Effect of Varied Weight Training Programs on Resting Heart Rate of Secondary School Athletes

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Abstract : The aim of research is to determine the effect of varied weight training programmes on resting heart rate of secondary school athletes. 45 subjects were randomly assigned to three equal groups of 15 subjects and they were secondary school athletes who were studying in Govt. High Schools of Vidyanagara and Bettahalasuru, Bangalore, Karnataka, India. Three groups were assigned into Experimental Group-I (WTG) acted as Weight Training Group; Experimental Group-II (WWTG) acted as Without Weight Training Group and Group-III (CG) acted as control group. The Pre test scores were conducted for all the subjects on Resting Heart Rate collected by administering Heart Rate Monitor (Omron) in bpm. Experimental groups like Group-I practiced exercises with weight and Group-II practiced without weight exercises for a period of 12 weeks. The post test mean scores were collected on said criterion variable that is resting heart rate after the treatments. The difference between pre and post mean scores on resting heart rate was considered as the effect of experimental treatments. Analysis of Variance and Analysis of Covariance were used to determine the significance of the mean scores for resting heart rate. Post hoc analysis was made by using LSD test when obtained F value was significant. The level of significance was fixed at 0.05 level. It was concluded that secondary school athletes who involved in weight training exercises and without weight training exercises were significantly reduced the resting heart rate. The WTG group was reduced more resting heart rate in when compared with WWTG group. The study suggests that include these exercises in school curriculum for better health and wellness and it will help to academic and health perspective.

Index Terms - Strength Training, Weight Training, Without Weight Training, Secondary School Athletes, Resting Heart Rate

I. INTRODUCTION

Sports scientists, physiologists, sports training experts and physical educationists have been devising different means and methods to develop abilities and capacities of sports person. On the basis of various experiments, new methods have been designed to develop physical abilities and physiological changes of the athletes. The basic components of physical fitness endurance, speed, strength and flexibility can be developed through different training methods. Weight training is one doing exercise, using resistance (normally weights) to build muscle strength and endurance. In weight training one can use weights or simply one's own body weight as resistance. The trainer should have knowledge of the predominant types of muscular activity associated with the particular event, the movement pattern involved and the type of strength requir3d. Exercises should be identified that will produce the desired development. Although specificity is important, it is necessary in every schedule to include exercises of a general nature that is power clean, bench press, back squats, sit ups, shoulder press, chest press, etc.

Heart rate is the number of times the heart beats per minute. Studies have shown that the efficiency of the heart can be judge through heart rate both at rest and during exercises. Herat rate is markedly decreased as a result of physical exercises particularly endurance training. Highly conditioned endurance athletes usually have resting heart rate lower than 40 beats / minutes. Normally after finishing the exercises our heart rate does not come d9wn immediately rather it takes sometime to return to its resting rate. But due to aerobic physical exercise programme recovery process fasters. Heart rate recovery period is the time, which we take to return heart rate t normal level.

II. PURPOSE OF THE STUDY

The purpose of the study is to determine the effect of strength training programs (weight training and without weight training) on Resting Heart Rate of school athletes.

III. STATEMENT OF HYPOTHESIS

It is hypothesized that there would be a significant difference in the Resting Heart Rate of experimental groups by weight training and without weight training.

IV. METHODOLOGY

The aim of research is to determine the effect of varied weight training programmes on resting heart rate of secondary school athletes. 45 subjects were randomly assigned to three equal groups of 15 subjects and they were secondary school athletes who were studying in Govt. High Schools of Vidyanagara and Bettahalasuru, Bangalore, Karnataka, India. Three groups were

assigned into Experimental Group-I (WTG) acted as Weight Training Group; Experimental Group-II (WWTG) acted as Without Weight Training Group and Group-III (CG) acted as control group. The Pre test scores were conducted for all the subjects on Resting Heart Rate collected by administering Heart Rate Monitor (Omron) in bpm. Experimental groups like Group-I practiced exercises with weight and Group-II practiced without weight exercises for a period of 12 weeks. The post test mean scores were collected on said criterion variable that is resting heart rate after the treatments. The difference between pre and post mean scores on resting heart rate was considered as the effect of experimental treatments. Analysis of Variance and Analysis of Covariance were used to determine the significance of the mean scores for resting heart rate. Post hoc analysis was made by using LSD test when obtained F value was significant. The level of significance was fixed at 0.05 level.

V. ANALYSIS OF THE DATA

The findings pertaining to analysis of covariance between experimental groups and control group on Resting Heart Rate of school athletes for pre, post adjusted post tests scores respectively.

Table-1. ANCOVA for the pre-test and post-test data on Resting Heart Rate (In bpm.) of Weight Training Group (WTG), Without Weight Training Group (WWTG) and Control Group (CG).

Tests		CG	WTG	WWTG	SV	df	Sum of square	Means square	'F' ratio
Pre-test	Mean	86.266	90.133	81.733	B	2	530.311	265.156	1.96^{NS}
	S.D.	9.742	12.523	12.400	W	42	5677.600	135.181	
Post-test	Mean	87.666	73.533	69.733	B	2	2678.978	1339.489	15.87*
	S.D.	8.541	10.147	8.795	W	42	3546.000	84.429	
Adjusted Post-test	Mean	87.554	71.466	71.913	B	2	2518.314	1259.157	24.65*
					W	41	2094.015	51.074	

Note: SV: Source of Variance; B-Between Groups; W- Within Groups; S.D.: Standard Deviation

Table value at 0.05(df-2, 42/41)=3.23

*Significant at 0.05 level; ^{NS}Not Significant

The above table shows the pre-test mean values of Resting heart rate of CG, WTG and WWTG are 86.266, 90.133 and 81.733 and standard deviations are 9.742, 12.523 and 12.400 respectively. The obtained 'F' ratio of 1.96 for pre-test mean of resting heart rate is less than the table value 3.23 for df 2 and 42 required for significance at 0.05 level. This indicates insignificant difference in the pre test scores of resting heart rate among the groups.

The above table also shows post-test mean values of Resting Heart Rate of CG, WTG and WWTG are 87.666, 73.533 and 69.733 and standard deviation are 8.541, 10.147 and 8.795 respectively. The obtained 'F' ratio of 15.87 on post-test mean of resting heart rate is greater than the table value 3.23 for df 2 and 42 required for significance at 0.05 level.

Further, the above table shows the mean value of Resting heart rate of CG, WTG and WWTG are 87.554, 71.466 and 71.913 respectively. The obtained 'F' ratio of 24.65 on adjusted post-test mean scores of Resting Heart Rate is greater than the table value 3.23 for df 2 and 41 required for significance at 0.05 level. This indicated that there was a significant difference in adjusted mean scores of Resting Heart Rate of secondary school athletes. Since significant F ratio was obtained, the result related to Resting Heart Rate is further subjected to post hoc analysis by using LSD test and results presented in Table-2.

Table-2. LSD Post Hoc Analysis Results on Resting Heart Rate (In bpm.) of secondary school athletes among control and experimental groups (CG, WTG and WWTG).

Adjusted post-test mean scores of Resting Heart Rate			Mean Difference	Critical Difference
CG	WTG	WWTG		
87.554	71.466	×	16.088*	5.632
×	71.466	71.913	0.447^{NS}	
87.554	×	71.913	15.641*	

*Significant at 0.05 of confidence.

The table-2 shows that the adjusted post-test mean difference on Resting Heart Rate between CG & WTG and CG & WWTG groups are 16.088 and 15.641 respectively which are higher than the critical difference of 5.632 at 0.05 level of confidence. The finding concludes that there was significant difference on Resting Heart Rate of school athletes between CG and WTG; and CG & WWTG and the mean difference on resting heart rate between WTG and WWTG groups is 0.447 which is less than the critical difference of 5.632 at 0.05 level of confidence. The

The finding concludes that there was significant difference on Resting Heart Rate of school athletes between CG & WTG; and CG & FWTG and insignificant difference exists between WTG & FWTG groups. The weight training and without weight training had reduced resting heart rate. The both experimental groups did not differ in developing explosive power among school athletes. The comparison of pre, post and adjusted post-test mean scores of Resting Heart Rate of school athletes among control and experimental groups are graphically depicted in Fig.1.

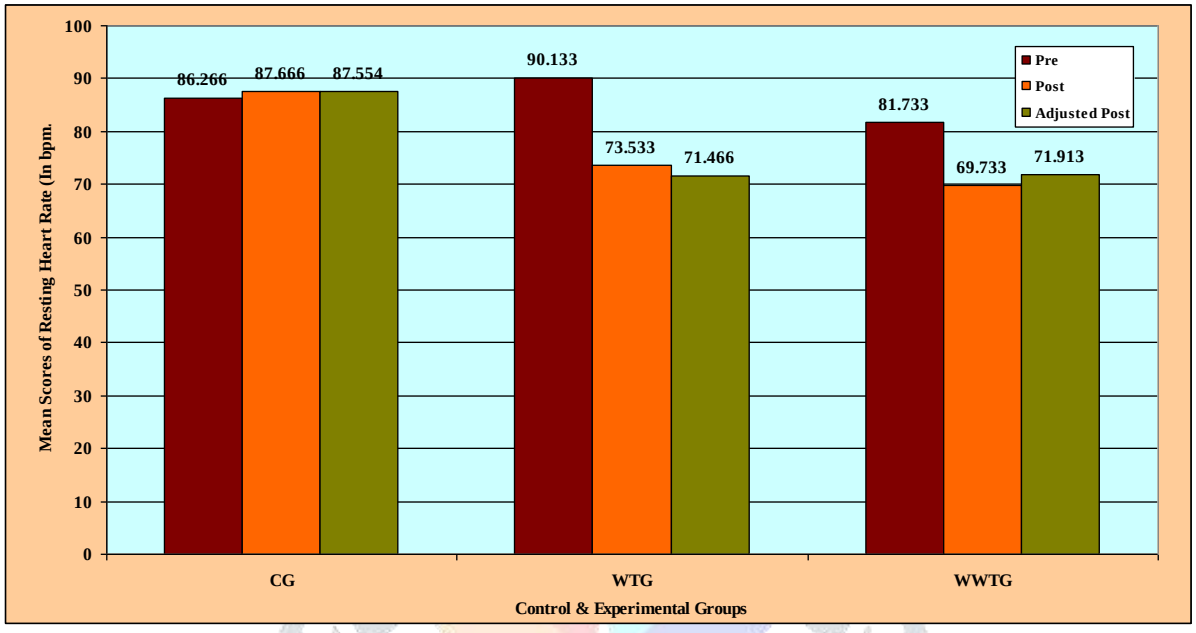

Fig.1: Bar diagram of Pre, Post and Adjusted Post-test Mean scores on Resting Heart Rate among control and experimental groups.

VI. DISCUSSIONS ON FINDINGS

The finding of the study shows that there exists significant difference in the Resting Heart Rate of experimental groups by practicing of exercises with weight training and without weight training. The results pertaining to Resting Heart Rate between pre and post (12 weeks duration) tests mean scores have been found significantly higher in experimental groups when compared to control group. The with weight training and without weight training programmes are most appropriate for developing resting heart rate. This is possible because due to regular practice of exercises of bench press, half squad, biceps curl, quadrants extension, abdominal curl, lunges, half squad with weight and without weight exercises of floor push ups, sit ups, chin ups, vertical jump, calf raises for 12 weeks. The supportive results found by studies by Lakshmikrishnan and Sivakumar (2014) and Gopinath (2000) found significant improvement in Resting heart rate after the strength training programme.

VII. CONCLUSION

It was concluded that with weight training and without weight training had reduced resting heart rate among school athletes. Both weight training programs are decreased the resting heart rate among school athletes.

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