Effect of Twelve Weeks conditioning training on Body Composition of Tribal Students of West Bengal

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ABSTRACT

The purpose of this study was to search the effect of regularly conditioning training program on body composition of tribal students of Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, West Bengal, India. 21 male students who resided in hostel of the institute were selected for the study and their age ranged between 17 to 21 years. Subjects' body mass index (BMI), skin fold thickness (SFT), body fat percentage (PBF), diameter-circumference (cm) values were measured as being the 1st measurement was done before the program, the 2nd measurement after the end of 5th week and the 3rd measure after the end of 10th week. SPSS-16 packet software was used to process the data obtained from the measurements. To indentify the relevance among three average measurements; Repeated Measure ANOVA/Benferroni test was applied and level of significance was chosen as 0.05 and 0.01.

Keywords: Conditioning training, Anthropometry, Body Composition.

Abbreviation: BMI, STF, PBF.

1. INTRODUCTION

It is stated that involvement of children in sport fields is significant in building a healthy and productive society. Doing exercises regularly accelerates the metabolism and thus prevents metabolic diseases and diseases related to other systems. Besides benefits for physical development, regular exercise also controls releasing of the hormones and their balance. In most of the developing and developed countries, people start sports at an early age. and training programs based on science are applied according to age groups and developmental characteristics (Fox, Bowers and Foss. 1988). Sports activities that a child does during pre-puberty and post-puberty period not only assists in building a healthy physical structure but also plays an important role in delaying deteriorations in physical structure at young ages. As is known, human body has an unstable system during childhood stage when the development is in the fastest way. In this stage, if the child eats healthily, does exercises regularly, has enough sleep, is involved in activities which increase flexibility, coordination, endurance and strength; growth and development happens sufficiently and genetically owned physical structure is achieved **(**Barrow and Harold. 1991) . Human body is quite skilled at increasing subcutaneous and depot adipose tissues. Body fat increases if the daily energy value taken from the food is more than the amount that the body needs. (e.g.: 3500 k.kal is equal to about 0.5 kg body fat (Ghosh. 2008)**.** To have more than enough body fat is an unnecessary and additional weight burden for the body and it affects body mechanics and poses risk factors for various diseases (Ghosh 2012). Flexibility, velocity, strength, muscular endurance, cardiovascular endurance, coordination, body structure and composition which are all needed for aerobic and anaerobic efforts play a significant role in increasing performance. In this

respect, it is stated that regularly conducted exercises increase physical and functional capacities in children (Mc. Ardle. Katch and Katch. 1991).

2. MATERIAL AND METHOD

2.1 Subject Selection:

21 male students who resided in hostel of Seva Bharati Mahavidyalaya, Kapgari, Paschim Medinipur, West Bengal, India were randomly selected for this study. The purpose of selecting the residential students was because they could be easily controlled and were easily available for the training program. The health standard was also checked by consulting a doctor. The age limits of the selected subjects ranged between 17 to 21 years.

2.2 Procedure:

All measurements of volunteer participants were taken in a comfortable position by a test controller, at the same hour every time at 8:00 a.m and the measurements were taken three times in total, the 1st measure being before the training program, the 2nd measure after the end of 6th week and the 3rd measure after the end of 10 weeks. Body mass index (kg/ m^2), skin fold thickness (mm), body fat percentage (%), diameter-circumference (cm) measurements were taken and recorded. The subjects were thoroughly explained about the purpose and importance of the study and that was why they took part in the training as well as testing procedure with motivation and eagerness. Participants used their maximum capacity in the tests and measurements procedure. The participants were given conditioning training 45 minutes in two shifts that was in the morning and in the evening in a day and 5 days in a week over the course of 10 weeks.

2.3 Measurements

Body Mass Index: Body mass index was calculated (kg/m^2) by dividing body weight value (kg) by square meter of body height measurement value (Kansal 2008).

Skinfold Measurement (Subcutaneous Adipose tissue thickness)*:* In order to find out the percentage of body fat, a Holtain skinfold calliper which provides a constant pressure of 10 g/sq. mm was used. Measurements were taken on the right side while subject was standing and from six standard regions of the body: Biceps, Triceps, Abdomen, Suprailliac, Quadriceps Femoris and Subscapula. Measurements were repeated until the same values were taken twice (Kansal 2008).

Body Fat Percentage: In order to calculate body fat index, the formula below was used. Body Fat Percentage (%) = (sum of 6 measurements (0.097) + 3.64) **(**Kansal 2008).

Circumference Measurements: Shoulder circumference, abdominal circumference, Hip circumference, Biceps extension circumference, Biceps circumference were taken through a steel tape and were recorded (Kansal 2008).

Statistical Analysis: SPSS-16 packaged software was used to process the data obtained from the measurements. Repeated Measure ANOVA/Benferroni test was applied to search the relationship between averages of three measurements and the level of significance was chosen to be 0.05 and 0.01.

3. FINDINGS

In our study. body mass index (BMI) between first measurememt 18.34 ± 2.53 (kg/m^2) second measurememt 19.04 ± 2.47 (kg/m^2) and third measurement 18.62 ± 2.24 (kg/m^2) were statistically significant ($p < 0.01$).

In the values of experimental group's biceps SFT first measurement 5.38 ± 1.53 (mm). second measurement 5.17 ± 1.39 (mm). third measurement 4.97 ± 1.27 (mm) no statistically significant difference observed between them ($p > 0.05$). Triceps SFT first measurement 9.60 ± 2.92 (mm) second measurement 9.42 ± 3.08 (mm) third measurement 8.90 ± 2.96 (mm) were statistically

significant difference observed between them (p<0.05). Suprailliac SFT first measurement 7.73 ± 5.06 (mm) second measurement 8.40 ± 5.60 (mm) third measurement 8.23 ± 5.54 (mm) were statistically significant difference observed between them (p<0.05). Abdomen SFT first measurement 11.78 ± 5.83 (mm) second measurement 10.92 ± 5.47 (mm) third measurement 10.38 ± 5.34 (mm) were statistically significant difference observed between them (p<0.05). Subscapula SFT first measurement 8.21 ± 4.41 (mm) second measurement 7.95 ± 4.15 (mm) third measurement 7.66 ±3.85 (mm) were no statistically significant difference between them (p>0.05). Leg SFT first measurement 15.92 ± 4.79 (mm) second measurement 15.45 ± 5.17 (mm) third measurement 14.57 ± 5.00 (mm) were statistically significant difference observed between them (p<0.05). PBF first measurement 9.33 ± 2.11 (%) second measurement 9.20 ± 1.99 (%) third measurement 8.94 ± 1.92 (%)were statistically significant difference observed between them (p<0.01). Shoulder circumference first measurement 86.78 ± 6.42 (cm) second measurement 86.73 ± 6.44 (cm) third measurement 87.09± 6.56 (cm) were no statistically significant difference between them (p>0.05). Abdomen circumference first measurement 65.85 ± 7.03 (cm) second measurement 67.04 ± 7.06 (cm) third measurement 66.85 ± 8.53 (cm) were no statisticially significant difference between them (p>0.05). Hip circumference first measurement 82.85 ± 7.23 (cm) second measurement 82.40 ± 6.65 (cm) third measurement 81.54 ± 6.71 (cm) no statisticially significant difference between them(p>0.05). Quardicep Femoris circumference first measurement 42.45 ± 4.93 (cm) second measurement 43.33 ± 4.56 (cm) third measurement 43.64 ± 4.31 (cm) were statistically significant difference observed between them (p<0.01). Flexed biceps circumference first measurement 21.33 ± 2.46 (cm) second measurement 21.64 ± 2.67 (cm) third measurement 21.57 ± 2.59 (cm) were no statisticially significant difference between them (p>0.05). Extension biceps circumference first measurement 20.09 ± 2.23 (cm) second measurement 20.38 ± 2.30 (cm) third measurement 20.64 ± 2.15 (cm) were statistically significant difference observed between them (p<0.05).

Table 1
The Experimental Group Comparison of Anthropometric

Variables	Measurements	XX/SS	F	P
Body Mass Index (kg/m^2)	1.Measurement	18.34±2.53	6.59	0.003**
	2.Measurement	19.04±2.47		
	3.Measurement	18.62±2.24		

* P<0.05 * * P<0.01

Body mass index between first measurememt 18.34±2.53 (kg/m^2) second measurememt 19.04±2.47 (kg/m^2) and third measurement 18.62±2.24 (kg/m^2) were statistically significant (p <0.01).

Table 2
The Experimental Group Skinfold and Diameter Measurement Comparison of Means

Variables	Measurements	XX/SS	F	P
Biceps *SFT* (mm)	1.Measurement	5.38±1.53	2.20	0.124
	2.Measurement	5.17±1.39		
	3.Measurement	4.97±1.27		
Triceps *SFT* (mm)	1.Measurement	9.60±2.92	3.29	0.047*
	2.Measurement	9.42±3.08		
	3.Measurement	8.90±2.96		
Suprailliac *SFT* (mm)	1.Measurement	7.73±5.06	3.51	0.039*
	2.Measurement	8.40±5.60		
	3.Measurement	8.23±5.54		
Abdomen *SFT* (mm)	1.Measurement	11.78±5.83	4.47	0.018*
	2.Measurement	10.92±5.47		
	3.Measurement	10.38±5.34		
Subscapula *SFT* (mm)	1.Measurement	8.21±4.41	2.40	0.10
	2.Measurement	7.95±4.15		
	3.Measurement	7.66±3.85		
Q.Femoris *SFT* (mm)	1.Measurement	15.92±4.79	3.66	0.034*
	2.Measurement	15.45±5.17		
	3.Measurement	14.57±5.00		
PBF (%)	1.Measurement	9.33±2.11	6.70	0.003**
	2.Measurement	9.20±1.99		
	3.Measurement	8.94±1.92		
Shoulder Circumference (cm)	1.Measurement	86.78±6.42	1.21	0.309
	2.Measurement	86.73±6.44		
	3.Measurement	87.09±6.56		
Abdominal Circumference (cm)	1.Measurement	65.85±7.03	1.78	0.180
	2.Measurement	67.04±7.06		
	3.Measurement	66.85±8.53		
Hip Circumference (cm)	1.Measurement	82.85±7.23	2.88	0.067
	2.Measurement	82.40±6.65		

	3.Measurement	81.54±6.71		
Q.Femoris Circumference (cm)	1.Measurement	42.45±4.93	6.08	0.005**
	2.Measurement	43.33±4.56		
	3.Measurement	43.64±4.31		
Flexed Biceps Circumference (cm)	1.Measurement	21.33±2.46	1.15	0.325
	2.Measurement	21.64±2.67		
	3.Measurement	21.57±2.59		
Extencion Biceps Circumference (cm)	1.Measurement	20.09±2.23	4.84	0.013*
	2.Measurement	20.38±2.30		
	3.Measurement	20.64±2.15		

*** P<0.05 * * P<0.01**

4. DISCUSSION

It was observed that the body mass index (BMI) parameters was found statistically significant (p<0.01) (Table 1). Among the average measurements of body fat percentage (PBF %) and Quadriceps Femoris circumference parameters significant difference were observed between measurements (p<0.01). In addition, at (p<0.05) level of significance was observed between the average measurements of Triceps STF, Suprailliac STF, Abdomen STF, Quadriceps Femoris STF, Biceps Extension Circumference parameters. Between the average measurements of Biceps STF, Subscapula STF, Shoulder circumference, Abdominal circumference, Hip circumference, Biceps Flexion Circumference parameters, no statistically significant difference was found (p>0.05) (Table 2).
In the research, while an increase between 1st and 2nd measurements of body weight and body mass index values was observed, a decrease between 2nd and 3rd measurements was identified. The reason of this, would be because of an increase in the muscle mass and a possible decrease in body fat percentage which occurred afterwards.

The results of the research, conducted on 36 children in total with mean age 12 and 14, in which Roemmich (1996) observed a significant increase in body weight (7) and the results of the research in which Raudsepp (1997) determined a p<0.05 level of significant difference as a result of football training given to children with mean age 10-14 show similarities with the findings we obtained in our research.

A decrease in body mass can be achieved in two ways. One of them is the decrease in subcutaneous adipose tissue after doing exercises. This situation mostly happens as a result of trainings requiring aerobic energy. The second one is the pushing of the increase in muscle mass in skinfold where the adipose is more flexible. This situation mostly results from core trainings.

In our research, at (p<0.01) level of statistical significance was determined between the averages of body fat percentage (%) measurements of the experiment group. In addition, at (p<0.05) level of statistical significance was determined among the averages of Triceps SFT, Suprailliac SFT, Abdomen SFT, Leg SFT, Biceps flexion circumference parameters measurements.

The results of the research in which Roemmich et al. (1996) found that body fat percentage of cadet wrestlers. decreased to 7.05 (%). which was 7.54 (%) in person; the results of the research in

which France (1987) found that the body fat percentage of 38 improving American wrestlers with mean age 15.3 was % 10.4; the result of the research conducted by Gorely et al. (2009)on 589 children aged 7-11 who are doing activities. in which they found significant differences in body fat percentage parameters; the results of the research. conducted by Roudsepp and Jurimae (1997). in which they found statistically significant differences between adipose tissue, physical activity and fitness in pre-pubertal girls support the study we conducted. The findings we obtained, in the light of the information that physical activities done with aerobic-intensity at least two times in a day have a positive impact on body composition.

As a result, it is possible to state that regularly conditioning trainings have a positive impact on the body composition parameters of any youth in general and tribals in specific.

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