



## Influence of Varied Training Capsules on Selected Physical Physiological Parameters and Anthropometric Measurements among College Level Women Kabaddi Players

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### ABSTRACT

Tabata training has a wide range of benefits for fitness and health that make it a great form of exercise. Tabata can also be incorporated into group personal training. Tabata has become a household name in the fitness industry. Whether are into Cross Fit, spinning, running, cycling, home workouts, or other various fitness boot camps, if likely heard of High-Intensity Interval Training (HIIT). Certainly, the most famous HIIT protocol is none other than tabata. Increased metabolism (Tabata after-burn effect on fat), tabata anywhere, it's only four minutes, no equipment needed, we do anything for 20 seconds at a time. The purpose of the study will find out the influence of varied training capsules on selected physical physiological parameters and anthropometric measurements among college level women kabaddi players. This study has been restricted to 30 kabaddi players in AVP College and 30 kabaddi players in St. Joseph's College, Tirupur. The Selected subject's age group from 18 to 25. Only the selected physical physiological and anthropometric variables were chosen for this study. The training duration of the experimental period will be twelve weeks. The tabata, circuit and resistance training programme lasted for a session in the morning between 6.30 and 7.30 a.m. for every day in a week. The same continued for twelve weeks. Attendance was taken before the commencement of each training session. All the training groups have undergone proper warm-up before the training programme and cooling down after the training programme exercises before and after training programme. The collected data were statistically analyzed with dependent "t" test to discover the significant development between pre and post test means of all groups. Analysis of co-variance (ANCOVA) was applied to decide whether the programmes of training shaped important improvements in selected variables after twelve weeks of training. Since the initial means were not coordinated, comparisons between actual could not be made, all means were familiar by failure to a common mean. The significant difference of paired adjusted final group means was tested for significance by applying Scheffe's post hoc test. The results of the study that there was a significant difference between pre and post test of agility, VO<sub>2</sub> Max and thigh circumference of college level women Kabaddi players.

**Keyword:** tabata, circuit and resistance training, speed and thigh circumference

### Introduction

Tabata training was discovered by **Japanese scientist Dr. Izumi Tabata** and a team of researchers from the national institute of fitness and sports in Tokyo. Tabata and his team conducted research on two groups of athletes. The first group trained at a moderate intensity level while the second group trained at a high-intensity level. The moderate-intensity group worked out five days a week for a total of six weeks; each workout lasted one hour. The high-intensity group worked out four days a week for six weeks; each workout lasted four minutes and 20 seconds (with 10 seconds of rest in between each set). The results, group 1 had increased their aerobic system (cardiovascular) but showed little or no results for their anaerobic system. Group 2 showed much more increase in their aerobic system than group 1 and increased their anaerobic system by 28 percent. In conclusion, high-intensity interval training has more impact on both the aerobic and anaerobic systems.

### Methodology

The purpose of the study will find out the influence of varied training capsules on selected physical, physiological and anthropometric variables among college level women kabaddi players. This study has been restricted to 30 kabaddi players in AVP College and 30 kabaddi players in St. Joseph's College, Tirupur. The Selected subject's age group from 18 to 25. Only the selected physical, physiological and anthropometric variables were chosen for this study. The training duration of the experimental period will be twelve weeks. The tabata, circuit and resistance training programme lasted for a session in the morning between 6.30 and 7.30 a.m. for every day in a week. The same continued for twelve weeks. Attendance was taken before the

commencement of each training session. All the training groups have undergone proper warm-up before the training programme and cooling down after the training programme exercises before and after training programme.

## Results and Discussion

The collected data were statistically analyzed with dependent “t” test to discover the significant development between pre and post test means of all groups. Analysis of co-variance (ANCOVA) was applied to decide whether the programmes of training shaped important improvements in selected variables after twelve weeks of training. Since the initial means were not coordinated, comparisons between actual could not be made, all means were familiar by failure to a common mean. The significant difference of paired adjusted final group means was tested for significance by applying Scheffe’s post hoc test.

**TABLE-1**

### ANALYSIS OF COVARIANCE AMONG TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON AGILITY

	Tabata training group	Circuit training group	Resistance training group	Control group	Source of Variance	Sum of square	Degrees of freedom	Mean square	F-value
Pre test mean	0.167	0.166	0.167	0.166	Between	0.000	3	0.000	1.08
					Within	0.000	56	0.000	
Post test mean	0.152	0.156	0.146	0.166	Between	0.003	2	0.01	3.07*
					Within	0.019	56	0.000	
Adjusted post mean	0.152	0.158	0.145	0.168	Between	0.004	3	0.002	4.42*
					Within	0.017	55	0.001	

*\*Required table value at 0.05 level of significant with degrees of freedom 3 and 56 is 2.77 and degrees of freedom 3 and 55 is 2.77.*

Table -1 shows the obtained ‘F’ values on pre test, post test and adjusted post test means on agility of tabata training group, circuit training group, resistance training group and control group. The pre test means on agility were 0.167, 0.166, 0.167 and 0.166 respectively. The ‘F’ value observed for the pre test on agility was 1.08. It fails to reach the table value of 2.77 for degrees of freedom 3 and 56 at 0.05 level of confidence. Based on the results it was confirmed that the mean differences among the groups of tabata training group, circuit training group, resistance training group and control group on agility before the start of the respective treatments were found to be insignificant.

The post test means on agility of tabata training group, circuit training group, resistance training group and control group were 0.152, 0.156, 0.146 and 0.166 respectively. The ‘F’ value observed for the post test on agility was 3.07. It was greater than the table value of 2.77 for degrees of freedom 3 and 56 at 0.05 level of confidence. Thus, the results obtained proved that the training on agility produced significant improvement among the experimental groups.

The adjusted post test means on agility test tabata training group, circuit training group, resistance training group and control group were 0.152, 0.158, 0.145 and 0.168 respectively. The ‘F’ value observed for the adjusted post test means on agility was 13.81. It was greater than the table value of 2.77 for degrees of freedom 3 and 55 at 0.05 level of confidence. The observed F- value on adjusted post test means among the groups on agility was highly significant as the value was higher than required table value of 4.42. Thus the results obtained proved that the training on agility test produced significant improvements among the experimental groups. Since significant differences were recorded, the scores were further subjected to statistical treatment using Scheffe’s post hoc test and the results were presented in the table -2

**FIGURE -1**

### BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEAN VALUES OF TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON AGILITY

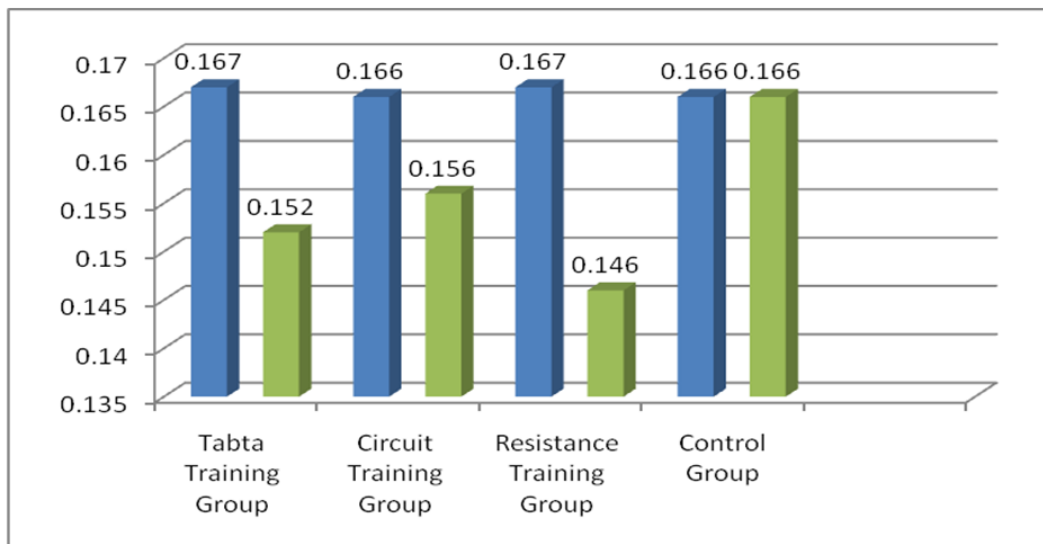


TABLE – 2

BAR DIAGRAM SHOWING THE SCHEFFE’S POST HOC TEST MEAN VALUES OF TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON AGILITY

Tabata training group	Circuit training group	Resistance training group	Control group	M.D	C.I
0.152	0.158	-	-	0.006	0.10
0.152	-	0.145	-	0.007	
0.152	-	-	0.168	0.016*	
-	0.158	0.145	-	0.013*	
-	0.158	-	0.168	0.01	
-	-	0.145	0.168	0.023*	

Table – 2 revealed that the mean differences between the paired adjusted post test means of all groups. The mean difference between tabata training group and control group and between circuit training group and resistance training group and between resistance training group and control group were 0.016, 0.013 and 0.023 respectively. The values of mean difference of adjusted post test means were higher than the required confidence interval value of 0.10 and it was found to be significant.

Thus, the mean differences of paired adjusted post test mean between tabata training group and circuit training group and between tabata training group and resistance training group and between tabata training group and control group were 0.006, 0.007 and 0.01 lesser than the required confidence interval value of 0.10 it was found to be not significant at 0.05 level of confidence. From these results it was inferred that tabata training group produced significant improvement on agility better than the other training groups of circuit training group, resistance training group and control group. Further, twelve weeks of resistance training group significantly improved agility when compared with tabata training group, circuit training group and control group.

The adjusted post test mean values of experimental group and control group on agility were given in graphical representation in figure –2.

FIGURE – 2

BAR DIAGRAM SHOWING THE SCHEFFE’S POST HOC TEST MEAN VALUES OF TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON AGILITY

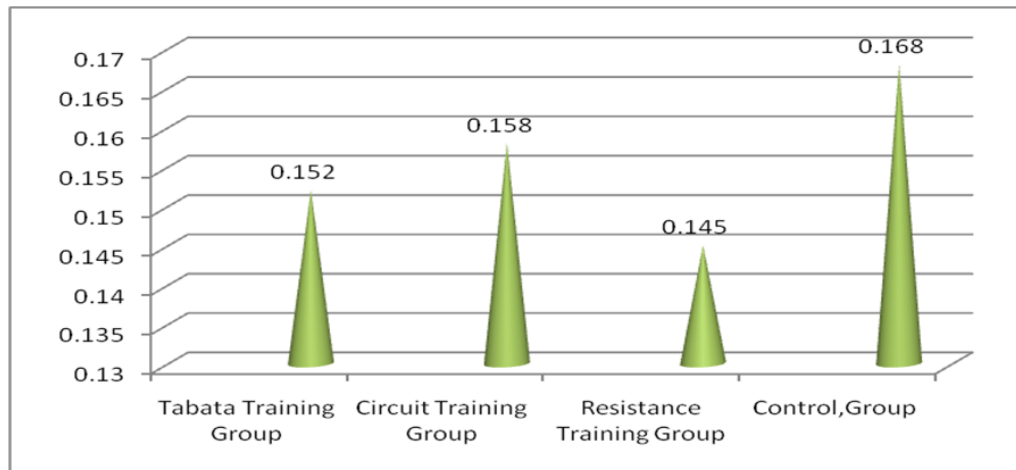


TABLE - 3

**ANALYSIS OF COVARIANCE AMONG TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON VO<sub>2</sub> MAX**

	Tabata training group	Circuit training group	Resistance training group	Control group	Source of Variance	Sum of square	Degrees of freedom	Mean square	F-value
Pre test mean	49.28	49.29	49.40	49.36	Between	.155	3	.052	0.003
					Within	1149.68	56	20.530	
Post test mean	56.09	54.21	55.81	49.64	Between	399.927	2	133.309	5.12*
					Within	1456.921	56	26.016	
Adjusted post mean	56.14	54.25	55.74	49.61	Between	404.294	3	134.765	24.91*
					Within	297.450	55	5.408	

Table -3 shows the obtained 'F' values on pre test, post test and adjusted post test means on VO<sub>2</sub>Max of tabata training group, circuit training group, resistance training group and control group.

The pre test means on VO<sub>2</sub>Max were 49.28, 49.29, 49.40 and 49.36 respectively. The 'F' value observed for the pre test on VO<sub>2</sub>Max was 0.003. It fails to reach the table value of 2.77 for degrees of freedom 3 and 56 at 0.05 level of confidence. Based on the results it was confirmed that the mean differences among the groups of tabata training group, circuit training group, resistance training group and control group on VO<sub>2</sub>Max before the start of the respective treatments were found to be insignificant.

The post test means on VO<sub>2</sub>Max of tabata training group, circuit training group, resistance training group and control group were 56.09, 54.21, 55.81 and 49.64 respectively. The 'F' value observed for the post test on VO<sub>2</sub>Max was 6.12. It was greater than the table value of 2.77 for degrees of freedom 3 and 56 at 0.05 level of confidence. Thus the results obtained proved that the training on VO<sub>2</sub>Max produced significant improvement among the experimental groups.

The adjusted post test means on VO<sub>2</sub>Max test of tabata training group, circuit training group, resistance training group and control group were 56.14, 54.25, 55.74 and 49.61 respectively. The 'F' value observed for the adjusted post test means on VO<sub>2</sub>Max was 25.91. It was greater than the table value of 2.77 for degrees of freedom 3 and 55 at 0.05 level of confidence.

The observed F- value on adjusted post test means among the groups on VO<sub>2</sub>Max was highly significant as the value was higher than required table value of 2.77. Thus the results obtained proved that the training on VO<sub>2</sub>Max test produced significant improvements among the experimental groups. Since significant differences were recorded, the scores were further subjected to statistical treatment using Scheffe's post hoc test and the results were presented in the table -4

FIGURE -4

**BAR DIAGRAM SHOWING THE SCHEFFE'S POST HOC TEST MEAN VALUES OF TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON**

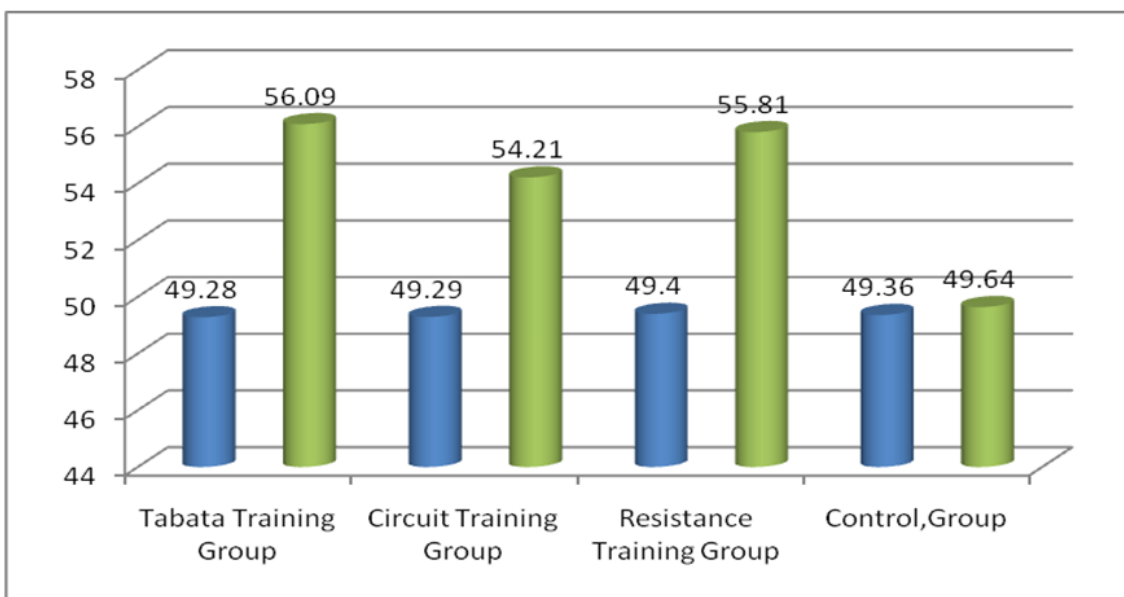


TABLE – 4

THE SCHEFEE'S POST HOC TEST ON VO<sub>2</sub> MAX

Tabata training group	Circuit training group	Resistance training group	Control group	M.D	C.I
56.149	54.252	-	-	1.89	2.41
56.149	-	55.749	-	0.4	
56.149	-	-	49.615	6.53*	
-	54.252	55.749	-	1.49*	
-	54.252	-	49.615	4.63*	
-	-	55.749	49.615	6.13*	

Table - 4 revealed that the mean differences between the paired adjusted post test means of all groups. The mean difference between tabata training group and control group and between circuit training group and control group and between resistance training group and control group were 6.53, 4.63 and 6.13 respectively. The values of mean difference of adjusted post test means were higher than the required confidence interval value of 2.41 and it was found to be significant.

Thus, the mean differences of paired adjusted post test means between tabata training group and circuit training group and between tabata training group and resistance training group and between circuit training group and resistance training were 1.89, 0.4 and 1.49 lesser than the required confidence interval value of 2.41, it was found to not significant at 0.05 level of confidence. From these results it was inferred that tabata training group and resistance training group produced significant improvement on VO<sub>2</sub>Max of than the other training groups of circuit training group and control group.

Further, twelve weeks of tabata training group significantly improved VO<sub>2</sub> Max when compared with resistance training group, circuit training group and control group.

The adjusted post test mean values of experimental group and control group on VO<sub>2</sub> Max were given in graphical representation in figure – 5

FIGURE – 5

BAR DIAGRAM SHOWING THE SCHEFFE'S POST HOC TEST MEAN VALUES OF TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON VO<sub>2</sub>Max

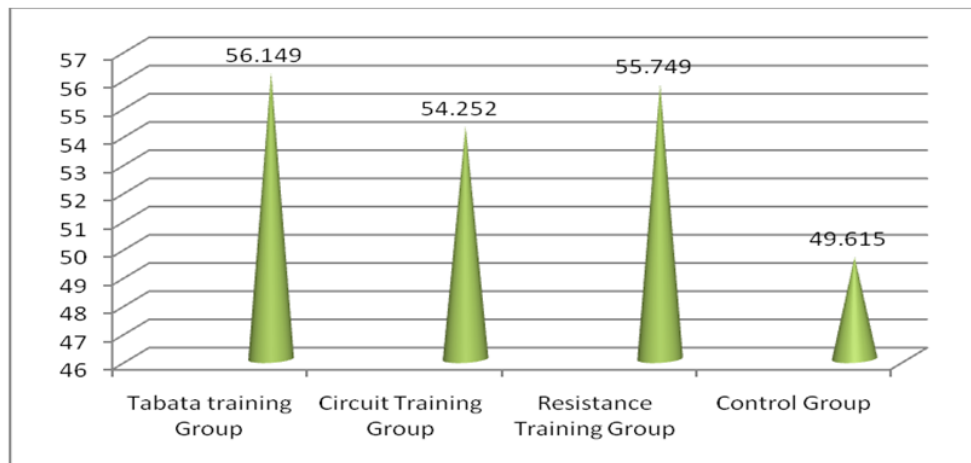


TABLE-5

**ANALYSIS OF COVARIANCE AMONG THE HIGH INTENSITY AERIBIC TRAINING GROUP LOW INTENSITY AEROBIC TRAINING GROUP AND CONTROL GROUP ON THIGH CIRCUMFERENCE**

	Tabata training group	Circuit training group	Resistance training group	Control group	Source of Variance	Sum of square	Degrees of freedom	Mean square	F-value
Pre test mean	26.53	23.91	24.91	26.30	Between	2.25	3	1.12	0.46
					Within	141.44	56	2.48	
Post test mean	23.91	22.91	28.31	25.01	Between	44.98	2	22.49	8.00*
					Within	160.22	56	2.81	
Adjusted post mean	23.91	22.93	25.29	25.03	Between	51.15	3	25.58	12.51*
					Within	114.53	55	2.04	

Table -5 shows the obtained 'F' values on pre test, post test and adjusted post test means on thigh circumference of tabata training group, circuit training group, resistance training group and control group.

The pre test means on thigh circumference were 26.53, 23.91, 24.91 and 26.30 respectively. The 'F' value observed for the pre test on thigh circumference was 0.046. It fails to reach the table value of 2.76 for degrees of freedom 3 and 56 at 0.05 level of confidence. Based on the results it was confirmed that the mean differences among the groups of tabata training group, circuit training group, resistance training group and control group on thigh circumference before the start of the respective treatments were found to be insignificant.

The post test means on thigh circumference of tabata training group, circuit training group, resistance training group and control group were 23.91, 22.91, 28.30 and 25.01 respectively. The 'F' value observed for the post test on thigh circumference was 8.00. It was greater than the table value of 2.76 for degrees of freedom 3 and 56 at 0.05 level of confidence. Thus the results obtained proved that the training on thigh circumference produced significant improvement among the experimental groups.

The adjusted post test means on thigh circumference test of tabata training group, circuit training group, resistance training group and control group were 23.91, 22.93, 25.29 and 25.03 respectively. The 'F' value observed for the adjusted post test means on thigh circumference was 12.51. It was greater than the table value of 2.76 for degrees of freedom 3 and 55 at 0.05 level of confidence. The observed F- value on adjusted post test means among the groups on thigh circumference was highly significant as the value was higher than required table value of 2.77. Thus the results obtained proved that the training on thigh circumference test produced significant improvements among the experimental groups.

Since significant differences were recorded, the scores were further subjected to statistical treatment using Scheffe's post hoc test and the results were presented in the table -6.

FIGURE - 4

**THE MEAN VALUES OF PRE TEST POST TEST AND ADJUSTED MEAN ON THIGH CIRCUMFERENCE OF TABATA TRAINING GROUP CIRCUIT TRAINING GROUP RESISTANCE TRAINING GROUP AND CONTROL GROUP**

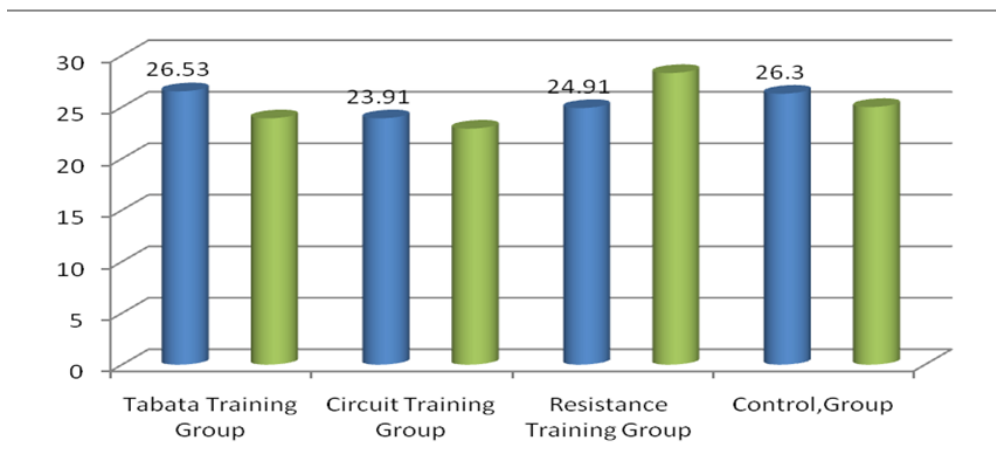


TABLE -6

BAR DIAGRAM SHOWONG THE SCHEFFE’S POST HOC TEST MEAN VALUES OF TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON THIGH CIRCUMFERENCE

Tabata training group	Circuit training group	Resistance training group	Control group	M.D	C.I
23.91	22.93	-	-	0.98	2.41
23.91	-	26.91	-	3.00*	
23.91	-	-	25.03	1.12	
-	22.93	26.91	-	3.98*	
-	22.93	-	25.03	2.1	
-	-	26.91	25.03	1.88	

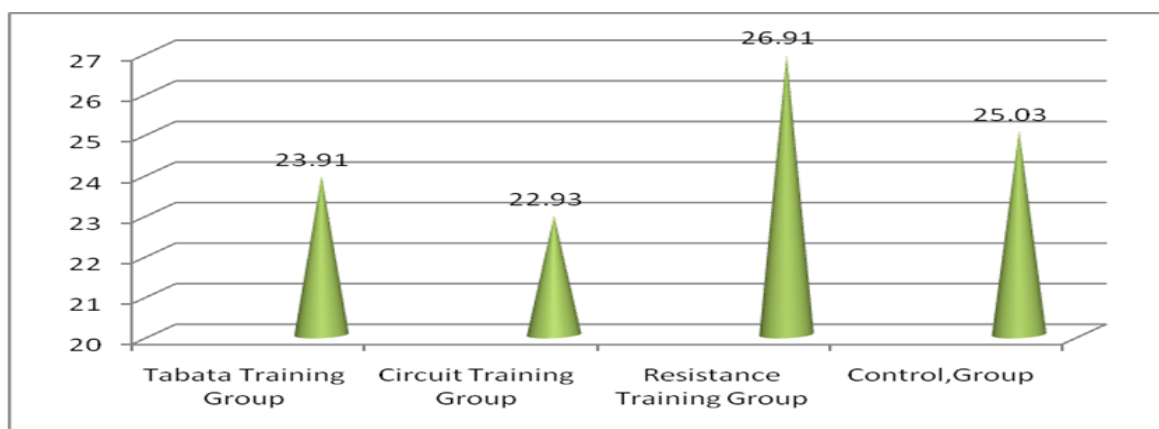
Table - 6 revealed that the mean differences between the paired adjusted post test means of all groups. The mean difference between tabata training group and resistance training group and between circuit training group and resistance training group 3.00 and 3.98 respectively. The values of mean difference of adjusted post test means were higher than the required confidence interval value of 2.41 and it was found to be significant.

Thus, the mean differences of paired adjusted post test means between tabata training group and circuit training group and between tabata training group and control group and between circuit training group and control and between resistance training group and control group were 0.98, 1.12, 2.1 and 1.88 lesser than the required confidence interval value of 2.41, it was found to not significant at 0.05 level of confidence.

From these results it was inferred that tabata training group and resistance training group produced significant improvement on thigh circumference of than the other training groups of circuit training group and control group. Further, twelve weeks of interval training group significantly improved thigh circumference when compared with resistance training group, circuit training group and control group. The adjusted post test mean values of experimental group and control group on thigh circumference were given in graphical representation in figure – 6

FIGURE – 6

BAR DIAGRAM SHOWONG THE SCHEFFE’S POST HOC TEST MEAN VALUES OF TABATA TRAINING GROUP, CIRCUIT TRAINING GROUP, RESISTANCE TRAINING GROUP AND CONTROL GROUP ON THIGH CIRCUMFERENCE



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## Conclusions

1. The tabata training group significantly improved the selected physical fitness, physiological and anthropometric variables among college level women kabaddi players.
2. The circuit training group significantly improved the selected physical fitness, physiological and anthropometric variables among college level women kabaddi players.
3. The resistance training group significantly improved the selected physical fitness, physiological and anthropometric variables among college level women kabaddi players.
3. From the findings of the study it was concluded that the tabata training group, circuit training group and resistance training group had better improvement than the control group in physical fitness variables of agility,  $\dot{V}O_2$  Max and thigh circumference among college level women kabaddi players.
4. From the findings of the study it was concluded that the tabata training group had better improvement than the resistance training group in thigh circumference among college level women kabaddi players.
4. From the findings of the study it was concluded that the game circuit training group had better improvement than the resistance training group in agility,  $\dot{V}O_2$  max and thigh circumference among college level women kabaddi players.

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## Recommendations

1. It is recommended that coaches and Physical Educators in the game of kabaddi should give due to include tabata training, resistance training and circuit training in their training schedules.
2. In the physical exercise, while designing the training programme the effect of varied training modalities is explained on positively on performance related components and specific skill variables of kabaddi players, the Physical Education Teachers and coaches can prefer this type of training so as to achieve aim in time.
3. It was also recommended that kabaddi team to reach any level should have knowledge training group to train the players for enhancing their performance.

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## Recommendations for future research

1. A similar study may be conducted on players of national kabaddi team to assess their level in the variables.
2. A similar study may be conducted for different games and sports.
3. A similar study may be conducted in greater details to assess chance on biochemical, hematological, physical fitness and skill performance variables.

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