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ENHANCEMENT OF BACK STRENGTH AND STRENGTH ENDURANCE THROUGH LOW, MODERATE AND HIGH INTENSITY RESISTANCE TRAINING PROGRAMMES AMONG COLLEGE WOMEN ATHLETES

S. Meenakshi* & I. John Parthiban**

* Ph.D Research Scholar (Part Time), Department of Physical Education, H. H. The Rajah's College (Autonomous), (Affiliated to Bharathidasan University), Pudukkottai, Tamil Nadu, India

** Director of Physical Education, H. H. The Rajah's College (Autonomous), (Affiliated to Bharathidasan University), Pudukkottai, Tamil Nadu, India

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Abstract:

The Purpose of the study was to find out enhancement of back strength and strength endurance through low, moderate and high intensity resistance training programmes among college women athletes**.** For this purpose, sixty (N=60) women athletes who had participated in the University of Madras athletic meet during the year 2024-2025 were randomly selected as subjects. The subjects were divided randomly into four groups of fifteen each (n=15) named Low Intensity Resistance Training (LIRT), Medium Intensity Resistance Training (MIRT), High Intensity Resistance Training (HIRT) and Control. Group-I underwent Low Intensity Resistance Training (LIRT), Group-II underwent Medium Intensity Resistance Training (MIRT), Group-III underwent High Intensity Resistance Training (HIRT) and Group-IV acted as Control group (GC). The experimental groups underwent respective training period for three days per week for eight weeks. Back strength and strength endurance was selected as dependent variables. Back strength was measured by Dynamometerand Strength Endurance was measured by Bend knee Sit-up Test. All the subjects were tested before and after the intervention on the selected dependent variables. The data obtained from the experimental groups before and after the experimental period were statistically analyzed with dependent 't'-test. The Medium Intensity Resistance Training group has been found to be better than the Low Intensity Resistance Training group, High Intensity Resistance Training group and Control group in developing Back Strength and Strength Endurance.

Key Words: Low Intensity Resistance Training (LIRT), Medium Intensity Resistance Training (MIRT), High Intensity Resistance Training (HIRT), Back Strength, Strength Endurance

Introduction:

Using barbells, dumbbells, machines, and other equipment to improve fitness, appearance, and/or athletic performance is known as "resistance training," though many people also call it strength training. For athletes in a range of sports, resistance training is a recognized training technique. Training objectives like greater muscle strength, muscle hypertrophy, better body composition, and enhanced athletic performance can all be accomplished with the right exercise regimen (Kotzamanidis, 2005).

For strength and power athletes as well as those who exercise for health reasons, resistance training ought to be a significant part of any fitness regimen. Naturally, resistance training is crucial for athletes participating in power-demanding sports like bodybuilding, sprinting, and weightlifting. But strength training also helps a lot of other athletes, particularly those who play sports that demand a lot of muscular endurance (Kamlesh, 1997).

Strength training can cause muscle hypertrophy, in part because it causes muscle fibers to enlarge. Furthermore, high resistance training can shift the distribution of fiber types toward faster twitch fibers. Strength training also has a neuron-motor effect, and alterations in the nervous system may be partially responsible for the rise in muscle strength. Training speeds appear to be closely associated with an improvement in muscle strength training through isolated movements (Paavolainen, 1999).

Studies showing that resistance training in the form of weight training and, more recently, plyometric training has improved some competitive performances have bolstered the significance of resistance training for sports performance. Usually, this has been described as an increase in the ability to jump vertically. According to numerous studies, resistance training has improved muscle strength but has not changed athletes' dynamic performance (Bloomfield et al., 1994).

Methodology:

The present study was to find out the effect of low, moderate and high intensity resistance training on back strength among college women athletes. For this purpose, sixty (N=60) inter college athletics who have participated in the University of Madras athletic meet during the year 2024-2025 were selected. For this study random group sampling test was used. The selected subjects were classified into four groups of fifteen each (n=15) namely, Group-I underwent Low Intensity Resistance Training (LIRT), Group-II underwent Medium Intensity Resistance Training (MIRT), Group-III underwent High Intensity Resistance Training (HIRT) and Group-IV acted as Control. The experimental groups underwent respective training period for three days per week for ten weeks. Among various strength related parameters back strength and strength endurance were selected as dependent variables. Back strength was measured by Dynamometer and Strength Endurance was measured by Bend knee Sit-up Test. All the subjects were tested prior to and immediately after the intervention on back strength and strength endurance.

Analysis of the Data:

The data collected from the experimental groups and control group on prior and after experimentation on selected variables were statistically examined by dependent t- test on selected criterion variables separately. In all the cases 0.05 level of significance was fixed.

Back Strength:

In order to examine the significance differences among Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT), High Intensity Resistance Training group (HIRT) and Control group of back strength dependent t- test was applied and it was presented in the table 1.

Table 1: Distribution Mean and Standard Deviation values and Dependent t-test values for Pre-Assessment and Post- Assessment on Back Strength among Different Groups

Test	Low Intensity Resistance Training Group (LIRT)	Medium Intensity Resistance Training Group (MIRT)	High Intensity Resistance Training Group (HIRT)	Control Group (CG)
Pre- Assessment	92..47±1.15	92.47±1.15	92.27±1.18	92.27±1.12
Post- Assessment	95.73±1.06	95.66±0.94	97.07 ±0.77	92.53±1.09
't'-test	8.09	8.96*	13.17*	0.66

* Significant at 0.05 level.

(Table value required for significance at .05 level for 't'-test with df 14 is 2.15)

The table 1 shows that the pre-assessment means and standard deviation of Back Strength for Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT), High Intensity Resistance Training group (HIRT) and Control group are 92.47±1.15, 92.47±1.15, 92.27±1.18 and 92.27±1.12respectively. The post - assessment mean is95.73±1.06, 95.66±0.94, 97.07±0.77 and 92.53±1.09 respectively. The obtained dependent t-ratio values between the pre and post assessment means on Back Strength of Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT), High Intensity Resistance Training group (HIRT) and Control group are 8.09, 8.96, 13.17 and 0.66 respectively.

The table value required for significant difference with df 14 at 0.05 level is 2.15. It was concluded that experimental groups such as Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT) and High Intensity Resistance Training group (HIRT) had registered significant improvement in Back Strength.

The pre and post assessment mean values of Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT), High Intensity Resistance Training group (HIRT) and Control group on back strength are graphically represented in the

Figure 1

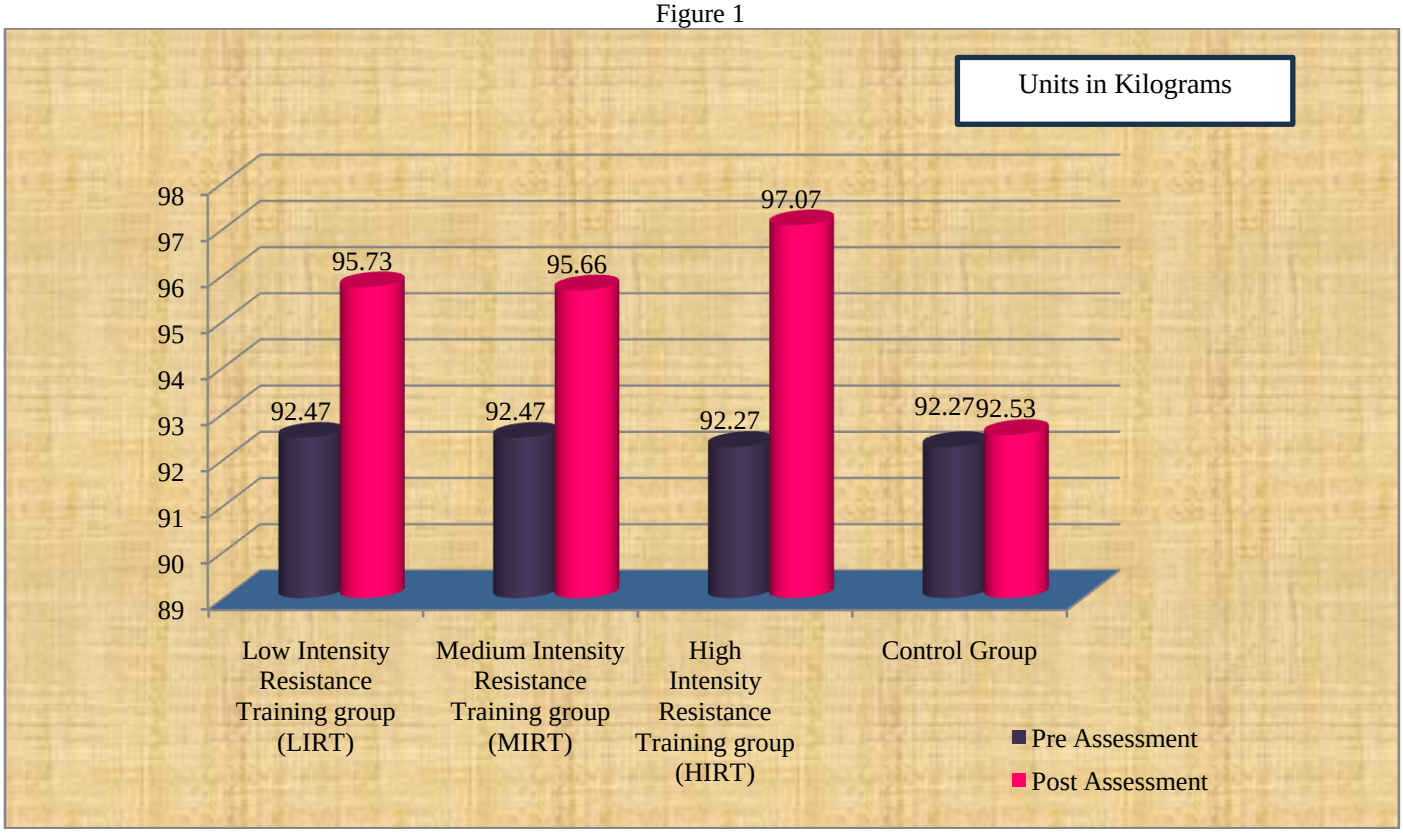

Figure 1: Pre - Assessment and Post- Assessment on Back Strength among Different Groups (In Kilograms)

Strength Endurance:

In order to examine the significance differences among Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT), High Intensity Resistance Training group (HIRT) and Control group of Strength Endurance dependent t- test was applied and it was presented in the table 2.

Table 2: Distribution Mean and Standard Deviation values and Dependent t-test values for Pre-Assessment and Post- Assessment on Strength Endurance among Different Groups

Test	Low Intensity Resistance Training Group (LIRT)	Medium Intensity Resistance Training Group (MIRT)	High Intensity Resistance Training Group (HIRT)	Control Group (CG)
Pre- Assessment	14.20±1.92	14.47±2.00	14.53±2.06	14.53±1.59

Post- Assessment	18.33±1.62	19.67±2.67	18.40±1.62	14.80±1.80
't'-test	3.95*	4.05*	3.65*	0.25

* Significant at 0.05 level.

(Table value required for significance at .05 level for 't'-test with df 14 is 2.15)

The table 2 shows that the pre-assessment means and standard deviation of Strength Endurance for Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT), High Intensity Resistance Training group (HIRT) and Control group are 14.20±1.92, 14.47±2.00, 14.53±2.06 and 14.53±1.59 respectively. The post- assessment mean is 18.33±1.62, 19.67±2.67, 18.40±1.62 and 14.80±1.80 respectively. The obtained dependent t-ratio values between the pre and post assessment means on Strength Endurance of Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT), High Intensity Resistance Training group (HIRT) and Control group are 3.95, 4.05, 3.65 and 0.25 respectively.

The table value required for significant difference with df 14 at 0.05 level is 2.15. It was concluded that experimental groups such as Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT) and High Intensity Resistance Training group (HIRT) had registered significant improvement in Strength Endurance.

The pre and post assessment mean values of Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT), High Intensity Resistance Training group (HIRT) and Control group on Strength Endurance are graphically represented in the figure 2.

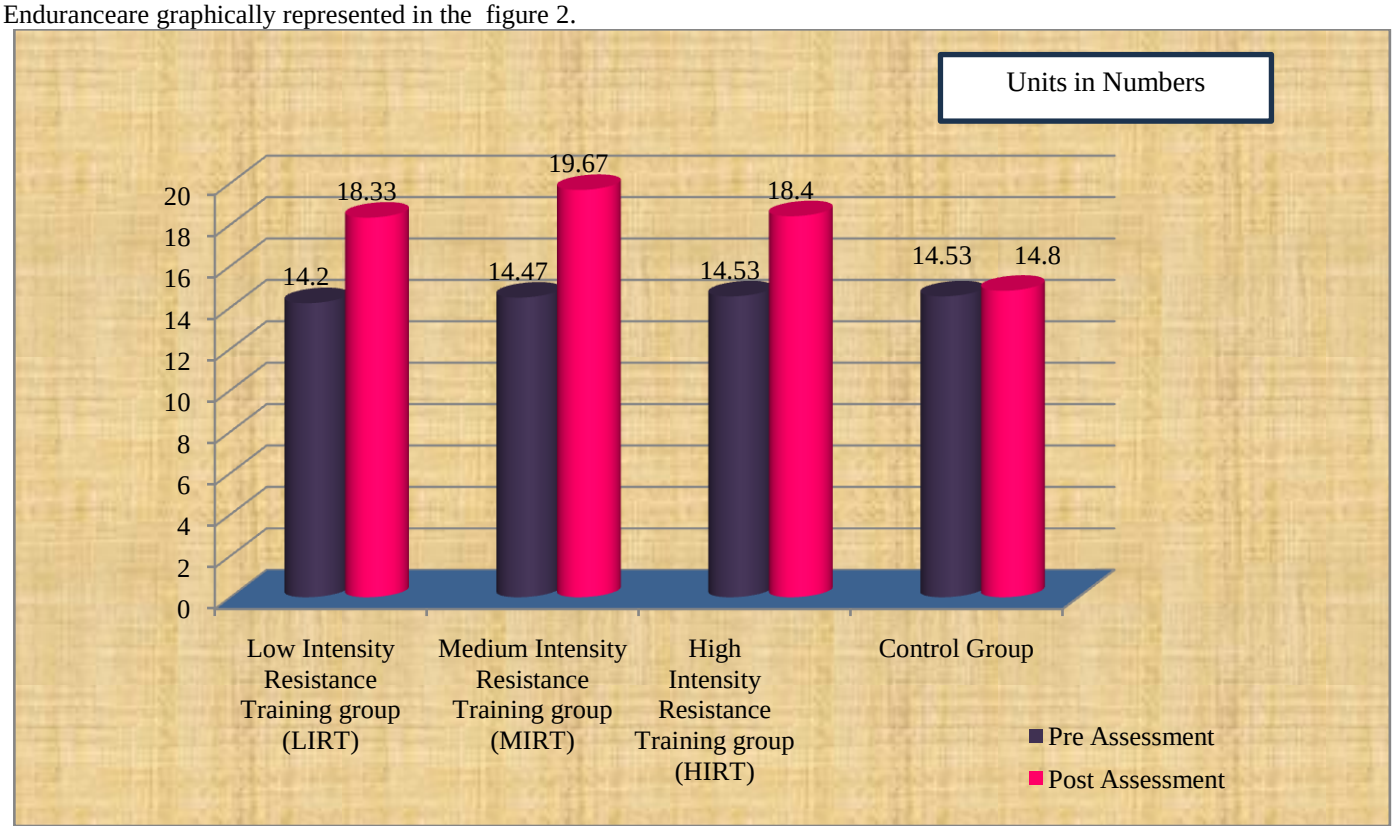

Figure 2: Pre - Assessment and Post- Assessment on Strength Endurance among Different Groups

Conclusions:

- The results of the study showed the experimental groups such as Low Intensity Resistance Training group (LIRT), Medium Intensity Resistance Training group (MIRT) and High Intensity Resistance Training group (HIRT) had registered significant improvement on Back Strength and Strength Endurance.
- Further the study showed, when the experimental groups were compared with each other, the High Intensity Resistance Training (HIRT) programme was found to be greater than the Low Intensity Resistance Training (LIRT) programme, Medium Intensity Resistance Training (MIRT) programme and Control group (CG) on the increase of selected criterion variable namely Back Strength and Strength Endurance.

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