



Effect of medium intensity resistance training on anthropometric Measures of female students

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Abstract:

The purpose of this study was to find out the effect of medium intensity resistance training on anthropometric measures of female students. Twenty-four female under graduate students studying in the B.N.C.P.E., Udaipur, Rajasthan were randomly selected as subjects and their age ranged from 17 to 20 years. The selected subjects were randomly assigned into two equal groups namely experimental (N=12) which underwent medium intensity resistance training for 12 weeks with 3 sessions per week and control group (N=12) which did not undergo any special training. Thigh girth, calf girth and upper arm girth were selected as criterion variables for this study. The subjects were tested for thigh girth, calf girth and upper arm girth prior to and after training programme. The obtained data were statistically assessed for any significant difference using analysis of co variance (ANCOVA). The results showed that there were no significant improvement on thigh girth (52.30 ± 2.19 Vs 51.12 ± 1.45 $P < 0.05$) and calf girth (34.32 ± 2.01 Vs 33.22 ± 2.17 , $P < 0.05$) and there was a significant improvement in upper arm girth (32.40 ± 1.36 Vs 28.89 ± 1.68 , $P < 0.05$) between the experimental group and control group.

Keywords: *Medium Intensity, Resistance Training, Anthropometric Measures*

1. Introduction

In recent years athletic performance has been transformed skill technique and training standard are being constantly improved. Physical education scientists have been training to develop new methods of training and technique to attain a high level of performance in games and sports. The principles of sports training have undergone many changes in the past years. The sports training principles, therefore are not static, but they undergo changes in keeping pace with the development of knowledge in various sciences.

In resistance training load refers to the mass or amount of weights utilized for specific exercises. The Percentage of one repetition maximum (IRM) method was used in this training programme. It is the Maximum load that can be lifted successfully one through the full range of movement (Fielding et al. 2002) In percentage method the load of IRM is treated as hundred percent (Stone, 2003). In this study 70% of RM was used for resistance training, this training was used to develop the size of the muscles. The point of maximal thigh circumference is the thigh girth (Johnson & Nelson, 1982). The muscles through use becomes stronger and bigger. Participation in resistance training will improve the strength and size of the muscles in thigh, calf and other parts of the body (Shea, 1996). Rigorous training, particularly when done against weights usually results in muscle fiber thickening. There is also an increase in the number of capillaries and thickening of connective tissues. Similarly, the muscle tendons that connects muscles and ligaments that connect muscles to bones become strong. These kinds of changes are likely to result in gain in body weight.

2. Methodology

The purpose of the study was to find out the effects of medium intensity resistance training on anthropometric measures of female students. To achieve the purpose of the study, twenty-four women undergraduate students studying in B.N.C.P.E. Udaipur Rajasthan were selected subjects at random. The selected subjects were divided into two equal groups of twelve subjects each, such as resistance training group and control group. Resistance training group underwent medium intensity resistance training programme for three sessions per week for twelve weeks. Control group did not participate in any special training programme apart from their regular physical activities as per their curriculum.

Before collection of data, the subjects were oriented about the purpose of the study and investigator explained the test to subjects and about the procedure to be adopted for measuring thigh girth, calf girth and upper arm girth. The experimental group underwent the training with an intensity of 70% of effort. The data was collected prior to and immediately after the training programme for the criterion variables. They were statistically examined for significant differences, if any, by applying analysis of co variance (ANCOVA). The level of significance was fixed at 0.05

3. Analysis of the Data and the Results of the Study

Table 1: Analysis of covariance of data on upper thigh girth of experimental group and control group

Test		Experimental Group	Control Group	S.V	SS	df	MS	F ratio
Pretest	Mean	50.64	50.80	B	0.15	1	0.15	0.04
	SD	2.08	1.88	W	86.65	22	3.94	
Posttest	Mean	52.31	51.12	B	8.52	1	8.52	2.47
	SD	2.19	1.45	W	75.93	22	3.45	
Adjusted Posttest				B	8.89	1	8.89	2.54
	Mean	52.32	51.10	W	73.50	21	3.50	

$$F = (df 1,22)(0.05) = 4.30, P < 0.05 \text{ \& } (df 1,21)(0.05) = 4.32, P < 0.05$$

Table 1 shows that the pre test mean of experimental and control groups are 50.64 and 50.80 respectively. The obtained F ratio of 0.04 for pre test mean is less than the table value 4.30 for df 1 and 22 required for significance at 0.05 level. The obtained F ratio of 2.47 for post test mean is lesser than the table value 4.30 for df 1 and 18 required for significance at 0.05 level. The adjusted post test mean of experimental and control groups are 52.30 and 51.10 respectively. The obtained F ratio of 2.54 for adjusted post test mean is also lesser than the required table value 4.32 for df 1 and 21 for significant 0.05 level.

The result of the study indicated that there was no significant difference between the post test and adjusted post test mean of medium intensity resistance training group and control group on third girth. The pre, post and adjusted post mean values of experimental and control group on percent thigh girth were graphically represented in the figure 1.

Table 2: Analysis of covariance of data on calf girth of experimental and control group

Test		Experimental Group	Control Group	S.V	SS	df	MS	F ratio
Pretest	Mean	29.43	28.88	B	1.87	1	1.87	0.68
	SD	1.84	1.45	W	60.61	22	2.76	
Posttest	Mean	32.40	28.89	B	73.85	1	73.85	31.49*
	SD	1.36	1.68	W	51.59	22	2.35	
Adjusted Posttest				B	83.50	1	83.50	48.15*
	Mean	32.54	28.75	W	36.42	21	1.73	

$$F = (df 1,22)(0.05) = 4.30, P < 0.05 \text{ \& } (df 1,21)(0.05) = 4.32, P < 0.05$$

Table 2 shows that the pre test mean of experimental and control groups are 32.09 and 32.91 respectively. The obtained F ratio of 0.92 for pre test mean is lesser than the table value 4.30 for df 1 and 22 required for significance at 0.05 level. The adjusted post test mean of experimental and control groups are 34.44 and 33.10 respectively. The obtained F ratio of 2.43 for adjusted post test mean is also lesser than the required table value 4.32 for df 1 and 21 for significant 0.05 level.

The result of the study indicated that there was no significant difference between the post test and adjusted post test mean of medium intensity resistance training group and control group on calf girth. The pre, post and adjusted post mean values of experimental groups and control group on percent calf girth were graphically represented in the figure 2.

Table-3: Analysis of covariance of data on upper arm girth of experimental groups and control group

Test		Experimental Group	Control Group	S.V	SS	df	MS	F ratio
Pretest	Mean	29.43	28.88	B	1.87	1	1.87	0.68
	SD	1.84	1.45	W	60.61	22	2.76	
Posttest	Mean	32.40	28.89	B	73.85	1	73.85	31.49*
	SD	1.36	1.68	W	51.59	22	2.35	
Adjusted Posttest				B	83.50	1	83.50	48.15*
	Mean	32.54	28.75	W	36.42	21	1.73	

Significant $F=(df 1,22)(0.05)=4.30, Pd^{>}0.05$ & $(df 1,21)(0.05)=4.32, Pd^{>}0.05$

Table 3 shows that the pre test mean of experimental and control groups are 29.43 and 28.88 respectively. The obtained F ratio of 0.68 for pre test mean is lesser than the table value 4.30 for df 1 and 22 required for the significance at 0.05 level. The obtained F ratio of 31.49 for post test mean is higher than the table value 4.30 for df 1 and 22 required for significance at 0.05 level. The adjusted post test mean of experimental and control groups are 32.54 and 28.75 respectively. The obtained F ratio of 48.15 for adjusted post test mean is also higher than the required table value 4.32 for df 1 and 22 for significant 0.05 level.

The result of the study indicated that there was a significant difference between the post test and adjusted post test mean of medium intensity resistance training group and control group on upper arm girth. The pre, post and adjusted post mean values of experimental groups and control group on percent upper arm girth were graphically represented in the figure 3.

Figure 1 : The pre, post and adjust post test mean value of experimental and control group on Thigh girth

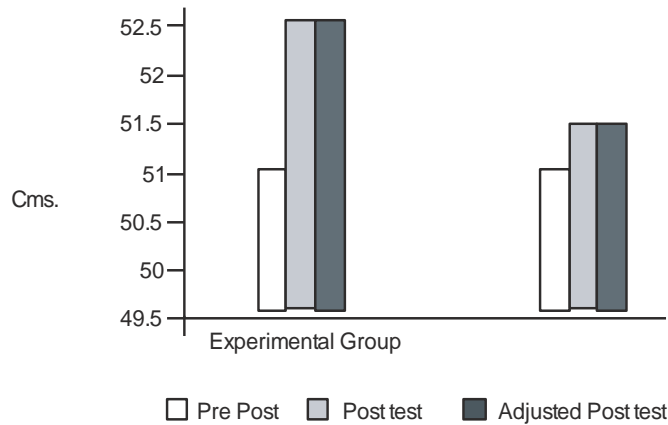


Figure 2 : The pre, post and adjust post test mean value of experimental and control group on Calf girth

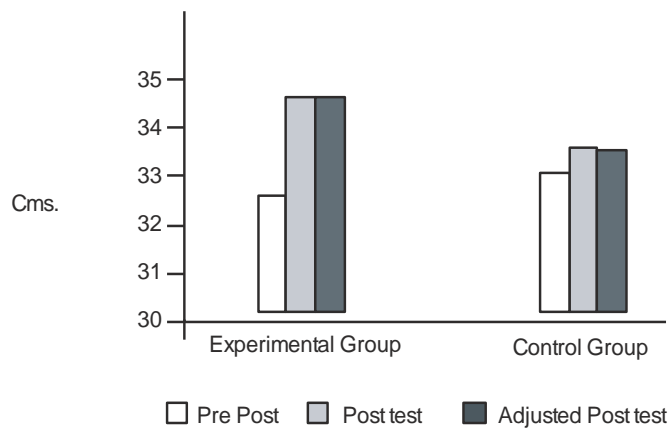
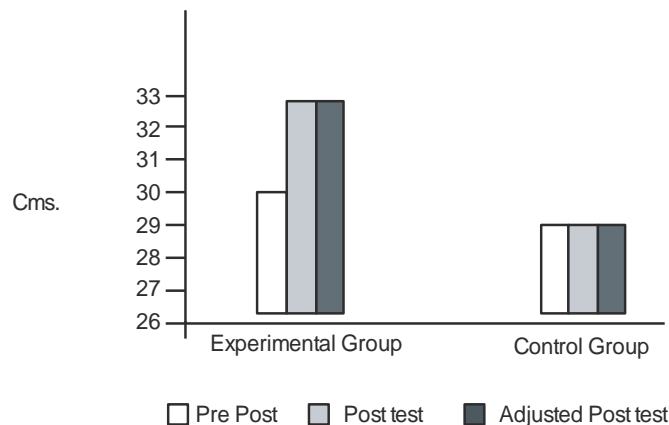


Figure 3 : The pre, post and adjust post test mean value of experimental and control group on Upper Arm girth



4. Discussion on Findings

Many research studies revealed that the use of training intensities elicits training adaptations and further it indicates that it also includes the specific adaptations in girth variables. John et al. (1996) and Faigenbaum et al. (1999) stated that resistance training is effective in enhancing the lower body strength and size. Bidwell et al. (1996) pointed out that resistance is best for increasing the of muscles. Teixeira et al. (2001) pointed out that resistance training three times per week is as effective as five

times per week. From the results of the present study and literature, it is concluded that the dependent variable such as upper arm girth was significantly improved due to the influence of medium intensity resistance training. However, there was no significant improvement on thigh girth and calf girth due to medium intensity resistance training.

5. Conclusion

The result of the study showed that, there was a significant improvement on upper arm girth between resistance training group. However, there was no significant difference on thigh girth and calf girth due to medium intensity resistance training. Hence it has been concluded that the medium intensity resistance training group has improved on upper arm girth when compared to control group.

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