Table VII shows the following paired mean comparisons were significant at 0.05 level as the obtained mean differences between Initial Score and after Nutritional Supplementation1.17 was greater than the required value of 1.02. It also compared between Initial Score and after Resupplementation Score 1.35 was greater than the required value of 1.02. However, when compared between other groups there was no significant difference at 0.05 level.

The mean gains under different phases of supplementation are presented through line graph for better understanding of the results of the study in Figure II

Figure II
Showing Line Graph on Mean Scores of Red Blood Cells under Different Phases of Supplementation among College Women



Discussions on Findings

Iron deficiency anemia is the common type of anemia, and is known as sideropenic anemia. It is the most common cause of microcytic anemia. Iron deficiency anemia occurs when the dietary intake or absorption of iron is insufficient, and hemoglobin, which contains iron, cannot be formed. Researchers have found that nutritional supplements can help one to have the optimum health deserved and minimize the risk of diseases. Tiwari ,et.al. (2011) found iron supplementation on iron deficient women, Haemoglobin (Hb) levels along with antioxidant enzymes, were found significantly increased ($P < 0.01$) in anemic women after treatment.

The results presented in Table III proved that the significant differences were between initial score and after nutritional supplementation score and initial score and after resupplementation score. The results of the study proved that the difference between after nutritional supplementation score and after desupplementation score; and after desupplementation score and after resupplementation score have significantly improved hemoglobin of the anemic college women. And the hypothesis that the nutritional supplementation and resupplementation phases would improve hemoglobin of the college women was accepted at 0.05 level.

The results presented in Table VI proved that the significant differences were due to specific nutritional supplementation and resupplementation. The results presented proved significant differences between after nutritional supplementation and after resupplementation have

significantly improved red blood cells of the anemic college women. And the hypothesis that the nutritional supplementation and resupplementation phases would improve red blood cells of the college women was accepted at 0.05 level.

Conclusions

It was concluded that there was significant differences between after nutritional score and after desupplementation score; and after desupplementation score and after resupplementation score have significantly improved hemoglobin of the anemic college women.

It was concluded that after nutritional supplementation and after resupplementation have significantly improved red blood cells of the anemic college women.

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EFFECT OF FOUR WEEKS SWISS BALL EXERCISE ON MUSCULAR STRENGTH AND BALANCE OF COLLEGE MALE STUDENTS

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Abstract

The aim of the present study was to find out the effect of four weeks Swiss ball exercise on muscular strength and balance of college male students. The benefit of training using Swiss ball exercises is that they are very effective at targeting core muscles. Swiss balls are one of today's top fitness tools - and for good reason. Using a Swiss ball will improve the muscular strength, balance and also strength of the abs and the lower back. Since the Swiss ball is unstable you have to constantly adjust your balance, which in turn will improve your muscular strength, balance, proprioception and flexibility. For this purpose ten college male students were selected randomly from Pt. KundanLal Shukla Mahavidyalaya,Kanpur Dehat (U.P). The subject's age ranged between 18to 25 years. Their life style and living condition were not taken under consideration. The subjects underwent training for four weeks with duration of 45minute. The training was started at 7.00 am and it was given for five days per weeks. The pre-test and post-test on muscular strength and balance was measured using push-ups and standing stork test. The data were collected before and after four weeks Swiss ball exercise training program. To find out the significance difference between pre and post-test means score of muscular strength, balance and the Data collected from the subjects was statistically analyzed by 't' test. The result of the study shows that the Swiss ball exercises play a significant role in muscular strength and balance. The training was more effective for subjects.

Key Words: Swiss ball exercise, muscular strength, balance, college male.

Introduction

Swiss balls are large, heavy-duty inflatable balls with a diameter of 45 to 75 cm (18 to 30 inches). Swiss balls offer you a fun, safe and highly effective way to exercise. Swiss ball exercise an exercise ball is a ball constructed of soft elastic with a diameter of approximately 35 to 85 centimeters (14 to 34 inches) and filled with air. The air pressure is changed by removing a valve stem and either filling with air or letting the ball deflate. It is most often used in physical therapy, athletic training and exercise. It can also be used for weight training. The ball, while often referred to as a Swiss ball, is also known by a number of different names, including balance ball, body ball, fitness ball, gym ball, Pilates ball, stability ball, yoga ball.

The physical object known as a "Swiss Ball" was developed in 1963 by Aquilino Cosani, an Italian plastics manufacturer. He perfected a process for molding large puncture-resistant plastic balls. Those balls, then known as "Pezzi balls", were first used in treatment programs for newborns and infants by Mary Quinton, a British physiotherapist working in Switzerland. Later, Dr. Susanne Klein-Vogelbach, the director at the Physical Therapy School in Basel, Switzerland, integrated the use of ball exercise as physical therapy for neuro-developmental treatment. Based on the concept of "functional kinetics", Klein-Vogelbach advocated the use of ball techniques to treat adults with orthopedic or medical problems. The term "Swiss Ball" was used when American physical therapists began to use those techniques in North America after witnessing their benefits in Switzerland. From their development as physical therapy in a clinical setting, those exercises are now used in athletic training, as part of a general fitness routine and incorporation in alternative exercises such as yoga and Pilates.

A primary benefit of exercising with an exercise ball as opposed to exercising directly on a hard flat surface is that the body responds to the instability of the ball to remain balanced, engaging many more musclesthose muscles become stronger over time to keep balance. Most frequently, the core body muscles as the abdominal muscles and back musclesare the focus of exercise ball fitness programs.

Methodology

Subject

The main purpose of the study was to determine the effect of four weeks Swiss ball exercise on muscular strength and balance of college male students. There are ten college male students randomly selected from Pt. Kundanlal Shukla Mahavidyalya, Kanpur-Dehat (U.P), who were volunteered participated to conduct the study and the purpose of the study was explained. The method of performing the test on muscular strength and balance was explained to the subjects before the test. The age ranged of the subjects between 18 to 25 years as per their admission record.

Tools and Instruments

The test of muscular strength measured with the help of push-ups and for balance, it measured by the standing stork test. The score of the push-ups was noted as how many possible push-ups per minutes and for score of balance measured in seconds.

Procedure

The measurement of the pre-test was administered to the selected subjects for one month which includes many Swiss balls exercises (Swiss ball push-ups, ball jackknife, ball crunch, ball sit-ups, floor abdominal crunch).The Swiss ball exercise training given as per scheduled. The duration of the training program was 45 minute per day and frequency of the training was five days per week.

Statistical Technique

The present study pays attention mainly on the 't' test was applied to find out the significance difference between the pre and post-test means of muscular strength and balance. The statistical analysis of the obtained data showed a statistically significant increase of muscular strength and balance after both 4-week Swiss ball exercise programs.

Results

To find out the significance difference between the pre-test and post-test means of muscular strength and balance through the't 'test. The obtained't' ratio was tested for the significance difference at the 0.05 level of confidence. The finding are

Table-1
Significance difference in muscular strength of male between pre-test and post-test score

TEST	MEAN	S.D	't' RATIO
Pre-test	22.50	2.83	**4.25***
Post-test	27.60	2.54	

Significance at 0.05 level t 0.05 (9) = 2.26

It is observed from table-1 that the calculated 't' (4.25) is more than the tabulated value (2.26). It may be considered that there was significant difference found between the pre-test and post-test means.

The scores are also illustrated in the figure-1

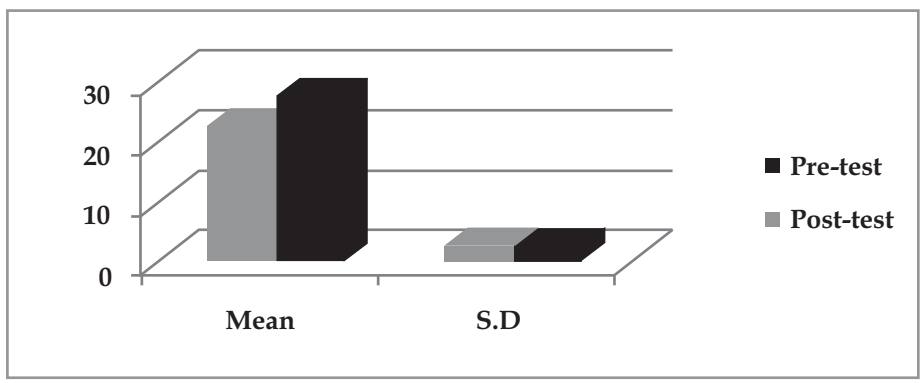


Table-2
Significance difference in balance of male between pre-test and post-test score

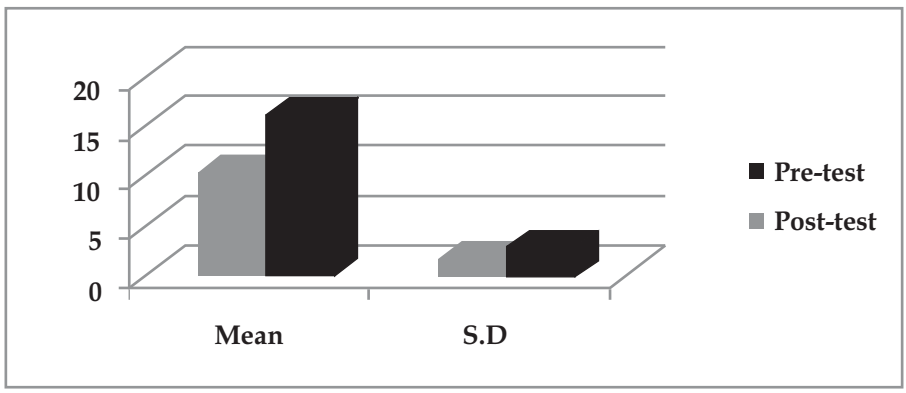
TEST	MEAN	S.D	't' RATIO
Pre-test	10.50	1.77	**5.08***
Post-test	16.20	2.93	

Significance at 0.05 level t 0.05 (9) = 2.26

It is observed from table-2 that the calculated 't' (5.08) is more than the tabulated value (2.26). It may be considered that there was significant difference found between the pre-test and post-test means.

It is observed from table-2 that the calculated 't' (5.08) is more than the tabulated value (2.26). It may be considered that there was significant difference found between the pre-test and post-test means.

The scores are also illustrated in the figure-2



"This significant change in muscular strength and balance might be due to the effects of one month Swiss ball exercise training program to the effective group".

Discussion

The study was conducted to find out the effect of four weeks Swiss ball exercise on muscular strength and balance of college male students. The result shows, it has been observed that there was significant difference between pre and post-test mean score of muscular strength and balance. The Swiss ball exercise on muscular strength and balance was improved, its means it significantly increased. The findings of this study are in agreement with the findings of Sekendiz.B(2010) Who proved that effect of 12weeks Swiss-ball core strength training exercises can be improvement in sedentary women. In conclusion, this study provides practical implications for sedentary individuals, physiotherapists, strength and conditioning specialists who can benefit from core strength training with Swiss balls. The Swiss ball exercise, significant increases in muscular strength and Balance.

Conclusion

It was observed that effect of Swiss ball training program increased the muscular strength and balance in college male. Swiss ball exercises play a significant role in muscular strength, flexibility and balance. There are some papers conducted on Swiss ball and core strength.

Martínez.Amat.A.et.al., (2012)These results show that 12 weeks proprioception training program in older adults is effective in postural stability, static and dynamic balance, and could lead to an improvement in gait and balance capacity, as well as to a decrease in the risk of falling in adults aged 65 years and older.

Sundstrup.E.et.al.,(2012) Swiss ball training is recommended as a low intensity modality to improve joint position, posture, balance, and neural feedback. However, proper training intensity is difficult to obtain during Swiss ball exercises whereas strengthening exercises on machines usually are performed to induce high level of muscle activation.

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Sekendiz B, Cuğ M, Korkusuz F(2010) "Effects of Swiss-ball core strength training on strength, endurance, flexibility, and balance in sedentary women.",Journal of Strength and Conditioning Research / National Strength & Conditioning Association,24(11), pp. 3032-3040.

INFLUENCE OF CARDIO-RESPIRATORY ENDURANCE TRAINING, RESISTANCE TRAINING AND CORE STRENGTH TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AMONG COLLEGE ATHLETES

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Abstract

The purpose of this study was to examine the influence of cardio-respiratory endurance training, resistance training and core strength training on selected physical fitness variables among college athletes. To achieve the purpose of this study 50 male athletes were selected from various Colleges in Coimbatore who had represented their college level athletic competition. The subjects were selected in to the age group of 18 to 25 years. Experimental group-I was given Cardio-respiratory endurance training. Experimental group-II was given resistance training. Experimental group-III was given core strength training. Experimental group-IV was given the packages of combined cardio-respiratory endurance, resistance and core strength training. Control group was restricted to participate in any specific training programme. The training regimen lasted for twelve weeks for 3 days per week and 1 session of 90 minutes daily morning. The selected dependent variables were assessed using standard tests and procedures, before and after the training regimen. Analysis of covariance was used to determine the significant difference existing between pretest and posttest on selected dependent variables. The analysis of data revealed that twelve weeks of cardio-respiratory endurance training, resistance training, core strength training and combined training have significantly improved the selected physical fitness variables of college athletes .

Key words: Cardio-respiratory endurance training, resistance training and core strength training,

Introduction

In order to compete at peak levels, athletes need strength, endurance, speed, agility and other physical characteristics. To attain high levels of these attributes, one needs specific physical training. Athletic training requires careful planning to create a calendar of workouts that progress from general to specific exercises. Athletic movement patterns are variable and dynamic, and require proper neuromuscular training to respond and react to loads placed on the body. Training can be accomplished using a variety of methodologies and equipments.

Cardio-respiratory endurance training has numerous health and fitness benefits that can result in improved performance in any sport. Regardless of the sport we play, cardio-respiratory endurance training increases our body's ability to supply oxygen and nutrients to the working muscles and tissues. With the improved heart function, resting and exercise heart rate is lowered. This results in using oxygen and energy more efficiently during exercise. Another benefit of cardio-respiratory endurance training is to improved body composition by burning excess body fat to achieve an optimal body weight.

Resistance training is an essential element of fitness for virtually every sports man and sports woman. Long gone are the days when coaches believed resistance exercises only added unnecessary bulk to the athlete, hindering their ability to execute skill. The benefits of resistance training to athletic performance are enormous and many. Not only is it an integral conditioning component for power athletes such as football and rugby players, performance in the pure endurance events can be improved with a well-structured strength routine. A physiological analysis of any game or event will confirm that most athletes require explosive power, muscular endurance, maximal strength or some combination of all three in order to excel. Rarely is pure muscle bulk the primary concern and when it is, other elements of strength are equally as important.

Core training is a very important aspect of an exercise routine for athletes. When incorporated into a proper workout routine it will help to improve neuromuscular control and hopefully reduce injuries. The trunk of the body is considered the core and is comprised of the abdominal muscles, back muscles, pelvic floor muscles and the diaphragm. The core is the basis for all functional movements in sports, and is crucial for everything from cutting, to pivoting, to throwing, etc. Its main purposes are to allow for balance and stability, absorbing force and for the transfer of force/energy to the extremities. The transfer of force/energy affords the athlete the ability to generate additional power with various athletic activities such as a golf swing or a punch.

Incorporating proper technique and core training into a routine will facilitate improved neuromuscular athletic movement patterns which can help with maintaining correct alignment and stability of the spine and pelvis while performing an athletic activity. It will also help the athlete become more efficient with the execution of movements. The strength or weakness of the core will determine the athlete's ability to move and generate power efficiently while participating in sport. Having good core strength, stability, and efficient dynamic neuromuscular control will facilitate the opportunity for improved sports performance. The purpose of this investigation is to examine the influence of cardio-respiratory endurance training, resistance training and core strength training on selected physical fitness variables among college athletes.

Methodology

Subjects and Variables

To achieve the purpose of this study 50 male athletes were selected from various Colleges in Coimbatore who had represented their college level athletic competition. The subjects were selected in to the age group of 18 to 25 years. The selected subjects were randomly assigned to experimental and control groups of 10 each. Experimental group-I was given the packages of Cardio-respiratory endurance training. Experimental group-II was given the packages of resistance training. Experimental group-III was given the packages of core strength training. Experimental group-IV was given combined cardio-respiratory endurance, resistance and core strength training. Control group was restricted to participate in any specific training programme. The selected dependent variables such as speed, explosive power, muscular strength, flexibility and cardio respiratory endurance were assessed using standard tests and procedures, before and after the training regimen. The instruments used for testing the dependent variables were standard and reliable as they were purchased from the reputed companies. The variables and tests used are presented in table-1.

Table 1: **Criterion Variables and Test**

SL. No.	Variables	Tests / Instruments	Unit of Measurement
1.	Speed	50 meters run	Seconds
2.	Explosive Power	Standing broad Jump	Centimeters
3.	Muscular strength	Bent Knee Sit-ups	Number
4.	Flexibility	Sit and reach test	Centimeters
5	Cardiorespiratory Endurance	Cooper's 12 minutes Run/Walk	Meters

Training Protocol

The training regimen for the four experimental groups lasted for twelve weeks for 3 days per week and 1 session of 90 minutes in the morning session. Experimental group-I underwent cardio-respiratory endurance training. Experimental group-II underwent resistance training. Experimental group-III underwent core strength training. Experimental group-IV underwent combined cardio-respiratory endurance training, resistance training and core strength training. The cardio-respiratory endurance training consists of 20-40 minutes running with 65- 80% HRR. The running intensity was determined by a percentage of heart rate reserve (HRR). The intensity was increased as training progressed. The resistance training program was a total body workout consisting of 3 sets of 6-10 repetitions on 5 exercises that trained all the major muscle groups. The core strength training consisting of 3 sets of 6-10 repetitions on 5 exercises that trained only core region. A percentage of each subject's one-repetition maximum for each exercise was used to determine the intensity of training. The intensity and number of repetitions performed for each exercise was progressively increased. The control group did not participate in any specialized training during the period of study.

Experimental Design and Statistical Technique

The experimental design used in this study was random group design involving 50 subjects, who were divided at random into five groups of ten subjects each. The data collected from the five groups prior to and post experimentation on selected dependent variables were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since five groups were involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 for significance.

Results

The data collected on selected physical fitness variables before and after twelve weeks of cardio-respiratory endurance training, resistance training, core strength training and combined Cardio-respiratory endurance training, resistance training and core strength training is statistically analyzed by analysis of covariance and the results are presented in table-II.

Table – II

Analysis of Covariance on Selected Physical Fitness Variables of Experimental and Control Groups

	CRET Group	RT Group	CST Group	CT Group	Control Group	S o V	Sum of Squares	Df	Mean squares	'F' ratio
Speed	7.20	7.43	7.46	6.91	8.04	B	10.29	4	2.57	42.83*
						W	2.50	44	0.06	
Explosive Power	1.65	1.73	1.80	1.86	1.56	B	0.78	4	0.20	66.67
						W	0.14	44	0.003	
Muscular strength	32.69	34.89	33.24	36.75	29.08	B	585.14	4	146.29	31.06*
						W	207.36	44	4.71	
Flexibility	39.65	41.83	42.57	46.12	33.47	B	906.68	4	226.67	47.52*
						W	209.82	44	4.77	
Cardio respiratory Endurance	2435.4	2316.8	2274.3	2564.6	2165.4	B	571607.4	4	142901.9	41.06*
						W	153113.6	44	3479.9	

(The required table value for significance at 0.05 level of confidence with degrees of freedom 4 and 44 is 2.59)*Significant at .05 level of confidence

(CRET-cardio-respiratory endurance training, RT- resistance training, CST-core strength training, CT- combined training, CG- control group)

The obtained 'F' ratio value for the adjusted post-test means on speed, explosive power, muscular strength, flexibility and cardio respiratory endurance of cardio-respiratory endurance training, resistance training, core strength training and combined training and control groups are 42.83, 66.67, 31.06, 47.52, and 41.06 respectively which are greater than the required table value of 2.59 for the degrees of freedom 4 and 44 at 0.05 level of confidence. Hence, it was concluded that significant differences exist between the adjusted post test means of cardio-respiratory endurance training, resistance training, core strength training, and combined training and control groups on selected physical fitness variables.

Since, the obtained 'F' ratio value in the adjusted post test means is found to be significant, the Scheffe'S test is applied as post hoc test to find out the paired mean difference, and it is presented in table-III.

Table –III

Scheffe's Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups

Variables	Mean differences										Confidence Interval
	CRET & RT	CRET & CST	CRET & CT	CRET & CG	RT & CST	RT & CT	RT & CG	CST & CT	CST & CG	CT & CG	
Speed	0.23	0.26	0.29	0.84*	0.03	0.52	0.61*	0.55	0.58*	1.13*	0.35
Explosive power	0.08*	0.15*	0.21*	0.09*	0.07	0.13*	0.17*	0.06	0.24*	0.30*	0.08
Muscular Strength	2.20	0.55	4.06*	3.61*	1.65	1.86	5.81*	3.51*	4.16*	7.67*	3.12
Flexibility	2.18	2.92	6.47*	6.18*	0.74*	4.29*	8.36*	3.55*	9.10*	12.65*	3.14
Cardio respiratory endurance	118.6*	161.1*	129.2*	270.0*	42.5*	247.8*	151.4*	290.3*	108.9*	399.2*	84.91

* Significant at .05 level(CRET-cardio-respiratory endurance training, RT- resistance training, CST- core strength training, CT- combined training, CG- control group)

Table-III shows the mean differences between the experimental groups and also between the experimental and control groups on speed, explosive power, muscular strength, flexibility and cardio respiratory endurance. The Scheffe's post hoc analysis proved that when comparing the experimental groups with control group significant mean differences exists between them on selected physical fitness variables. Since, the mean differences were higher than the confident interval values at .05 level of significance. When comparing the experimental groups it shows significant mean differences between them in some comparisons and insignificant differences on other comparisons.

Discussion

Many studies have reported significant increases in maximum voluntary contraction in humans after resistance training (Garfinkel & Cafarelli 1992; Hakkinen et al., 1992). Alcaraz and others (2008) found that heavy-resistance circuit training may be an effective training strategy for the promotion of both strength and cardiovascular adaptations. Coutts and others (2004) observed that 12 weeks of direct supervision of resistance training in young athletes results in greater training adherence and increased muscular strength, power, and running speed than unsupervised training.

Similarly, LeMura and others (2002) observed 16 weeks of various modes of resistance training and found that the resistance training group increased upper and lower body strength. Starkey (1996) determined the effects of different volumes of high-intensity resistance training on isometric torque and muscle thickness; found that both groups improved muscular strength torque

similarly at most angles. Dorgo and others (2009) found significant improvements in muscular strength and muscular endurance of the manual resistance training and weight resistance training groups.

Performing strength and endurance training simultaneously can be detrimental to the gains that might be made in performing one type of training alone (Bell et al., 2000). Substantial and beneficial gains in endurance performance have been reported in most of the training studies conducted previously. Research has found that strength training does not reduce endurance performance (Hortobagyi, Katch & Lachance 1991; Sale et al., 1990; McCarthy et al., 1995) There is evidence to suggest that strength training is beneficial to endurance performance Hickson et al.,1988; Marcinik et al.,1991). Additionally, research suggests that combined training is equally effective, and in some cases superior, when compared to other forms of isolated endurance and resistance training as evidenced by increased strength, superior endurance performance, and improved power in response to a chronic complex training stimulus.

Conclusions

The result of this study demonstrated that, cardio-respiratory endurance training, resistance training, core strength training and combined training has significant impact on speed, explosive power, muscular strength, flexibility and cardio respiratory endurance among college athletes. It is also concluded that combined cardio-respiratory endurance, resistance and core strength training is better than isolated cardio-respiratory endurance training, resistance training, core strength training in improving the selected physical fitness components.

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EFFECTS OF PROGRESSIVE RESISTANCE TRAINING ON ARM EXPLOSIVE POWER AMONG SCHOOL LEVEL PLAYERS

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Abstract

The purpose of the study was designed to find out the effects of progressive training on arm explosive power among the school level players. For this purpose, thirty boys studying in Lisieux Matric Higher Secondary school, Coimbatore, Tamil Nadu, India, were selected as subjects at random. The age of the subjects ranged from 15 to 17 years respectively The selected subjects were randomly assigned to two groups of fifteen each such as Group –I (PRTG) Progressive Resistance Training Group), and Group – II (CG–Control Group). The selected subjects were initially tested on criterion variables used in this study and this was considered as pre-test. After the pre test the subjects underwent their respective training programmes for the duration of twelve weeks with three days per week. The data collected from the two groups prior to and after the training programme on the selected criterion variables were statistically analyzed with dependent t' test

Introduction

Sports' training is a continuous and systematic process. It requires hard work of both physical and mental levels, to attain the high level performance in the competitions of various levels. It is right to say that sports' training is scientific Endeavour to reach high level performance.

Strength is the most important components of physical fitness, which affects performance in almost all the games and sports in some form or the other.

The primary objective in strength training is not to learn to lift as much weight as possible but to increase the strength for application to the relevant sport. This is possible only when the coaches and physical education teachers use the correct and most beneficial and economical means to train their sportsmen. (Uppal and Aliferi, 1984)

The most successful athletes should have superior strength and exceptional speed to integrate them with explosive action for excellent performance. Increased strength often contributes to better performance. In certain cases, improved strength can be the most important single contribution for better performance. (Thomas, 1965) For any kind of sports activities physical fitness is very important. Strength is required for power production, stabilizing a joint, supporting arms and legs (core stability), avoiding injury, and coping with contact. The resistance used during strength training can be one's bodyweight, bodyweight plus a weighted vest : barbells and dumbbells with light; medium or heavy loads; medicine balls or an unstable surface such as a wobble board or Swiss ball.(Singh, 1991)

Methodology

The purpose of the study was designed to find out the effect of progressive training on physical fitness components among the school level players. For this purpose, Thirty boys studying in Lisieux Matric Higher Secondary school, Coimbatore, Tamil Nadu, India, during the academic year 2010–2011, were selected as subjects at random. The age ranged from 15 to 17 years respectively. The selected subjects hailed from various socio - economic conditions.

The subjects successfully completed the minimum strength requirements test recommended by Voight and Draovitch (1991), which consists of static stability and dynamic movement testing for thirty sec.

Test: 1. Two – Hand Medicine Ball Put

The purpose of the test was to measure the power of the arms. The equipment needed for this was 6-pound medicine ball, marking materials, small rope, Chair and measuring tape. From a sitting position in a straight back chair, the subject holds the ball in both hands with the ball drawn back against the chest and just under the chin. He then pushed the ball upward and outward for maximum distance. The rope is placed around the subject's chest and held taut to the rear by a partner in order to eliminate rocking action during the push. The subject's effort should be primary with the arms. The distance of the best of three trails measured to the nearest 0.01 meter is recorded as the score. One practice trail may be taken before scoring.

Table-1

Computation of 't' ratio of progressive resistance training group and control group on arm explosive power

Groups	Pre - test mean	Pre - test S.D.	Post - test mean	Post - test S.D.	't' ratio
Progressive resistance training	3.66	0.35	4.02	0.14	5.02*
Control group	3.66	0.30	3.68	0.30	1.01

* Significant at 0.05 level for the degrees of freedom 1 and 14, 2.14

Table 1 shows that the 't' ratios on arm explosive power of progressive resistance training group were 5.02 respectively. Since these values were higher than the required table value of 2.14, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 14. And the obtained 't' ratio between pre and post test of control group 1.01 was lesser than the required table value of 2.14 was found to be not significant.

From the results it was inferred that, both progressive resistance training group produced a significant improvement in arm explosive power of school level players.

Conclusions

Progressive Resistance training had significant improvement in Arm Explosive Power, by finding significant differences in comparison between base line and post test.

Progressive Resistance Training had significant improvement in Arm Explosive Power

The control group had not significantly improved in all the selected variables.

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EFFECT OF FLOOR AEROBIC EXERCISE AND LOW DIET ON BODY MASS INDEX AND PERCENT BODY FAT IN OBESE YOUNG ADULT MEN

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Abstract

Excessive body weight is associated with various diseases, particularly cardiovascular diseases; diabetes mellitus type II, obstructive sleep apnea, certain types of cancer. As a result, obesity has been found to reduce life expectancy. A combination of excessive caloric intake, lack of physical activity, and genetic susceptibility is thought to explain most cases of obesity. The primary treatment for obesity is dieting and physical exercise. The present study was to design to examine the effects of floor aerobic exercise and low diet on obese young adult men. For this reason forty (N=40) obese young adults were selected from Fitness One, a fitness club in Chennai. The subjects were from different walks of life. The age of the subjects was between 22 to 40 years. The subjects were healthy other than their obesity. The study was formulated as a true random group design, consisting of a pre test and post test. The subjects (n=40) were randomly assigned to four equal groups of ten young adult obese men in each. The groups were assigned as Experimental Groups I, II, III and control group respectively. Pre tests were conducted for all the subjects on percent body fat and body mass index. The experimental groups participated in their respective experiments, namely, aerobic exercises and low fat diet and combined aerobic exercise and low fat diet for six weeks. After the experiment of exercises and diet for six weeks, post test scores were obtained and compared with using ANCOVA to find out the effect of aerobic exercise and low fat diet on obese young adult men. The results of the study clearly indicated that low fat diet and aerobic exercise significantly reduced the body fat and body mass index.

Keyword: Aerobic Exercise, Low Fat Diet, Percent Body Fat and Body Mass Index Introduction

Sedentary lifestyles and physical inactivity may be risk factors for obesity in youth. Obesity

has reached epidemic proportions globally, with more than 1 billion adults overweight - at least 300 million of them clinically obese - and is a major contributor to the global burden of chronic disease and disability. Often coexisting in developing countries with under-nutrition, obesity is a complex condition, with serious social and psychological dimensions, affecting virtually all ages and socioeconomic groups.

Increased consumption of more energy-dense, nutrient-poor foods with high levels of sugar and saturated fats, combined with reduced physical activity, have led to obesity rates. Obesity and overweight pose a major risk for serious diet-related chronic diseases, including type II diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer. The health consequences range from increased risk of premature death, to serious chronic conditions that reduce the overall quality of life (WHO, 2003).

Aerobic refers to a variety of exercises that stimulate heart and lung activity for a time period sufficiently long to produce beneficial changes in the body (Cooper, 1970). Aerobic is a system of exercises designed to promote the supply and use of oxygen in the body. Some of these exercises include running, dancing, rowing, skating and walking. Aerobic exercise increases cardio respiratory fitness, which is the heart's ability to pump blood and deliver oxygen throughout the body. Some benefits of cardio respiratory fitness are increased endurance and energy. Weight control decreased blood pressure, decreased heart rate, decreased cholesterol levels, and an increased ability to manage stress.

Aerobics are more efficient method to decrease the percentage of body fat to attain the other metabolic benefits of fitness. It has also a very good way to develop musculoskeletal fitness while building strength, flexibility and coordination.

Exercise and its calorie burning potential

All exercise burns calories for they involve movements and energy is required for every movement made. The calorie burning ability of each exercise depends on the speed and/or force at which the exercise is performed. This proves the calorie burning potential of an exercise can be increased depending on an individual's motivation for that movement. While exercising our muscles burn both fat and glucose (carbohydrates in the blood) in different proportions. Depending on how an individual exercises muscle can burn fat in a larger proportion to glucose.

When activity is light and easy we tend to burn a much higher percentage of fat. Fat is a slow burning fuel that requires oxygen so if oxygen is delivered to muscle cells in sufficient quantities the cells can easily burn fat for most of its energy requirement. A potential problem for weight loss is lighter exercise burns fewer total calories. It means to burn fat directly we should exercise at a lower level of effort and for longer duration. However some people just don't have the time to exercise for longer periods. The only way to burn fat quickly is to increase the metabolism through anaerobic exercise so we burn the fat indirectly.

Dietary intake

An appropriate dietary management strategy should begin with a basic understanding of the relationship between calories ingested and expended. The critical balance between energy intake and energy expenditure determines body weight. The goal is to manipulate lifestyle through eating and exercise so that the obese individual's energy balance is negative over 24 hours. This means one has expended more calories than ingested. This can be achieved by: decreasing food intake and keeping physical activity constant, keeping food intake constant and increasing physical activity, decreasing food intake and increasing physical activity simultaneously.

Methodology

The present study was to design to examine the effects of floor aerobic exercise and low diet on obese young adult men. For this reason forty (N=40) obese young adults were selected from Fitness One, a fitness club in Chennai. The subjects were from different walks of life. The age of the subjects was between 22 to 40 years. The subjects were healthy other than their obesity. Those young adult men who have more than 25% of percent body fat were considered as obese for the purposes of this study (Steven, 2007). The study was formulated as a true random group design, consisting of a pre test and post test. The subjects (n=40) were randomly assigned to four equal groups of ten young adult obese men in each. The groups were assigned as low fat diet group, aerobic exercise group and combination of low fat diet and aerobic exercise group and control group respectively. Pre tests were conducted for all the subjects on percent body fat and body mass index. The experimental groups participated in their respective experiments for six weeks. After the experiment of exercises and diet for six weeks, post test scores were obtained and compared with using ANCOVA to find out the effect of aerobic exercise and low fat diet on obese young adult men.

Results on percent body fat

The statistical analysis comparing the initial and final means of percent body fat due to aerobic exercise and low fat diet on obese young adult men is presented in Table I.

Table I

Computation of analysis of covariance on percent body fat

	AEROBIC GROUP	LOW FAT DIET GROUP	COMBINED GROUP	CONTROL GROUP	S V	S S	d f	M S	F
Pre Test Mean	34.31	33.41	34.13	34.50	B	6.64	3.00	2.21	0.88
					W	90.63	36.00	2.52	
Post Test Mean	32.09	31.84	31.89	34.05	B	33.74	3.00	11.25	5.36*
					W	75.53	36.00	2.10	
Adjusted Post Test Mean	31.95	32.25	31.86	33.81	B	24.51	3.00	8.17	6.79*
					W	42.10	35.00	1.20	
Mean Diff	- 2.22	- 1.57	- 2.24	- 0.43					

* Significant at 0.05 level for the degrees of freedom 1 and 14, 2.14

As shown in Table I, the obtained F ratio of 0.88 on pre test means of the groups was insignificant at 0.05 level. This shows that the means of the groups were equal among the groups before the experimental treatment. The obtained F ratio on post test means was 5.36, which was greater than the required F value of 2.87 to be significant at 0.05 level. Taking into consideration of the pre test means and post test means, adjusted post test means were determined and analysis of covariance was done and the obtained F value 6.79 was greater than the required value of 2.87 and hence it was accepted that there was significant differences among the obese young adult men on percent body fat.

Since significant changes were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table II.

Table II

Scheffe's Confidence Interval Test Scores on Percent Body Fat

Aerobics Group	Low Fat Diet Group	Combined Group	Control Group	MD	C.I
32.32	32.22			0.30	1.55
32.32		32.05		0.09	1.55
32.32			33.83	1.86*	1.55
	32.22	32.05		0.39	1.55
	32.22		33.83	1.56*	1.55
		32.05	33.83	1.95*	1.55

* Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between aerobics exercise group and control group. It also proved that there was significant differences existed between combined group and control group. The post hoc analysis proved that there was significant differences existed between low fat diet and control group. When compared between the experimental groups there were no significant differences on percent body fat.

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure I.

Figure I

Bar Diagram on Ordered Adjusted Means of Percent Body Fat

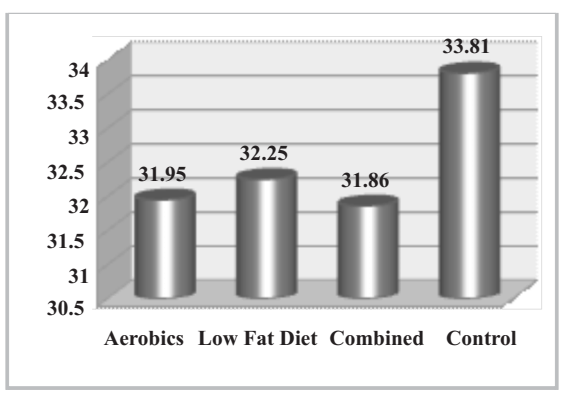

Table III

Computation of analysis of covariance on body mass index

	Aerobic Group	Low Fat Diet Group	Combined Group	Control Group	SV	SS	df	MS	F
Pre Test Mean	32.12	31.85	31.67	31.5	B	2.23	3	0.74	0.24
					W	111.81	36	3.11	
Post Test Mean	30.70	30.64	29.94	31.0	B	6.09	3	2.03	0.57
					W	127.38	36	3.54	
Adjusted Post Test Mean	30.35	30.57	30.05	31.3	B	8.80	3	2.93	11.43*
					W	8.98	35	0.26	
Mean Diff	-1.42	-1.21	-1.73	-0.46					

* Significant at 0.05 level of confidence for 3 and 36 (df) =2.87, 3 and 35(df) =2.87

As shown in Table III, obtained F ratio of 0.24 on pre test means of the groups was insignificant at 0.05 level. This shows that the means of the groups were equal among the groups before the experimental treatment. The obtained F ratio on post test means was 0.57, which was lesser than the required F value of 2.87 to be significant at 0.05 level. Taking into consideration of the pre test means and post test means, adjusted post test means were determined and analysis of covariance was done and the obtained F value 11.43 was greater than the required value of 2.87 and hence it was accepted that there was significant differences among the obese young adult men on body mass index.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table VI.

Table IV

Scheffe's Confidence Interval Test Scores on Body mass index

Aerobics Group	Low Fat Diet Group	Combined Group	Control Group	MD	C.I
30.35	30.57			0.22	0.65
30.35		30.05		0.30	0.65
30.35			31.32	0.97*	0.65
	30.57	30.05		0.51	0.65
	30.57		31.32	0.76*	0.65
		30.05	31.32	1.27*	0.65

* Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between aerobics group and control group, low fat diet group and control group. And also there was significant differences existed between combined group and control group. The post hoc analysis proved that there was no significant difference between the experimental groups on body mass index.

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure I.

Figure II

Bar Diagram on Ordered Adjusted Means of Body Mass Index

Discussions on findings

Result proved that there was significant differences existed between low fat diet and control group, combined group and control group, which proved that six weeks treatments namely, low fat diet and combination of aerobic exercises and low fat diet significantly reduced percent body fat of obese young adult men. However comparing between the treatment groups, the results presented in table II proved that there was no significant differences among the treatment groups. And the differences were insignificant at 0.05 level.

The result of the study proved that there was significant differences existed between treatment groups and control group, which proved that six weeks treatments namely, aerobic exercises, low fat diet and combination of aerobic exercises and low fat diet significantly reduced body mass index of obese young adult men. However comparing between the treatment groups, the results presented in table VI proved that there was no significant differences among the treatment groups. And the differences were insignificant at 0.05 level.

Conclusions

Within the limitations and delimitations of this study, the following conclusions were drawn:

It was concluded that floor aerobic exercises, low fat diet and combined group significantly reduced the percent body fat of the obese young adult men.

It was concluded that low fat diet and combined group significantly reduced the body mass index of the obese young adult men.

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