CHAPTER - IV

RESULTS AND DISCUSSIONS

4.1. OVERVIEW

This chapter deals with the analysis of data collected from the samples understudy. The purpose of this study was to find out the effect of isolated asanas, recreational games and aerobic exercises with stretching on selected physical fitness, co-ordinative abilities and body composition variables of intellectually challenged persons. Forty intellectually challenged persons from therapy unit of Ramakrishna Mission Vivekananda University (RMVU) Faculty of Disability Management and Special Education, Periyanaickenpalayam, Coimbatore, Tamilnadu were randomly selected and they were assigned into four equal groups. Each group consists of ten subjects. Pretest was conducted for all the forty subjects on the selected physical fitness variables namely abdominal plus psoas strength, abdominal minus psoas strength, psoas and lower abdomen strength, upper back strength, lower back strength and hamstring muscles strength, flexibility and leg explosive power, co-ordinative abilities variables namely orientation ability and differentiation ability, body composition variables namely fat mass at right arm, fat mass at left arm, fat mass at trunk, fat mass at right leg, fat mass at left leg and body mass index was measured by tanita body composition monitor (BCM). This initial test scores formed as pretest scores of the subjects. Experimental group I was exposed to asanas training, experimental group II was exposed to recreational games training, experimental group III was exposed to aerobic exercises with stretching training and the control group was not exposed to any training other than their regular daily activities. The experimental period was 12 weeks. After the experimental period, all the subjects were measured on the selected physical fitness variables, co-ordinative abilities

variables and body composition variables. This final test scores formed as post test scores of the subjects. The pretest and post-test scores were subjected to statistical analysis by using paired 't' test and analysis of covariance (ANCOVA) to find out the significant improvement between pre and post tests and among the group mean differences and whenever the 'F' ratio for adjusted post-test was found to be significant then pair wise comparison among the groups was applied. In all cases 0.05 level of significance was fixed to test hypothesis.

4.2 TEST OF SIGNIFICANCE

This is the important portion of thesis achieving the conclusion by examining the hypotheses. The procedure of testing the hypotheses was either by accepting the hypotheses or rejecting the same in accordance with the results obtained in relation to the level of confidence.

The test was usually called the test of significance since we test whether the differences between three groups or within many groups' scores were significant or not. In this study, if the obtained 'p' values were lesser than the 0.05 value, the hypotheses were accepted to the effect that there existed significant differences among the means of the groups compared and if the obtained 'p' values were greater than the 0.05 values, then the hypotheses were rejected to the effect that there existed no significant differences among the means of the groups under study.

4.3 LEVEL OF SIGNIFICANCE

To ascertain the significant difference between the groups the level of confidence was set at 0.05 which was considered as adequate for the purpose of this study.

TABLE-XIX

COMPUTATION OF "t" RATIO BETWEEN THE PRE AND POST TESTS ON ASANAS TRAINING GROUP

Variables	Test	Mean	Standard Deviation	σ DM	DM	t	'p'
Abdominal Plus Psoas Strength	Pre	4.90	0.88	0.20	1.20	6.00*	0.01
	Post	6.10	0.88				
Abdominal Minus Psoas Strength	Pre	4.60	0.70	0.33	1.20	3.67*	0.01
	Post	5.80	1.23				
Psoas and Lower Abdomen Strength	Pre	4.50	1.43	0.27	1.50	5.58*	0.01
	Post	6.00	1.41				
Upper Back Strength	Pre	4.90	0.74	0.49	1.20	2.45*	0.04
	Post	6.10	1.20				
Lower Back Strength	Pre	5.00	0.67	0.22	2.50	11.18*	0.01
	Post	7.50	1.08				
Hamstring Muscles Strength	Pre	4.90	0.74	0.28	2.10	7.58*	0.01
	Post	7.00	1.15				
Flexibility	Pre	2.60	1.51	0.16	1.60	9.80*	0.01
	Post	4.20	1.75				
Leg Explosive Power	Pre	87.00	9.14	3.72	11.50	3.09*	0.01
	Post	98.50	13.34				
Orientation Ability	Pre	34.30	6.40	0.43	4.90	11.31*	0.01
	Post	29.40	6.11				
Differentiation Ability	Pre	8.80	1.69	0.56	1.60	2.85*	0.02
	Post	10.40	1.26				
Fat Mass at Right Arm	Pre	0.62	0.35	0.03	0.26	8.51*	0.01
	Post	0.36	0.26				
Fat Mass at Left Arm	Pre	0.66	0.61	0.06	0.28	4.45*	0.01
	Post	0.38	0.42				
Fat Mass at Trunk	Pre	6.32	3.01	0.11	0.82	7.17*	0.01
	Post	5.5	2.80				
Fat Mass at Right Leg	Pre	4.72	4.30	0.10	0.80	7.75*	0.01
	Post	3.92	4.14				
Fat Mass at Left Leg	Pre	4.45	3.45	0.12	0.73	6.22*	0.01
	Post	3.72	3.24				
Body Mass Index	Pre	21.14	1.05	0.34	2.47	7.34*	0.01
	Post	18.67	0.51				

Table XIX indicates the obtained 't' ratio on selected physical fitness variables namely abdominal plus psoas strength, abdominal minus psoas strength, psoas and lower abdomen strength, upper back strength, lower back strength and hamstring muscles

strength, flexibility and leg explosive power were 6.00, 3.67, 5.58, 2.45, 11.18, 7.58, 9.80 and 3.09 respectively. Since the 'p' value was lesser than the 0.05 of the selected physical fitness variables there were significant improvement between pre and post-test through asanas training. Co-ordinative abilities variables namely orientation ability and differentiation ability were 11.31 and 2.85 respectively. Since the 'p' value was lesser than the 0.05 of the selected co-ordinative abilities there were significant improvement between pre and post-test were significantly improved through asanas training. Body composition variables namely fat mass at right arm, fat mass at left arm, fat mass at trunk, fat mass at right leg, fat mass at left leg and body mass index were 8.51, 4.45, 7.17, 7.75, 6.22 and 7.34 respectively. Since the 'p' value was lesser than the 0.05 of the selected physical variables there were significant improvement between pre and post-test were significantly improved through asanas training. And also the results shows that the abdominal plus psoas strength was increased 24.49%, abdominal minus psoas strength was increased 26.09%, psoas and lower abdomen strength was increased 33.33%, upper back strength was increased 24.49%, lower back strength was increased 50%,hamstring muscles strength was increased 42.86%, flexibility was increased 61.54%, leg explosive power was increased 4.2%, orientation ability was decreased 14.29%, differentiation ability was increased18.18%, fat mass at right arm was decreased 41.94 %, fat mass at left arm was decreased 42.42%, fat mass at trunk was decreased 12.97 %, fat mass at right leg was decreased 16.95 %, fat mass at left leg was decreased16.40 % and body mass index was decreased 11.68 %.

TABLE-XX

COMPUTATION OF "t" RATIO BETWEEN THE PRE AND POST TESTS ON RECREATIONAL GAMES TRAINING GROUP

Variables	Test	Mean	Standard Deviation	σ DM	DM	t	'p'
Abdominal Plus Psoas Strength	Pre	4.70	0.95	0.23	2.10	9.00*	0.01
	Post	6.80	1.14				
Abdominal Minus Psoas Strength	Pre	4.80	0.63	0.23	1.90	8.14*	0.01
	Post	6.70	1.06				
Psoas and Lower Abdomen Strength	Pre	4.80	0.92	0.33	2.0	6.00*	0.01
	Post	6.80	1.32				
Upper Back Strength	Pre	5.00	0.82	0.28	1.90	6.86*	0.01
	Post	6.90	0.88				
Lower Back Strength	Pre	4.90	1.20	0.34	1.70	5.08*	0.01
	Post	6.60	1.51				
Hamstring Muscles Strength	Pre	5.00	0.82	0.40	2.50	6.23*	0.01
	Post	7.50	0.85				
Flexibility	Pre	2.20	2.15	0.23	1.90	8.14*	0.01
	Post	4.10	2.33				
Leg Explosive Power	Pre	88.50	13.40	2.90	14.5	5.00*	0.01
	Post	103.00	13.37				
Orientation Ability	Pre	32.40	2.07	0.85	4.40	5.20*	0.01
	Post	28.00	3.13				
Differentiation Ability	Pre	9.00	1.05	0.37	2.40	6.47*	0.01
	Post	11.40	0.97				
Fat Mass at Right Arm	Pre	0.60	0.21	0.09	0.24	2.54	0.03
	Post	0.34	0.26				
Fat Mass at Left Arm	Pre	0.63	0.28	0.12	0.32	2.71*	0.02
	Post	0.31	0.19				
Fat Mass at Trunk	Pre	6.07	2.61	0.13	0.68	5.04*	0.01
	Post	5.39	2.37				
Fat Mass at Right Leg	Pre	4.48	3.39	0.11	0.76	6.99*	0.01
	Post	3.72	3.25				
Fat Mass at Left Leg	Pre	4.34	3.64	0.12	0.70	5.96*	0.01
	Post	3.64	3.50				
Body Mass Index	Pre	20.87	1.08	0.48	1.11	2.32*	0.04
	Post	19.76	0.97				

Table XX indicates the obtained 't' ratio on selected physical fitness variables namely abdominal plus psoas strength , abdominal minus psoas strength, psoas and lower

abdomen strength, upper back strength, lower back strength, hamstring muscles strength, flexibility and leg explosive power were 9.00, 8.14, 6.00, 6.86, 5.08, 6.23, 8.14 and 5.00 respectively. Since the 'p' value was lesser than the 0.05 of the selected physical fitness variables there were significant improvement between pre and post-test through recreational games training. Co-ordinative abilities variables namely orientation ability and differentiation ability were 5.20 and 6.47 respectively. Since the 'p' value was lesser than the 0.05 of the selected co-ordinative ability there were significant improvement between pre and post-test were significantly improved through recreational games training. Body composition variables namely, fat mass at right arm, fat mass at left arm, fat mass at trunk, fat mass at right leg, fat mass at left leg and body mass index were 2.54, 2.71, 5.04, 6.99, 5.96 and 2.32 respectively. Since the 'p' value was lesser than the 0.05 of the selected body composition variables there were significant improvement between pre and post-tests of the selected recreational games training. And also the results shows that the abdominal plus psoas strength was increased 44.68 %, abdominal minus psoas strength was increased 39.58 %, psoas and lower abdomen strength was increased 41.67 %, upper back strength was increased 38 %, lower back strength was increased 34.69 %, hamstring muscles strength was increased 50 %, flexibility was increased 86.36 %, leg explosive power was increased 16.38 %, orientation ability was decreased 13.58 %, differentiation ability was increased 26.67 %, fat mass at right arm was decreased 40 %, fat mass at left arm was decreased 50.79 %, fat mass at trunk was decreased 11.20 %, fat mass at right leg was decreased 16.96 %, fat mass at left leg was decreased 16.13 % and body mass index was decreased 5.27 %.

TABLE-XXI

COMPUTATION OF "t" RATIO BETWEEN THE PRE AND POST TESTS ON AEROBIC EXERCISE WITH STRETCHING TRAINING GROUP

Variables	Test	Mean	Standard Deviation	σ DM	DM	t	'p'
Abdominal Plus Psoas Strength	Pre	5.00	0.94	0.15	1.70	11.13*	0.01
	Post	6.70	1.16				
Abdominal Minus Psoas Strength	Pre	4.70	1.42	0.25	1.80	7.22*	0.01
	Post	6.50	0.97				
Psoas and Lower Abdomen Strength	Pre	4.90	1.45	0.21	1.70	7.97*	0.01
	Post	6.60	1.35				
Upper Back Strength	Pre	4.80	1.14	0.10	1.90	19.00*	0.01
	Post	6.70	1.16				
Lower Back Strength	Pre	4.80	0.63	0.37	2.00	5.48*	0.01
	Post	6.80	1.55				
Hamstring Muscles Strength	Pre	5.10	0.74	0.43	3.10	7.15*	0.01
	Post	8.20	0.92				
Flexibility	Pre	2.40	3.41	0.29	2.20	7.57*	0.01
	Post	4.60	3.78				
Leg Explosive Power	Pre	90.00	14.53	1.94	14.00	7.20*	0.01
	Post	104.00	17.29				
Orientation Ability	Pre	35.40	4.99	0.72	5.10	7.07*	0.01
	Post	30.30	3.89				
Differentiation Ability	Pre	8.90	1.20	1.66	2.90	5.51*	0.01
	Post	11.80	0.79				
Fat Mass at Right Arm	Pre	0.61	0.25	0.11	0.25	2.37*	0.04
	Post	0.36	0.26				
Fat Mass at Left Arm	Pre	0.67	0.29	0.06	0.33	5.71*	0.01
	Post	0.34	0.14				
Fat Mass at Trunk	Pre	5.81	2.28	0.06	0.67	11.59*	0.01
	Post	5.14	2.20				
Fat Mass at Right Leg	Pre	4.45	1.82	0.20	0.58	2.84*	0.02
	Post	3.87	1.70				
Fat Mass at Left Leg	Pre	4.41	1.67	0.13	0.66	4.98*	0.01
	Post	3.75	1.35				
Body Mass Index	Pre	20.37	1.20	0.39	1.16	2.96*	0.01
	Post	19.21	1.29				

Table XXI indicates the obtained 't' ratio on selected physical fitness variables namely abdominal plus psoas strength, abdominal minus psoas strength, psoas and lower

abdomen strength, upper back strength, lower back strength, hamstring muscles Strength, flexibility and leg explosive power were 11.13, 7.22, 7.97, 19.00, 5.48, 7.15, 7.57 and 7.20 respectively. Since the 'p' value was lesser than the 0.05 of the selected physical fitness variables there were significant improvement between pre and post-test through aerobic exercises with stretching training. Co-ordinative abilities variables namely orientation ability and differentiation ability were 7.07 and 5.51 respectively. Since the 'p' value was lesser than the 0.05 of the selected coordinative abilities there were significant improvement between pre and post-test were significantly improved through aerobic exercises with stretching training. Body composition variables namely , fat mass at right arm, fat mass at left arm, fat mass at trunk, fat mass at right leg, fat mass at left leg and body mass index were 2.37, 5.71, 11.59, 2.84, 4.98 and 2.96 respectively. Since the 'p' value was lesser than the 0.05 of the selected body composition variables there were significant improvement between pre and post-tests of the selected aerobic exercises with stretching training. And also the results shows that the abdominal plus psoas strength was increased 34 %, abdominal minus psoas strength was increased 38.30 %, psoas and lower abdomen strength was increased 34.69 %, upper back strength was increased 39.58 %, lower back strength was increased 41.67 %, hamstring muscles strength was increased 60.78 %, flexibility was increased 91.67 %, leg explosive power was increased 15.56 %, orientation ability was decreased 14.41 %, differentiation ability was increased 32.58 %, fat mass at right arm was decreased 40.98 %, fat mass at left arm was decreased 49.25 %, fat mass at trunk was decreased 11.53 %, fat mass at right leg was decreased 13.03 %, fat mass at left leg was decreased 14.97 % and body mass index was decreased 5.69 %.

TABLE-XXII

COMPUTATION OF "t" RATIO BETWEEN THE PRE AND POST TESTS ON CONTROL GROUP

Variables	Test	Mean	Standard Deviation	σ DM	DM	t	'p'
Abdominal Plus Psoas Strength	Pre	4.80	0.63	0.28	0.10	0.36	0.73
	Post	4.70	0.67				
Abdominal Minus Psoas Strength	Pre	4.50	0.97	0.35	0.10	0.29	0.78
	Post	4.40	0.84				
Psoas and Lower Abdomen Strength	Pre	4.40	1.17	0.42	0.20	0.48	0.64
	Post	4.20	0.92				
Upper Back Strength	Pre	4.70	0.67	0.36	0.20	0.56	0.59
	Post	4.50	0.85				
Lower Back Strength	Pre	4.70	0.67	0.23	0.10	0.43	0.68
	Post	4.80	1.03				
Hamstring Muscles Strength	Pre	4.80	0.79	0.35	0.10	0.29	0.78
	Post	4.90	0.74				
Flexibility	Pre	2.10	1.60	0.33	0.20	0.61	0.56
	Post	2.30	1.95				
Leg Explosive Power	Pre	89.40	17.51	2.14	0.40	0.19	0.86
	Post	89.00	12.20				
Orientation Ability	Pre	36.80	4.94	1.34	0.50	0.37	0.72
	Post	36.30	4.08				
Differentiation Ability	Pre	8.70	1.57	0.50	0.10	0.20	0.85
	Post	8.60	1.07				
Fat Mass at Right Arm	Pre	0.64	0.33	0.16	0.28	1.79	0.81
	Post	0.36	0.26				
Fat Mass at Left Arm	Pre	0.70	0.37	0.16	0.04	0.24	0.81
	Post	0.74	0.26				
Fat Mass at Trunk	Pre	5.90	3.68	0.26	0.40	1.55	0.16
	Post	6.30	3.43				
Fat Mass at Right Leg	Pre	4.91	3.56	0.43	0.15	0.35	0.74
	Post	5.06	3.84				
Fat Mass at Left Leg	Pre	4.66	4.12	0.63	0.32	0.51	0.63
	Post	4.98	4.19				
Body Mass Index	Pre	21.89	1.80	0.55	0.05	0.09	0.93
	Post	21.84	2.52				

Table XXII indicates the obtained 't' ratio on selected physical fitness variables namely abdominal plus psoas strength, abdominal minus psoas strength, psoas and lower abdomen strength, upper back strength, lower back strength and hamstring muscles

strength, flexibility and leg explosive power were 0.36, 0.29, 0.48, 0.56, 0.43, 0.29, 0.61 and 0.19 respectively. Since the 'p' value was greater than the 0.05 of the selected physical fitness variables there were no significant improvement between pre and post-test through control group. Co-ordinative abilities variables namely orientation ability and differentiation ability were 0.37 and 0.20 respectively. Since the 'p' value was greater than the 0.05 of the selected co-ordinative abilities there were no significant improvement between pre and post-test were no significantly improved through of control group. Body composition variables namely fat mass at right arm, fat mass at left arm, fat mass at trunk, fat mass at right leg, fat mass at left leg and body mass index were 1.79, 0.24, 1.55, 0.35, 0.51 and 0.09 respectively. Since the 'p' value was greater than the 0.05 of the selected body composition variables there were no significant improvement between pre and post-tests of the control group. And also the results shows that the abdominal plus psoas strength was decreased 2.08 %, abdominal minus psoas strength was decreased 2.22 %, psoas and lower abdomen strength was decreased 4.55 %, upper back strength was decreased 4.26 %, lower back strength was increased 2.13 %, hamstring muscles strength was increased 48 %, flexibility was decreased 9.52 %, leg explosive power was increased 0.45 %, orientation ability was decreased 1.36 %, differentiation ability was decreased 1.15 %, fat mass at right arm was decreased 43.75 %, fat mass at left arm was increased 5.71 %, fat mass at trunk was increased 6.78 %, fat mass at right leg was increased 3.05 %, fat mass at left leg was increased 6.87 % and body mass index was decreased 0.23 %.

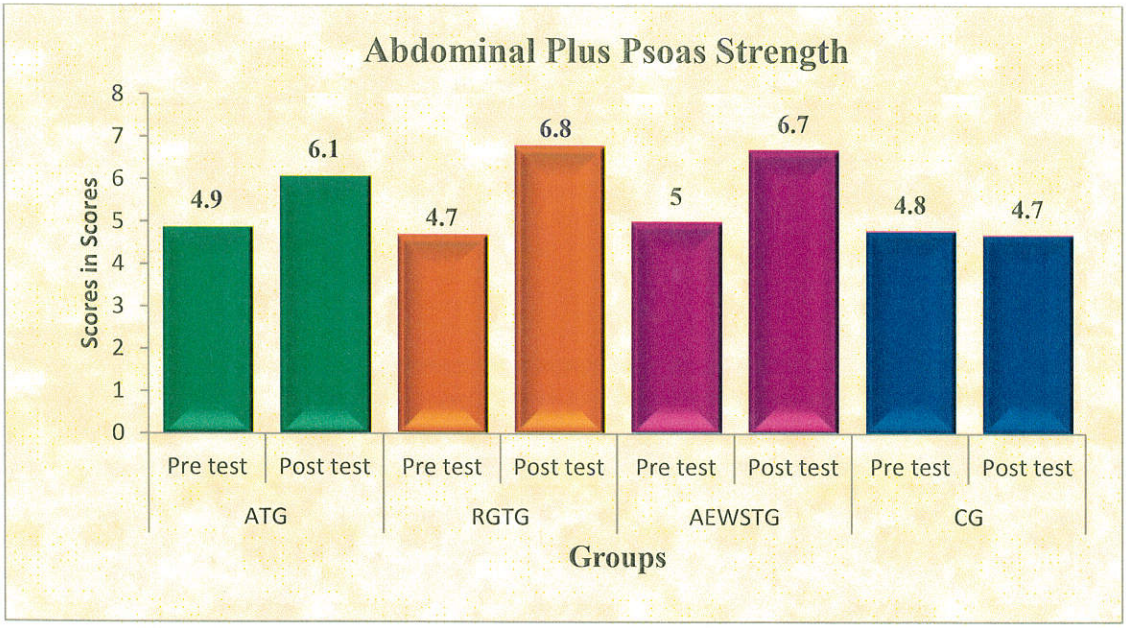

FIGURE 13 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON ABDOMINAL PLUS PSOAS STRENGTH OF EXPERIMENTAL AND CONTROL GROUPS

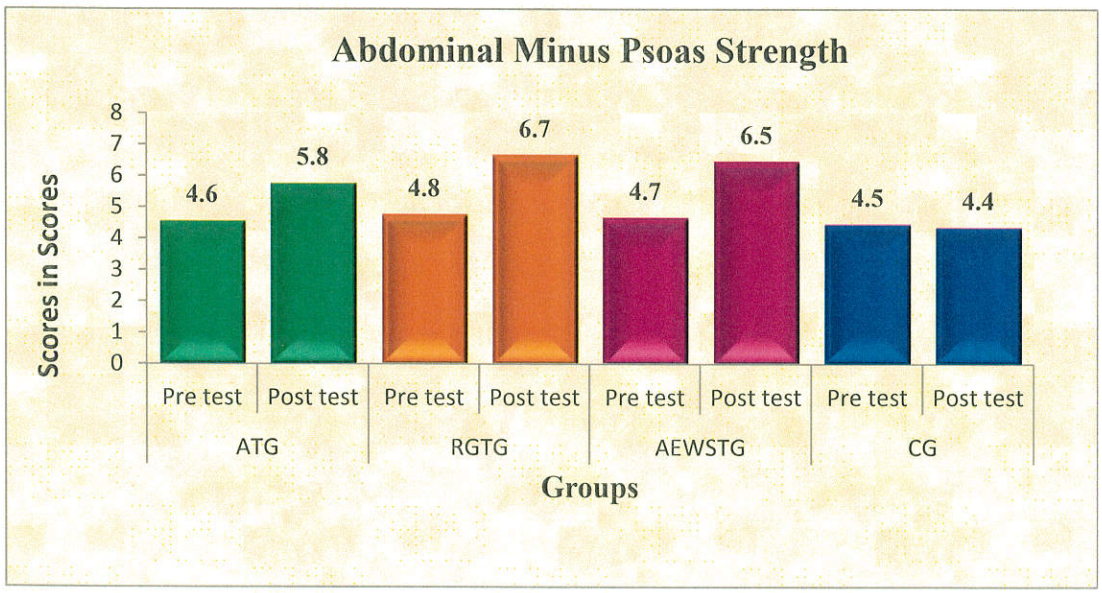

FIGURE 14 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON ABDOMINAL MINUS PSOAS STRENGTH OF EXPERIMENTAL AND CONTROL GROUPS

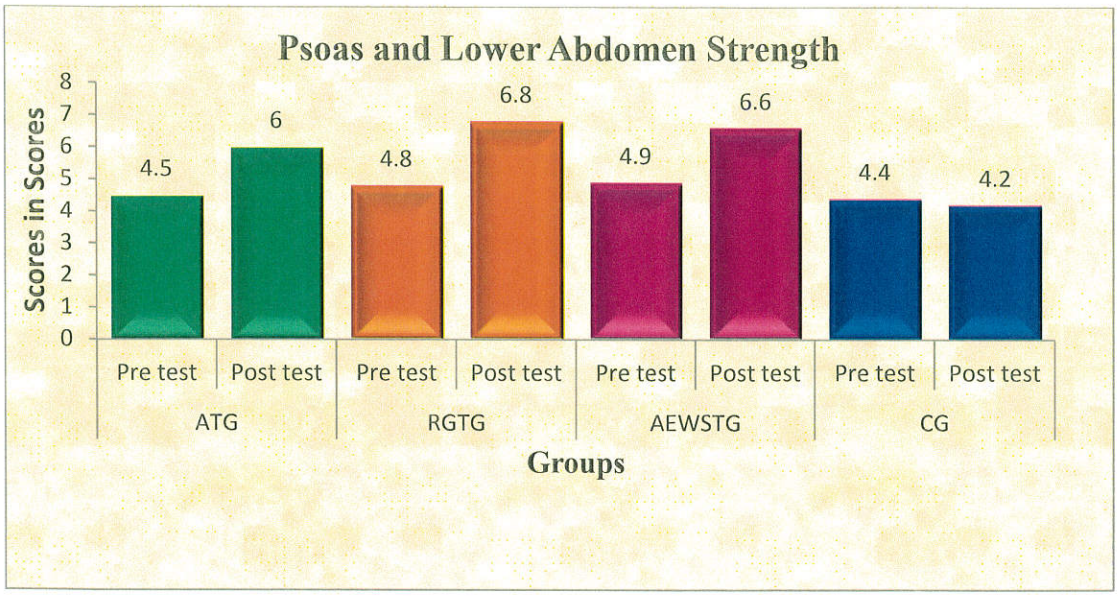

FIGURE 15 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON PSOAS AND LOWER ABDOMEN STRENGTH OF EXPERIMENTAL AND CONTROL GROUPS

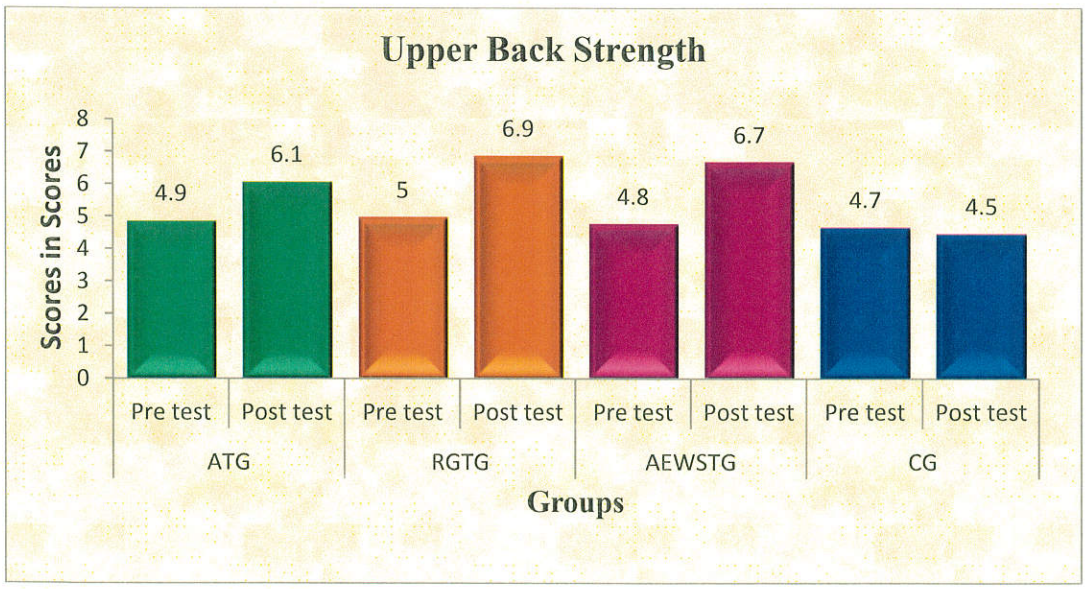

FIGURE 16 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON UPPER BACK STRENGTH OF EXPERIMENTAL AND CONTROL GROUPS

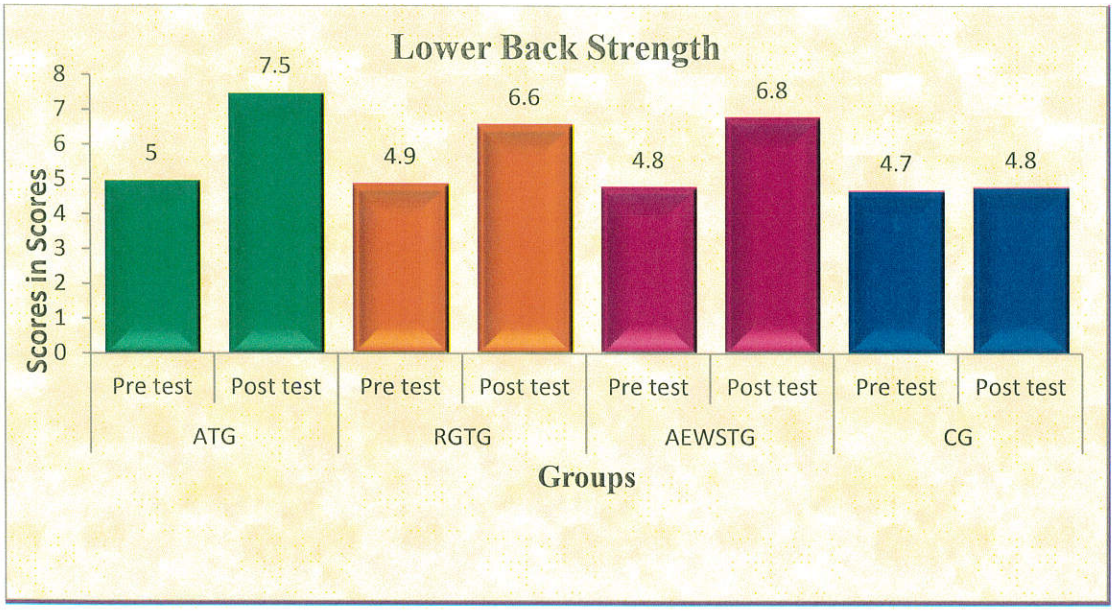

FIGURE 17 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON LOWER BACK STRENGTH OF EXPERIMENTAL AND CONTROL GROUPS

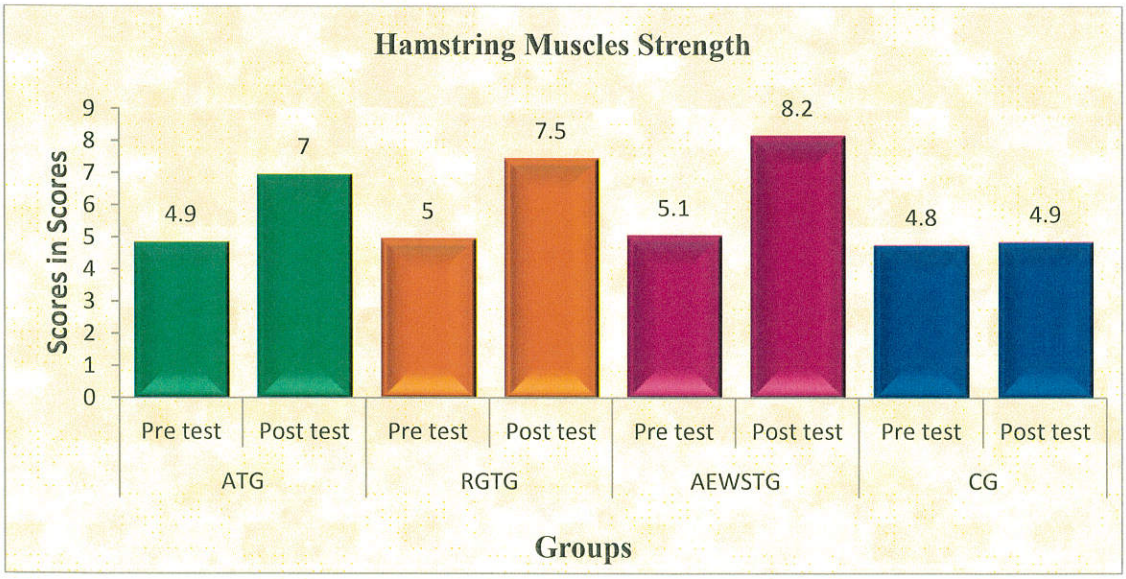

FIGURE 18 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON HAMSTRING MUSCLES STRENGTH OF EXPERIMENTAL AND CONTROL GROUPS

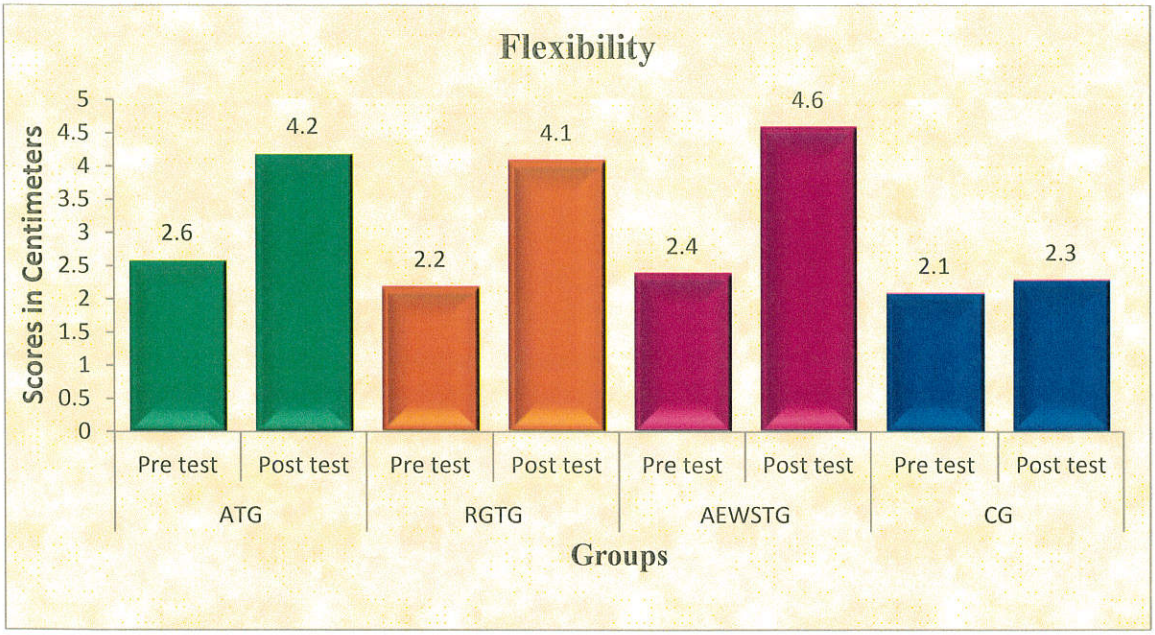

FIGURE 19 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON FLEXIBILITY OF EXPERIMENTAL AND CONTROL GROUPS

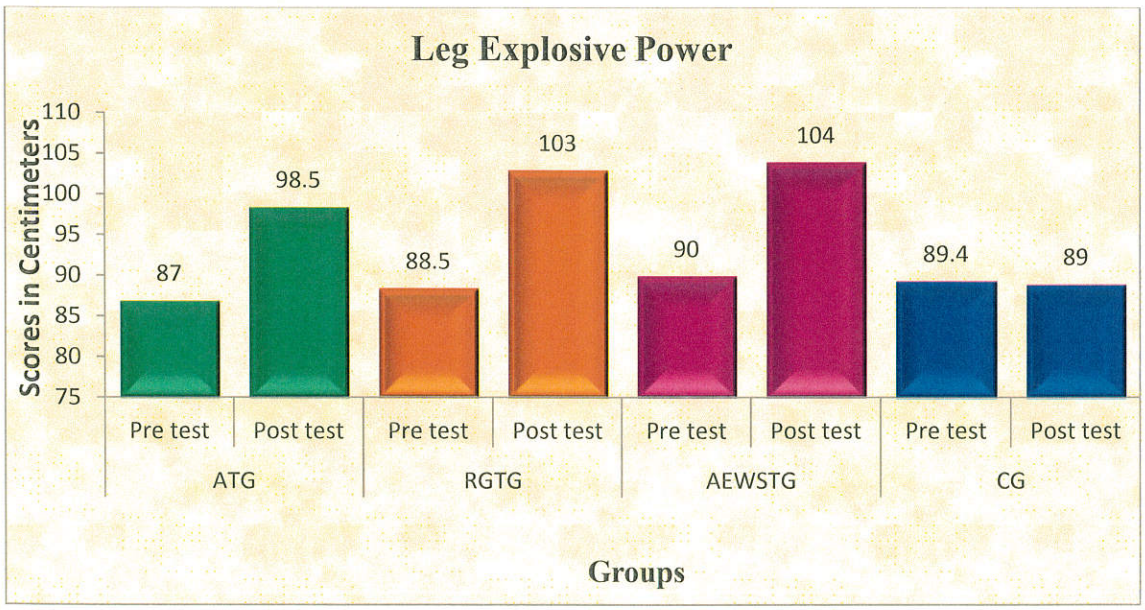

FIGURE 20 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON LEG EXPLOSIVE POWER OF EXPERIMENTAL AND CONTROL GROUPS

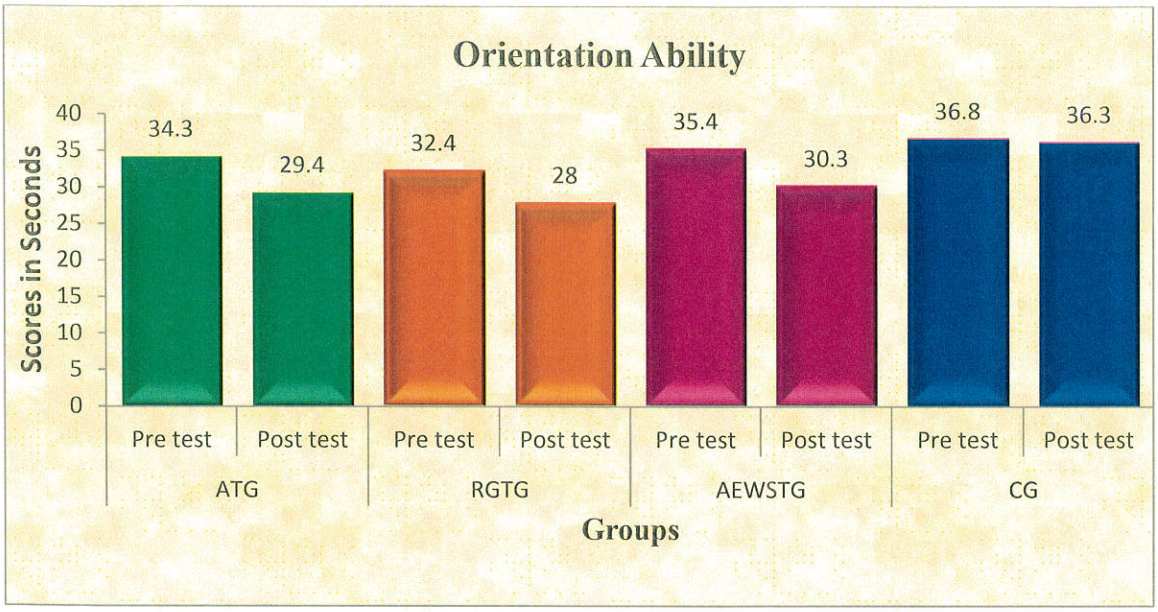

FIGURE 21 FIGURE SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON ORIENTATION ABILITY OF EXPERIMENTAL AND CONTROL GROUPS

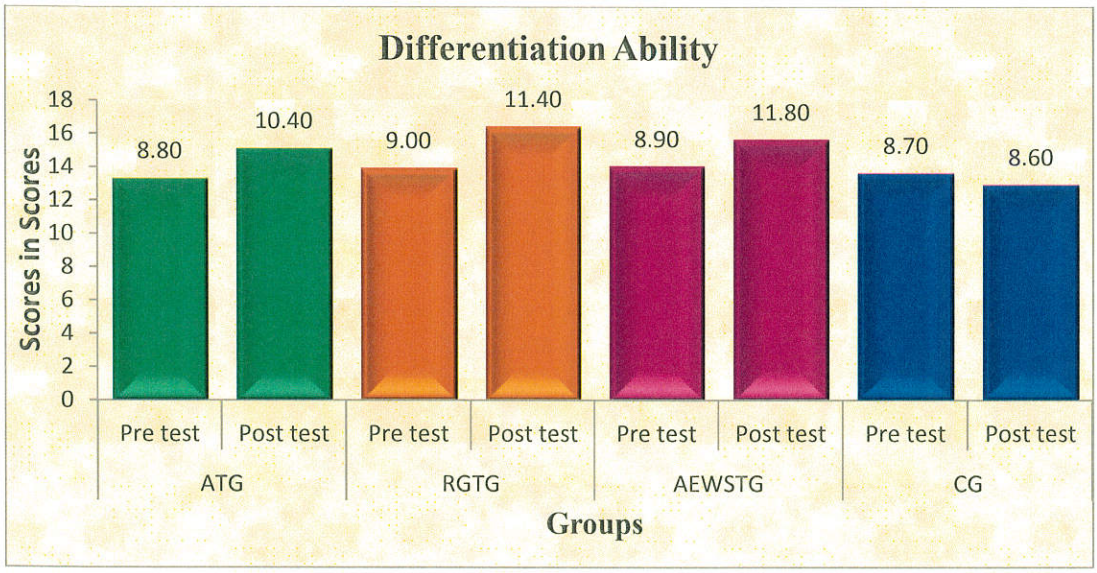

FIGURE 22 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON DIFFERENTIATION ABILITY OF EXPERIMENTAL AND CONTROL GROUPS

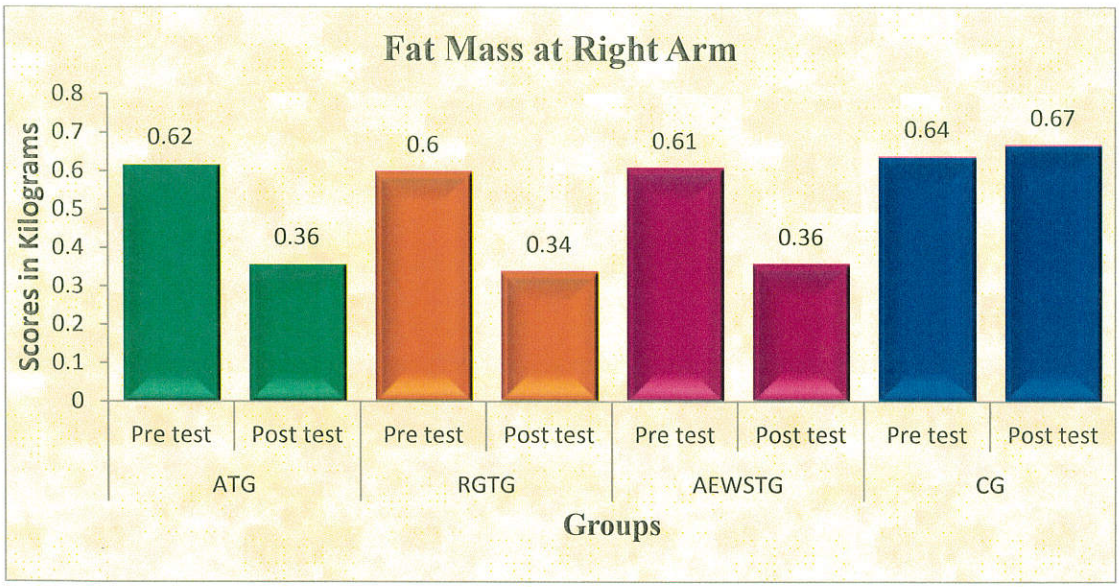

FIGURE 23 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON FAT MASS AT RIGHT ARM OF EXPERIMENTAL AND CONTROL GROUPS

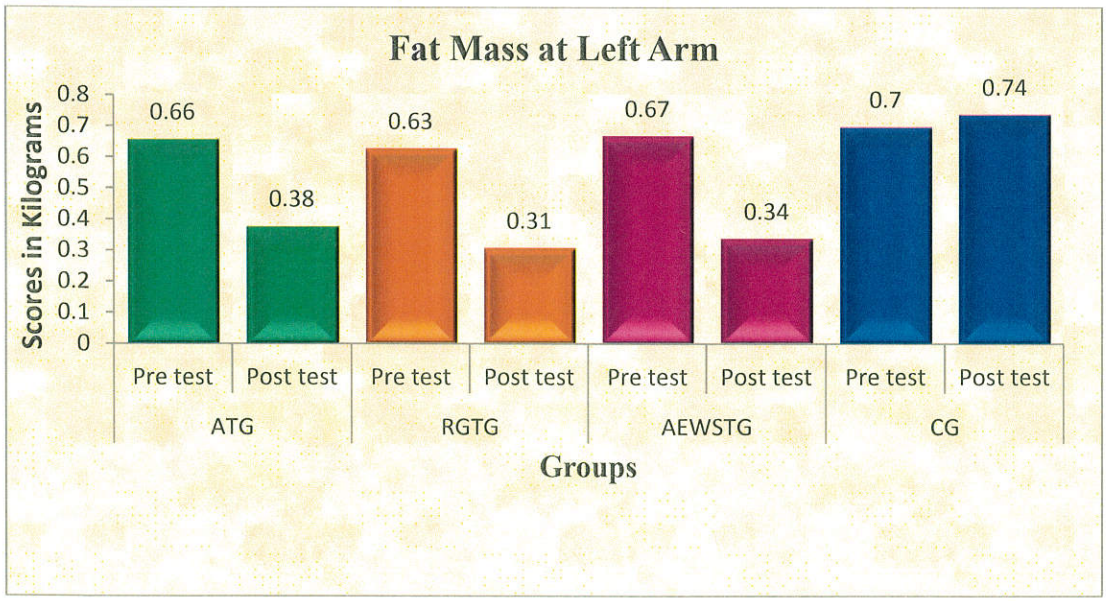

FIGURE 24 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON FAT MASS AT LEFT ARM OF EXPERIMENTAL AND CONTROL GROUPS

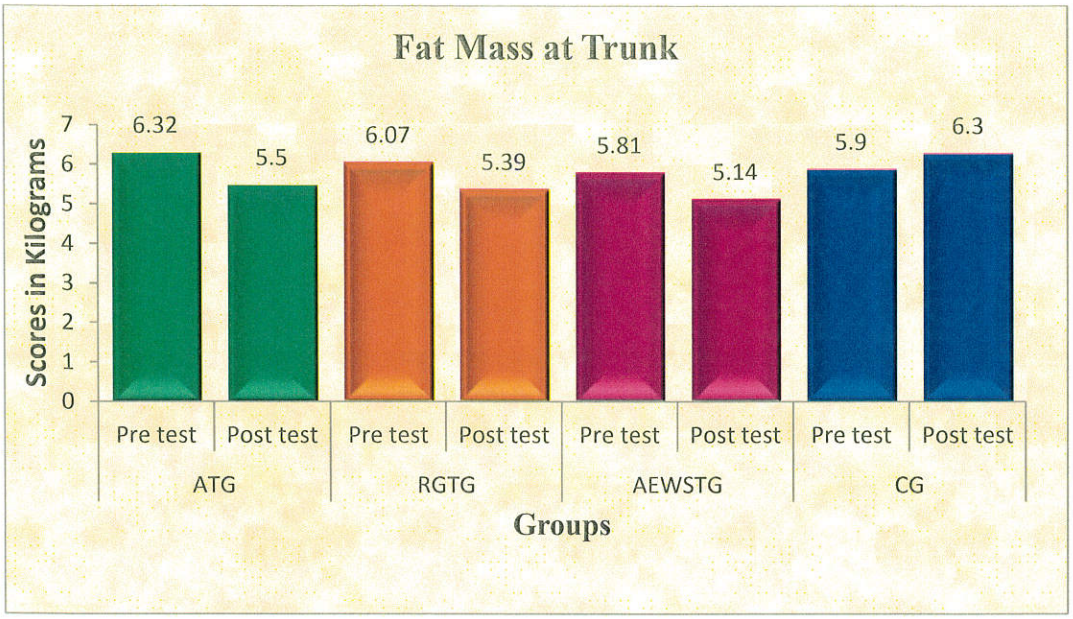

FIGURE 25 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON FAT MASS AT TRUNK OF EXPERIMENTAL AND CONTROL GROUPS

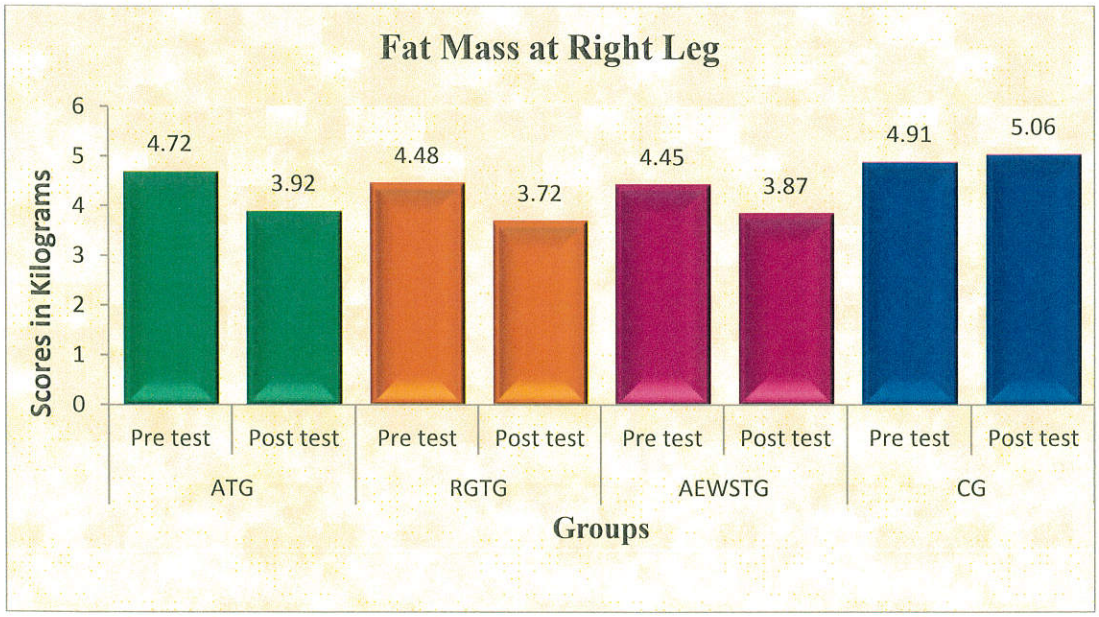

FIGURE 26 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON FAT MASS AT RIGHT LEG OF EXPERIMENTAL AND CONTROL GROUPS

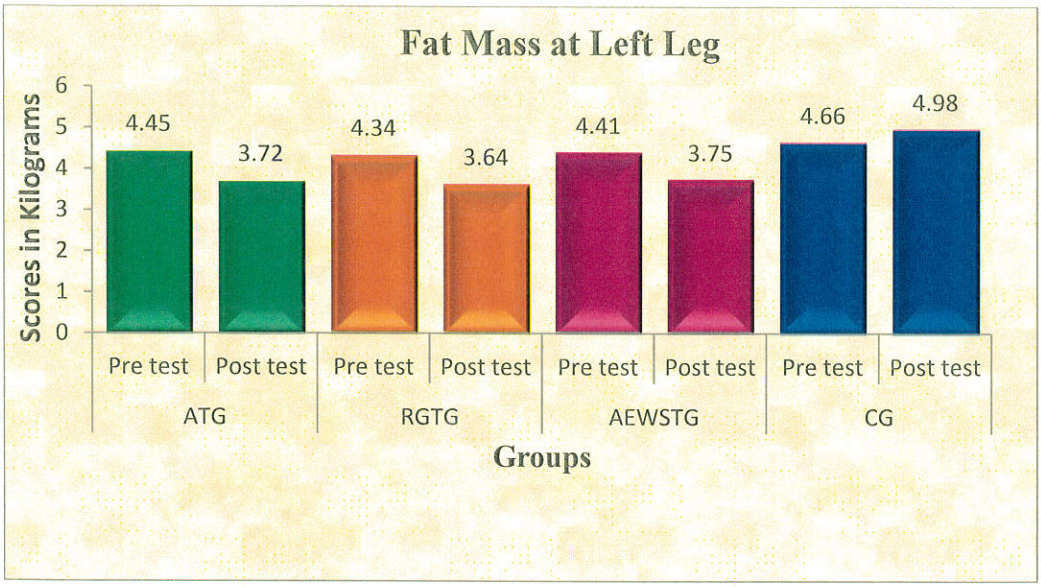

FIGURE 27 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON FAT MASS AT LEFT LEG OF EXPERIMENTAL AND CONTROL GROUPS

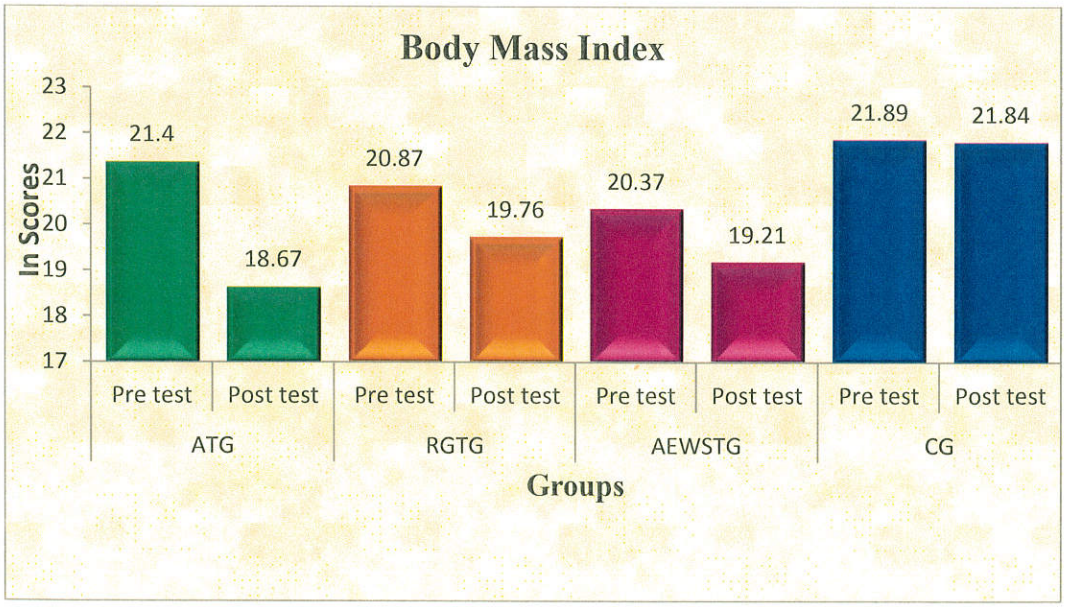

FIGURE 28 SHOWING THE MEAN DIFFERENCE OF PRE AND POST TESTS SCORES ON BODY MASS INDEX OF EXPERIMENTAL AND CONTROL GROUPS

4.4 COMPUTATION OF ANALYSIS OF COVARIANCE AND POST HOC TEST

4.4.1 RESULTS ON ABDOMINAL PLUS PSOAS STRENGTH

The physical fitness variable namely abdominal plus psoas strength was measured through Kraus weber strength test. The results on the effect of asanas, recreational games and aerobic exercises with stretching training are presented in table-XXIII.

TABLE –XXIII

COMPUTATION OF ANALYSIS OF COVARIANCE ON ABDOMINAL PLUS PSOAS STRENGTH (In Scores)

Test	Means				Source of Variance	Sum of Square	Degree of Freedom	Mean Square	Obtained 'F' Ratio	'p' value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	4.90	4.70	5.00	4.80	B	0.50	3	0.17	0.23	0.88
					W	26.60	36	0.74		
Post test	6.10	6.80	6.70	4.70	B	28.08	3	9.36	9.71*	0.01
					W	34.70	36	0.96		
Adjusted post test	6.06	6.92	6.58	4.74	B	27.51	3	9.17	19.25*	0.01
					W	16.67	35	0.48		
Mean gain	1.20	2.10	1.70	0.30						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XXIII shows that the pretest mean scores of abdominal plus psoas strength of asanas training group (ATG) was 4.90, recreational games training group (RGTG) was 4.70, aerobic exercise with stretching training group (AEWSTG) was 5.00 and control group (CG) was 4.80.

The obtained 'p' value on pretest 0.88 was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences

among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning subjects to groups.

The post-test analysis proved that there was a significant difference among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This was proved that there were significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on abdominal plus psoas strength.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XXIV.

TABLE -XXIV

PAIRED MEAN SIGNIFICANT DIFFERENCE ON ABDOMINAL PLUS PSOAS STRENGTH (In Scores)

Adjusted Post Test Means				Mean Difference	'p' Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	6.58	4.74	1.84*	0.01
-	6.92	-	4.74	2.18*	0.01
-	6.92	6.58	-	0.35	0.27
6.06	-	-	4.74	1.32*	0.01
6.06	-	6.58	-	0.52	0.10
6.06	6.92	-	-	0.87*	0.01

**Significant at 0.05 level of confidence.*

The above table XXIV clearly indicates that the paired mean significant difference on the level of abdominal plus psoas strength among the experimental and control groups. And the variation in abdominal plus psoas strength among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and recreational games training group (RGTG), asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG) and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences obtained between asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and aerobic exercise with stretching training group as well as recreational games training group and aerobic exercise with stretching training group on abdominal plus psoas strength.

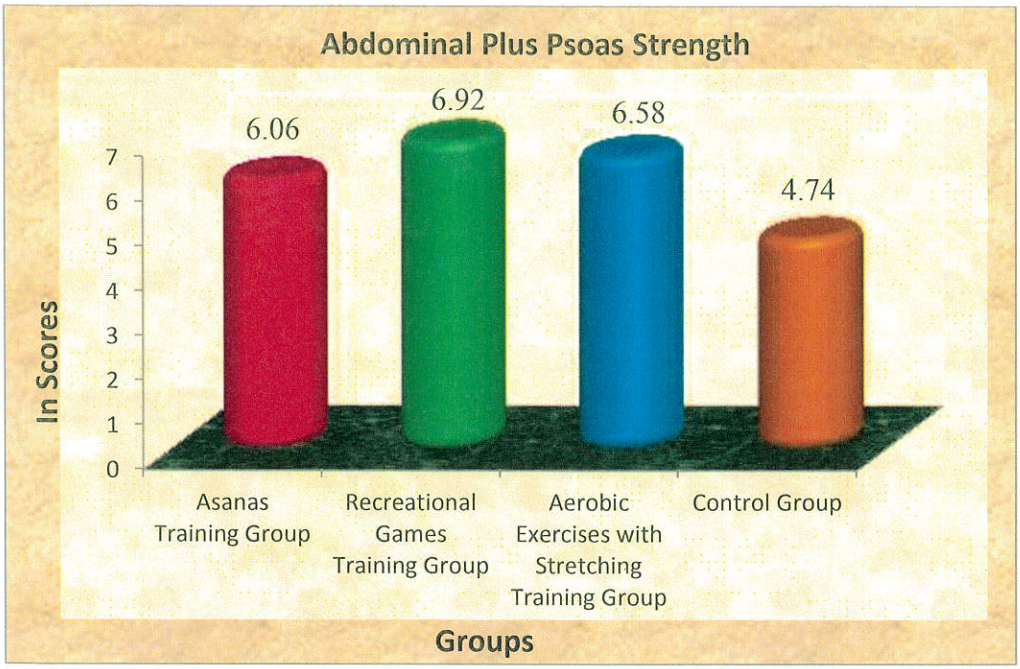

FIGURE – 29: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF ABDOMINAL PLUS PSOAS STRENGTH

4.4.1.1 DISCUSSIONS ON THE FINDINGS OF ABDOMINAL PLUS PSOAS STRENGTH

The results presented in table XXIII showed that the obtained adjusted post-test means on abdominal plus psoas strength of asanas training group (ATG) was 6.06, recreational games training group (RGTG) was 6.92 followed by aerobic exercise with stretching training group (AEWSTG) with mean value of 6.58, and control group (CG) mean values of 4.74.

The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.88, 0.01 and 0.01 respectively. It was found that the obtained 'p' values on post-test and adjusted post-test scores mean were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 24.49%), recreational games training group (RGTG = 44.68%) and aerobic exercise with stretching training group (AEWSTG = 34%) training would be effective in causing significant improvement among the experimental groups on abdominal plus psoas strength. And also when comparing the adjusted post-test mean values of abdominal plus psoas strength, the recreational games training means had most effective training means in increasing the abdominal plus psoas strength than the other training means.

While testing the effect of isolated asanas training group (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the abdominal plus psoas strength of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post test was not differ significantly. Hence it is clearly understood that the selected training means had influenced significantly to increase the abdominal plus psoas strength.

The results of this investigation are also supported by the following studies. Soubhagyalaxmi Mohanty et al., (2015) conducted a study on muscle strength, a component for balance, gait and functional mobility are vital for children with visual impairment. It was concluded that yoga therapy seemed to have considerable benefits for the children's muscular fitness.

Funk, (1971) conducted a study to determine the effect of a physical education programme on the physical fitness and motor development of a group of children classified as trainable mentally retarded. It was concluded that on two fitness test items, the shuttle run and sit-ups, the experimental group improved significantly.

Lante et al., (2014) conducted a study to compare two approaches to increasing physical activity in adults with intellectual disability a lifestyle physical activity (light-moderate intensity) approach and a structured exercise (moderate-vigorous intensity) approach. The study was concluded that the trial results determined that the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Soubhagyalaxmi Mohanty et al., (2015), Funk, (1971) and Lante et al., (2014).

4.4.2 RESULTS ON ABDOMINAL MINUS PSOAS STRENGTH

The physical fitness variable namely abdominal minus psoas strength was measured through Kraus weber strength test. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table XXV.

TABLE –XXV

COMPUTATION OF ANALYSIS OF COVARIANCE

ON ABDOMINAL MINUS PSOAS STRENGTH (In Scores)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	4.60	4.80	4.70	4.50	B	0.50	3	0.17	0.17	0.91
					W	34.60	36	0.96		
Post test	5.80	6.70	6.50	4.40	B	32.50	3	10.83	10.10*	0.01
					W	38.60	36	1.07		
Adjusted post test	5.83	6.61	6.47	4.49	B	27.70	3	9.23	12.56*	0.01
					W	25.73	35	0.74		
Mean gain	1.20	1.90	1.80	0.10						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XXV shows that the pretest mean scores of abdominal minus psoas strength of asanas training group (ATG) was 4.60, recreational games training group (RGTG) was 4.80, aerobic exercise with stretching training group (AEWSTG) was 4.70 and control group (CG) was 4.50.

The obtained 'p' value on pretest scores 0.91 was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects in to groups.

The post test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This was proved that there were significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on abdominal minus psoas strength.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results are presented in table-XXVI.

TABLE -XXVI

PAIRED MEAN SIGNIFICANT DIFFERENCE ON ABDOMINAL MINUS PSOAS STRENGTH (In Scores)

Adjusted Post Test Means				Mean Difference	'p' Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	6.47	4.49	1.98*	0.01
-	6.61	-	4.49	2.17*	0.01
-	6.61	6.47	-	0.14	0.72
5.83	-	-	4.49	1.34*	0.01
5.83	-	6.47	-	0.64	0.11
5.83	6.61	-	-	0.78*	0.05

**Significant at 0.05 level of confidence.*

The above table XXVI clearly indicates that the paired mean significant difference on the level of abdominal minus psoas strength among the experimental and control groups. And the variation in abdominal minus psoas strength among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and recreational games training group (RGTG), asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG) and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences obtained between asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and aerobic exercise with stretching training group as well as recreational games training group and aerobic exercise with stretching training group on abdominal minus psoas strength.

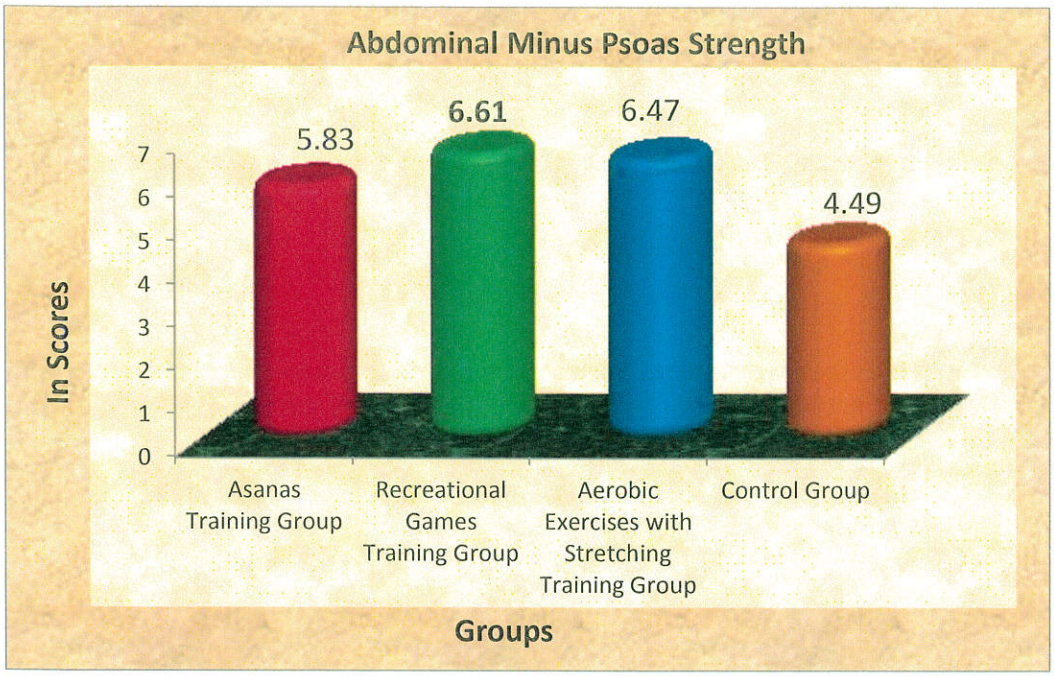

FIGURE – 30: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF ABDOMINAL MINUS PSOAS STRENGTH

4.4.2.1 DISCUSSIONS ON FINDINGS OF ABDOMINAL MINUS PSOAS STRENGTH

The results presented in table-XXV showed that the obtained adjusted posttest means on abdominal minus psoas strength of asanas training group (ATG) was 5.83, recreational games training group (RGTG) was 6.61aerobic exercise with stretching training group (AEWSTG) with mean value of 6.47, control group (CG) mean values of 4.49.

The differences among pretest scores, post-test and adjusted post-test mean of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.91, 0.01 and 0.01 respectively. It was found that obtained 'p' values on, post-test scores and adjusted post-test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 26.09%), recreational games training group (RGTG = 39.58%) and aerobic exercise with stretching training group (AEWSTG = 38.30%) training would be effective in causing significant improvement among the experimental groups on abdominal minus psoas strength. And also when comparing the adjusted post-tests means values of abdominal minus psoas the recreational games training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the abdominal minus psoas strength of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to increase the abdominal minus psoas strength.

The results of this investigation are also supported by the following studies. Soubhagyalaxmi Mohanty et al., (2015) conducted a study on muscle strength, a component for balance, gait and functional mobility are vital for children with visual impairment. It was concluded that yoga therapy seemed to have considerable benefits for the children's muscular fitness.

Funk, (1971) conducted a study to determine the effect of a physical education programme on the physical fitness and motor development of a group of children classified as trainable mentally retarded. It was concluded that on two fitness test items, the shuttle run and sit-ups, the experimental group improved significantly.

Lante et al., (2014) conducted a study to compare two approaches to increasing physical activity in adults with intellectual disability a lifestyle physical activity (light-moderate intensity) approach and a structured exercise (moderate-vigorous intensity) approach. The study was concluded that the trial results determined that the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Soubhagyalaxmi Mohanty et al., (2015), Funk, (1971) and Lante et al., (2014).

4.4.3 Results on Psoas and Lower Abdomen Strength

The physical fitness variable namely psoas and lower abdomen strength was measured through Kraus weber strength test. The result on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XXVII

TABLE –XXVII

COMPUTATION OF ANALYSIS OF COVARIANCE ON PSOAS AND LOWER ABDOMEN STRENGTH (In Scores)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	4.50	4.80	4.90	4.40	**B**	1.70	3	0.57	0.36	0.79
					W	57.40	36	1.59		
Post test	6.00	6.80	6.60	4.20	**B**	42.00	3	14.00	8.75*	0.01
					W	57.60	36	1.60		
Adjusted post test	6.10	6.70	6.43	4.37	**B**	32.30	3	10.77	12.33*	0.01
					W	30.56	35	0.87		
Mean gain	1.50	2.00	1.70	0.20						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XXVII shows that the pretest mean scores of psoas and lower abdomen strength of asanas training group (ATG) was 4.50, recreational games training group (RGTG) was 4.80, aerobic exercise with stretching training group (AEWSTG) was 4.90 and control group (CG) was 4.40.

The obtained 'p' value on pre test scores 0.79 was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post-test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on psoas and lower abdomen strength.

Since the significant differences were recorded and the results were subjected to pair wise comparison among the groups. The results were presented in table-XXVIII.

TABLE -XXVIII

PAIRED MEAN SIGNIFICANT DIFFERENCE ON PSOAS AND LOWER ABDOMEN STRENGTH (In Scores)

Adjusted Post Test Means				Mean Difference	'p' Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	6.43	4.37	2.06*	0.01
-	6.70	-	4.37	2.33*	0.01
-	6. 70	6.43	-	0.27	0.53
6.10	-	-	4.37	1.73*	0.01
6. 10	-	6.43	-	0.33	0.44
6. 10	6.70	-	-	0.59	0.17

**Significant at 0.05 level of confidence.*

The above table XXVIII clearly indicates that the paired mean significant difference on the level of psoas and lower abdomen strength among the experimental and control groups. And the variation in psoas and lower abdomen strength among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG) and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences obtained between asanas training group (ATG) and recreational games training group (RGTG), asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asanas training group and aerobic exercise with stretching training group as well as recreational games training group and aerobic exercise with stretching training group on psoas and lower abdomen strength.

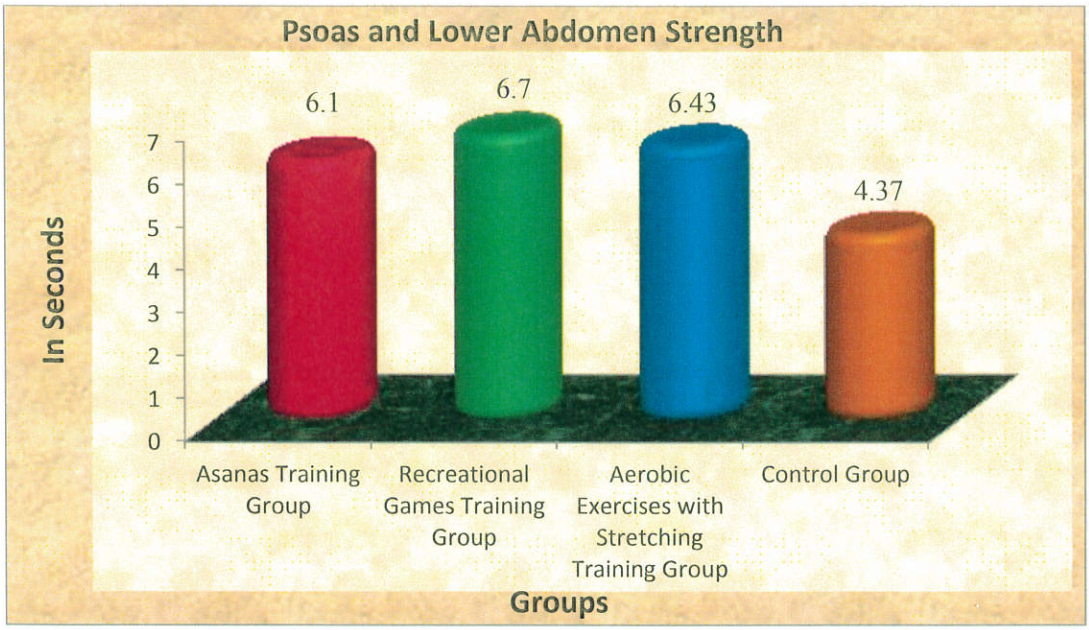

FIGURE –31: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF PSOAS AND LOWER ABDOMEN STRENGTH

4.4.3.1 DISCUSSIONS ON FINDINGS OF PSOAS AND LOWER ABDOMEN STRENGTH

The results presented in table-XXVII showed that the obtained adjusted post-test means on psoas and lower abdomen strength of asanas training group (ATG) was 6.10, recreational games training group (RGTG) was 6.70 aerobic exercise with stretching training group (AEWSTG) with mean value of 6.43, and the control group (CG) mean values of 4.37.

The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and the 'p' values obtained were 0.79, 0.01 and 0.01 respectively. It was found that obtained 'p' value on, post-test scores and adjusted post-test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 33.33%), recreational games training group (RGTG = 41.67) and aerobic exercise with stretching training group (AEWSTG =34.69%) training would be effective in causing significant improvement among the experimental groups on psoas and lower abdomen strength and also when comparing the adjusted post-test mean values of psoas and lower abdomen strength the recreational games training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the psoas and lower abdomen strength of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to increase the psoas and lower abdomen strength.

The results of this investigation are also supported by the following studies. Soubhagyalaxmi Mohanty et al., (2015) conducted a study on muscle strength, a component for balance, gait and functional mobility are vital for children with visual impairment. It was concluded that yoga therapy seemed to have considerable benefits for the children's muscular fitness.

Funk, (1971) conducted a study to determine the effect of a physical education programme on the physical fitness and motor development of a group of children classified as trainable mentally retarded. It was concluded that on two fitness test items, the shuttle run and sit-ups, the experimental group improved significantly.

Lante et al., (2014) conducted a study to compare two approaches to increasing physical activity in adults with intellectual disability a lifestyle physical activity (light-moderate intensity) approach and a structured exercise (moderate-vigorous intensity) approach. The study was concluded that the trial results determined that the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Soubhagyalaxmi Mohanty et al., (2015), Funk, (1971), and Lante et al., (2014)

4.4.4 Results on Upper Back Strength

The physical fitness variable namely upper back strength was measured through Kraus weber strength test. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XXIX.

TABLE –XXIX

COMPUTATION OF ANALYSIS OF COVARIANCE ON UPPER BACK STRENGTH (In Scores)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	4.90	5.00	4.80	4.70	B	0.50	3	0.17	0.23	0.88
					W	26.60	36	0.74		
Post test	6.10	6.90	6.70	4.50	B	35.50	3	11.83	11.09*	0.01
					W	38.40	36	1.07		
Adjusted post test	6.08	6.83	6.72	4.57	B	32.28	3	10.76	11.42*	0.01
					W	32.99	35	0.94		
Mean gain	1.20	1.90	1.90	0.20						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XXIX shows that the pretest mean scores of upper back strength of asanas training group (ATG) was 4.90, recreational games training group (RGTG) was 5.00, aerobic exercise with stretching training group (AEWSTG) was 4.80 and control group (CG) was 4.70.

The obtained 'p' value on pretest scores 0.88 was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post-test scores analysis proved that there were significant differences among the groups, as the obtained p value 0.01 was lesser than the required p value of 0.05. This proved that there were significant differences among the post test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on upper back strength.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XXX.

TABLE -XXX

PAIRED MEAN SIGNIFICANT DIFFERENCE

ON UPPER BACK STRENGTH (In Scores)

Adjusted Post Test Means				Mean Difference	'p' Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	6.72	4.57	2.16*	0.01
-	6.83	-	4. 57	2.27*	0.01
-	6.83	6.72	-	0.11	0.81
6.08	-	-	4. 57	1.51*	0.01
6.08		6.72	-	0.65	0.15
6.08	6.83	-	-	0.76	0.09

**Significant at 0.05 level of confidence.*

The above table XXX clearly indicates that the paired mean significant difference on the level of upper back strength among the experimental and control groups. And the variation in upper back strength among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG) and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and recreational games training group (RGTG), asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asanas training group and aerobic exercise with stretching training group as well as recreational games training group and aerobic exercise with stretching training group on upper back strength.

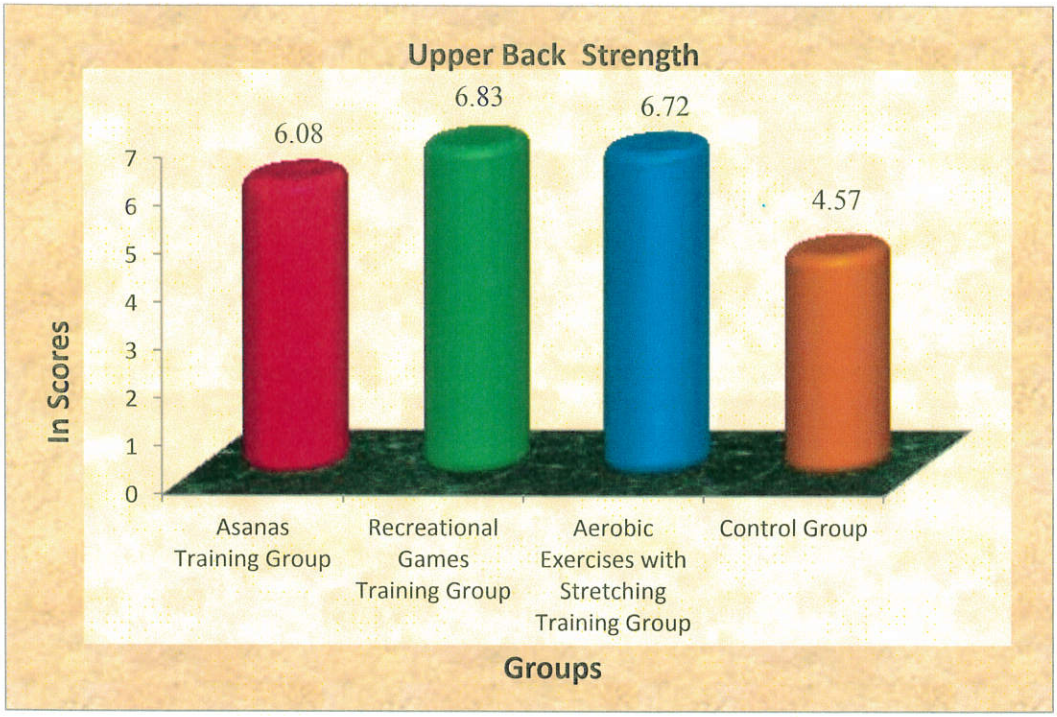

FIGURE –32: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF UPPER BACK STRENGTH

4.4.4.1 DISCUSSIONS ON FINDINGS OF UPPER BACK STRENGTH

The results presented in table-XXIX showed that the obtained adjusted post-test means on upper back strength of asanas training group (ATG) was 6.08, recreational games training group (RGTG) was 6.83 aerobic exercises with stretching training group (AEWSTG) with mean value of 6.72, and the control group (CG) mean values of 4.57.

The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.88, 0.01 and 0.01 respectively. It was found that obtained 'p' value on, post-test scores and adjusted post-test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 24.49%), recreational games training group (RGTG =38%) and aerobic exercise with stretching training group (AEWSTG = 39.58%) training would be effective in causing significant improvement among the experimental groups on upper back strength. And also when comparing the mean gain values of upper back the recreational games training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the upper back strength of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to increase the upper back strength.

The results of this investigation are also supported by the following studies. Soubhagyalaxmi Mohanty et al., (2015) conducted a study on muscle strength, a component for balance, gait and functional mobility are vital for children with visual impairment. It was concluded that yoga therapy seemed to have considerable benefits for the children's muscular fitness.

Funk, (1971) conducted a study to determine the effect of a physical education programme on the physical fitness and motor development of a group of children classified as trainable mentally retarded. It was concluded that on two fitness test items, the shuttle run and sit-ups, the experimental group improved significantly.

Lante et al., (2014) conducted a study to compare two approaches to increasing physical activity in adults with intellectual disability a lifestyle physical activity (light-

moderate intensity) approach and a structured exercise (moderate-vigorous intensity) approach. The study was concluded that the trial results determined that the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Soubhagyalaxmi Mohanty et al., (2015), Funk, (1971) and Lante et al., (2014).

4.4.5 RESULTS ON LOWER BACK STRENGTH

The physical fitness variable namely lower back strength was measured through Kraus weber strength test. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XXXI.

TABLE –XXXI

COMPUTATION OF ANALYSIS OF COVARIANCE ON LOWER BACK STRENGTH (In Scores)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	5.00	4.90	4.80	4.70	**B**	0.50	3	0.17	0.24	0.87
					W	24.60	36	0.68		
Post test	7.50	6.60	6.80	4.80	**B**	39.68	3	13.23	7.67*	0.01
					W	62.10	36	1.73		
Adjusted post test	7.33	6.54	6.86	4.97	**B**	30.98	3	10.33	11.61*	0.01
					W	31.13	35	0.89		
Mean gain	2.50	1.70	2.00	0.10						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XXXI shows that the pretest mean scores of lower back strength of asanas training group (ATG) was 4.90, recreational games training group (RGTG) was 5.00, aerobic exercise with stretching training group (AEWSTG) was 4.80 and control group (CG) was 4.70.

The obtained 'p' value on pretest scores 0.87 was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post-test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on lower back strength.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XXXII.

TABLE -XXXII

PAIRED MEAN SIGNIFICANT DIFFERENCE ON LOWER BACK STRENGTH (In Scores)

Adjusted Post Test Means				Mean Difference	'p' Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	6.86	4.97	1.89*	0.01
-	6.54	-	4. 97	1.58*	0.01
-	6.54	6.86	-	0.31	0.47
7.33	-	-	4. 97	2.36*	0.01
7.33	-	6.86	-	0.48	0.27
7.33	6.54	-	-	0.79	0.07

**Significant at 0.05 level of confidence.*

The above table XXXII clearly indicates that the paired mean significant difference on the level of lower back strength among the experimental and control groups. And the variation in upper back strength among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG) and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and recreational games training group (RGTG), asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asanas training group and aerobic exercise with stretching training group as well as recreational games training group and aerobic exercise with stretching training group on lower back strength.

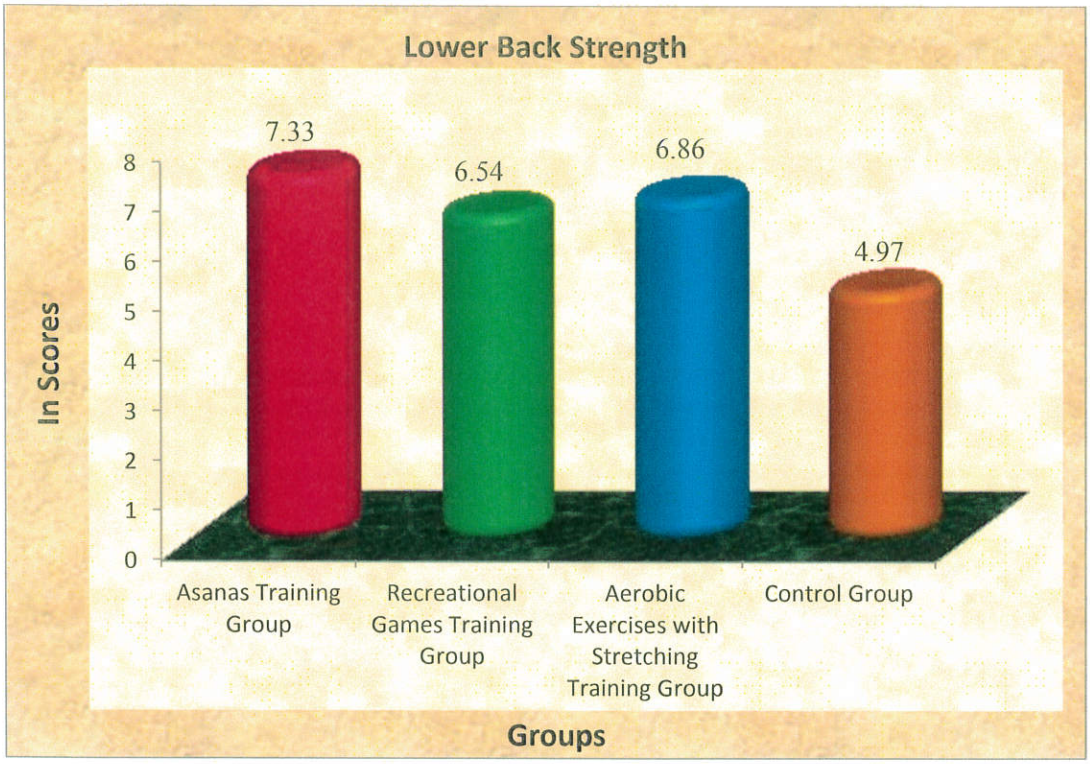

FIGURE – 33: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF LOWER BACK STRENGTH

4.4.5.1 DISCUSSIONS ON FINDINGS OF LOWER BACK STRENGTH

The results presented in table-XXXI showed that the obtained adjusted post-test means on lower back strength of asanas training group (ATG) was 7.33, recreational games training group (RGTG) was 6.54aerobic exercise with stretching training group (AEWSTG) with mean value of 6.86, control group (CG) mean values of 4.97.

The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.87, 0.01 and 0.01 respectively. It was found that obtained 'p' value on, post-test scores and adjusted post-test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 50%), recreational games training group (RGTG = 34.69) and aerobic exercise with stretching training group (AEWSTG = 41.67) training would be effective in causing significant improvement among the experimental groups on lower back strength. And also when comparing the mean gain values of lower back strength, the asanas training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the lower back strength of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to increase the lower back strength.

The results of this investigation are also supported by the following studies. Soubhagyalaxmi Mohanty et al., (2015) conducted a study on muscle strength, a component for balance, gait and functional mobility are vital for children with visual impairment. It was concluded that yoga therapy seemed to have considerable benefits for the children's muscular fitness.

Funk, (1971) conducted a study to determine the effect of a physical education programme on the physical fitness and motor development of a group of children classified as trainable mentally retarded. It was concluded that on two fitness test items, the shuttle run and sit-ups, the experimental group improved significantly.

Lante et al., (2014) conducted a study to compare two approaches to increasing physical activity in adults with intellectual disability a lifestyle physical activity (light-

moderate intensity) approach and a structured exercise (moderate-vigorous intensity) approach. The study was concluded that the trial results determined that the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Soubhagyalaxmi Mohanty et al., (2015), Funk, (1971) and Lante et al., (2014).

4.4.6 RESULTS ON HAMSTRING MUSCLES STRENGTH

The physical fitness variable namely hamstring muscles strength was measured through Kraus weber strength test. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XXXIII

TABLE –XXXIII

COMPUTATION OF ANALYSIS OF COVARIANCE ON HAMSTRING MUSCLES STRENGTH (In Scores)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	4.90	5.00	5.10	4.80	B	0.50	3	0.17	0.28	0.84
					W	21.40	36	0.59		
Post test	7.00	7.50	8.20	4.90	B	60.60	3	20.20	23.46*	0.01
					W	31.00	36	0.86		
Adjusted post test	7.00	7.50	8.19	4.91	B	58.61	3	19.54	22.14*	0.01
					W	30.88	35	0.88		
Mean gain	2.10	2.50	3.10	0.10						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XXXIII shows that the pretest mean scores of hamstring muscles strength of asanas training group (ATG) was 4.90, recreational games training group (RGTG) was 5.00, aerobic exercise with stretching training group (AEWSTG) was 5.10 and control group (CG) was 4.80.

The obtained 'p' value on pre test scores 0.84was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on hamstring muscles strength.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XXXIV.

TABLE -XXXIV

PAIRED MEAN SIGNIFICANT DIFFERENCE ON HAMSTRING MUSCLES STRENGTH (In Scores)

Adjusted Post Test Means				Mean Difference	'p' Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	8.19	4.91	3.28*	0.01
-	7.50	-	4.91	2.59*	0.01
-	7.50	8.19	-	0.69	0.11
7.00	-	-	4.91	2.09*	0.01
7.00	-	8.19	-	1.19*	0.01
7.00	7.50	-	-	0.49	0.25

**Significant at 0.05 level of confidence.*

The above table XXXIV clearly indicates that the paired mean significant difference on the level of hamstring muscles strength among the experimental and control groups. And the variation in hamstring muscles strength among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG), asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG) and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and recreational games training group (RGTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group as well as asanas training group and aerobic exercise with stretching training group on hamstring muscles strength.

The results of this investigation are also supported by the following studies. Soubhagyalaxmi Mohanty et al., (2015) conducted a study on muscle strength, a component for balance, gait and functional mobility are vital for children with visual impairment. It was concluded that yoga therapy seemed to have considerable benefits for the children's muscular fitness.

Sami Mohammed Elmahgoub et al. (2009) investigated that the effect of combined exercise training on indices of body composition, physical fitness and lipid profile in adolescents with mental retardation. The level of triglycerides, total cholesterol and low-density lipoprotein decreased significantly, while high-density lipoprotein increased. Muscle strength, muscle fatigue resistance and sit-to-stand were ameliorated. In conclusion, combined exercise training has a positive effect on indices of obesity, physical fitness and lipid profile in adolescents with mental retardation.

Andrew Graham and Greg Reid. (2000) conducted a study to describe the change in physical fitness of middle-aged adults with an intellectual disability over a period of 13 years. Using the Canadian Standardized Test of Fitness, the participants were evaluated for cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition. In this study we could observe that sprint interval training has stronger beneficial effects on body composition, physical fitness and metabolic.

Lante et al., (2014) conducted a study to compare two approaches to increasing physical activity in adults with intellectual disability a lifestyle physical activity (light-moderate intensity) approach and a structured exercise (moderate-vigorous intensity) approach. The study was concluded that the trial results determined that the effectiveness

and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Soubhagyalaxmi Mohanty et al., (2015), Sami Mohammed Elmahgoub et al. (2009), Andrew Graham and Greg Reid. (2000) and Lante et al., (2014).

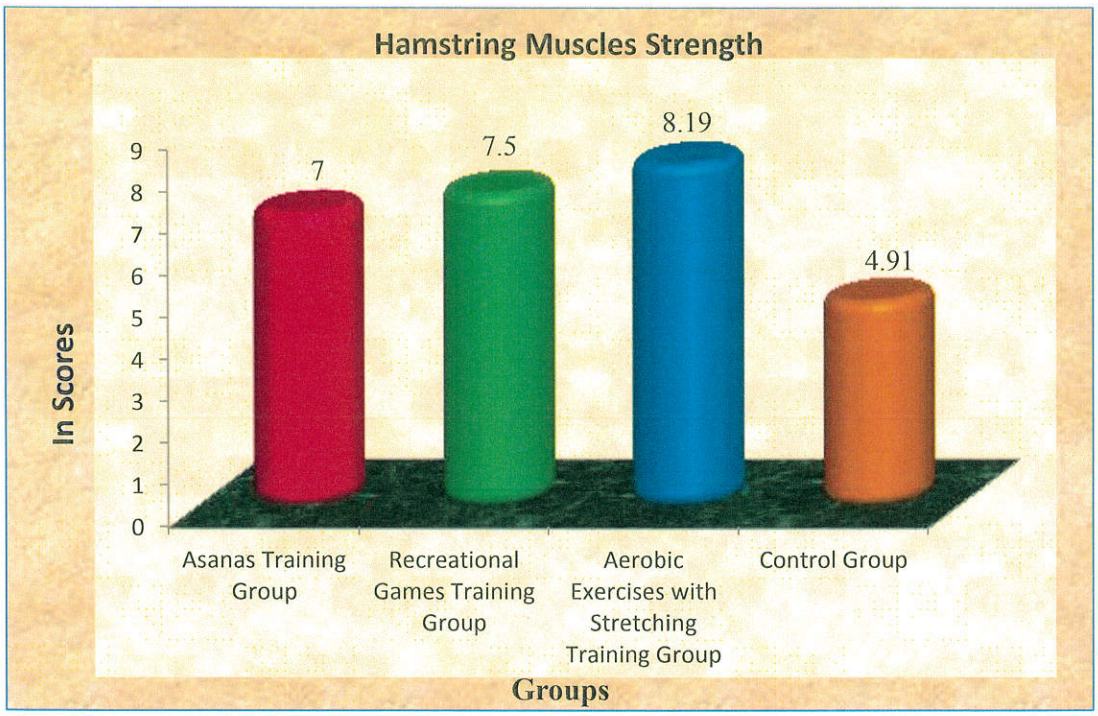

FIGURE –34: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF HAMSTRING MUSCLES STRENGTH

4.4.6.1 DISCUSSIONS ON FINDINGS OF HAMSTRING MUSCLES STRENGTH

The results presented in table-XXXIII showed that the obtained adjusted post-test means on hamstring muscles strength of asanas training group (ATG) was 7.00 recreational games training group (RGTG) was 7.50 aerobic exercises with stretching training group (AEWSTG) with mean value of 8.19, control group (CG) mean values of 4.91.

The differences among pretest scores, post test scores and adjusted posttest mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.84, 0.01 and 0.01respectively. It was found that obtained 'p' value on, post test scores and adjusted post-test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asana straining group (ATG = 42.86%), recreational games training group (RGTG = 50%) and aerobic exercise with stretching training group (AEWSTG = 60.78%) training would be effective in causing significant improvement among the experimental groups on hamstring muscles strength. And also when comparing the mean gain values of hamstring muscles strength the aerobic exercise with stretching training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the hamstring muscles strength of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to increase the hamstring muscles strength.

The results of this investigation are also supported by the following studies. Soubhagyalaxmi Mohanty et al., (2015) conducted a study on muscle strength, a component for balance, gait and functional mobility are vital for children with visual impairment. It was concluded that yoga therapy seemed to have considerable benefits for the children's muscular fitness.

Funk, (1971) conducted a study to determine the effect of a physical education programme on the physical fitness and motor development of a group of children classified as trainable mentally retarded. It was concluded that on two fitness test items, the shuttle run and sit-ups, the experimental group improved significantly.

Lante et al., (2014) conducted a study to compare two approaches to increasing physical activity in adults with intellectual disability a lifestyle physical activity (light-moderate intensity) approach and a structured exercise (moderate-vigorous intensity) approach. The study was concluded that the trial results determined that the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Soubhagyalaxmi Mohanty et al., (2015), Funk, (1971) and Lante et al., (2014).

4.4.7 RESULTS ON FLEXIBILITY

The physical fitness variable namely flexibility was measured through sit and reach test. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XXXV.

TABLE –XXXV

COMPUTATION OF ANALYSIS OF COVARIANCE ON FLEXIBILITY (Scores in Centimeters)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	2.60	2.20	2.40	2.10	**B**	1.48	3	0.49	0.09	0.96
					W	189.30	36	5.26		
Post test	4.20	4.10	4.60	2.30	**B**	31.40	3	10.47	1.58	0.21
					W	239.00	36	6.64		
Adjusted post test	3.91	4.23	4.52	2.54	**B**	23.00	3	7.67	11.34*	0.01
					W	23.66	35	0.68		
Mean gain	1.60	1.90	2.20	0.20						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XXXV shows that the pretest mean scores of flexibility of asanas training group (ATG) was 2.60, recreational games training group (RGTG) was 2.20, aerobic exercise with stretching training group (AEWSTG) was 2.40 and control group (CG) was 2.10.

The obtained 'p' value on pretest scores 0.96 was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test scores analysis proved that there were no significant differences among the groups, as the obtained 'p' value 0.21 was greater than the required 'p' value of 0.05. This proved that there were no significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on flexibility.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XXXVI.

TABLE -XXXVI

PAIRED MEAN SIGNIFICANT DIFFERENCE

ON FLEXIBILITY (Scores in Centimeters)

Adjusted Post Test Means				Mean Difference	"p" Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	4.52	2.54	1.98*	0.01
-	4.23	-	2.54	1.69*	0.01
-	4.23	4.52	-	0.29	0.44
3.91	-	-	2.54	1.37*	0.01
3.91	-	4.52	-	0.61	0.10
3.91	4.23	-	-	0.33	0.38

**Significant at 0.05 level of confidence.*

The above table XXXVI clearly indicates that the paired mean significant difference on the level of flexibility among the experimental and control groups. And the variation in flexibility among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG), and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and

recreational games training group (RGTG), asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group as well as asanas training group and aerobic exercise with stretching training group on flexibility.

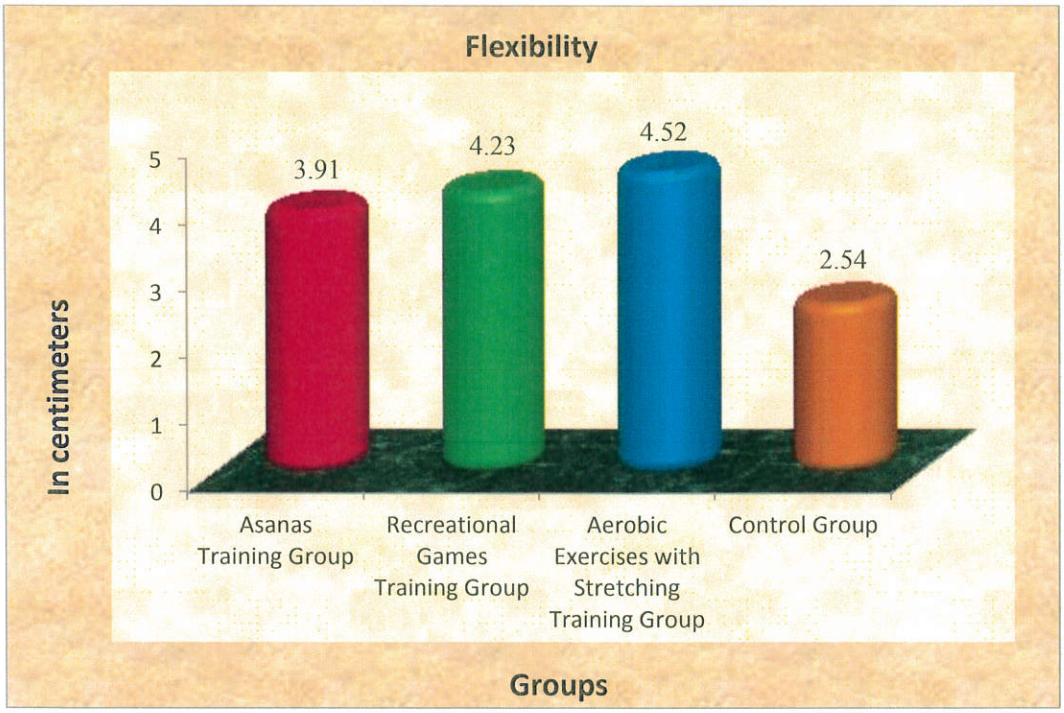

FIGURE –35: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF FLEXIBILITY

4.4.7.1 DISCUSSIONS ON FINDINGS OF FLEXIBILITY

The results presented in table-XXXV showed that the obtained adjusted post-test means on flexibility of asanas training group (ATG) was 3.91, recreational games training group (RGTG) was 4.23 aerobic exercise with stretching training group (AEWSTG) with mean value of 4.52, control group (CG) mean values of 2.54.

The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.96, 0.21 and 0.01 respectively. It was found that obtained 'p' value on adjusted post test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG =61.54%), recreational games training group (RGTG = 86.36%) and aerobic exercise with stretching training group (AEWSTG =91.67%) training would be effective in causing significant improvement among the experimental groups on flexibility. And also when comparing the mean gain values of flexibility the aerobic exercise with stretching training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the flexibility of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to increase the flexibility.

The results of this investigation are also supported by the following studies. Ananda Ghosh and M. Srinivasan. (2016) conducted a study on the impact of adapted yoga with recreational games practice on selected bio-motor variables of intellectually challenged children. The following bio motor variables namely flexibility and agility were selected for the study. The experimental group showed significant improvement on flexibility and agility.

Laura Guidetti et al. (2010) investigated that the effects of exercise and physical activity on health and well-being for individuals with intellectual disabilities. Findings of this study showed that physical activity improved fitness in adult athletes with intellectual disabilities, decreasing health risks. Athletes with lower intellectual disabilities obtained higher performance scores in motor coordination test.

Ransom & Mary V (2012) conducted a study to determine if a significant difference existed between a programme of continuous motion (run/walk) proceeded by a flexibility warm-up period and a continuous motion programme in the development of cardiovascular endurance in mildly and moderately mentally retarded adults. Results showed a significant increase in flexibility.

Hence the results of the study are in consonance with the research done by Ananda Ghosh and M. Srinivasan. (2016), Laura Guidetti et al. (2010) and Ransom & Mary V (2012)

4.4.8 RESULTS ON LEG EXPLOSIVE POWER

The physical fitness variable namely leg explosive power was measured through standing broad jump test. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XXXVII.

TABLE –XXXVII

COMPUTATION OF ANALYSIS OF COVARIANCE ON LEG EXPLOSIVE POWER (Scores in Centimeters)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	87.00	88.50	90.00	89.40	**B**	51.08	3	17.03	0.09	0.97
					W	7028.90	36	195.25		
Post test	98.50	103.00	104.00	89.00	**B**	1406.88	3	468.96	2.33	0.09
					W	7242.50	36	201.18		
Adjusted post test	99.91	103.22	103.02	88.45	**B**	1447.62	3	482.54	6.69*	0.01
					W	2523.97	35	72.11		
Mean gain	11.50	14.5	14	0.40						

**Significant at 0.05 level of confidence*. B=Between, W= Within.

Table - XXXVII shows that the pretest mean scores of leg explosive power of asanas training group (ATG) was 87.00, recreational games training group (RGTG) was 88.50, aerobic exercise with stretching training group (AEWSTG) was 90.00 and control group (CG) was 89.40.

The obtained 'p' value on pretest scores 0.97 was greater than the required 'p' value of 0.05 to be significant. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.09 was greater than the required 'p' value of 0.05. This proved that there were no significant differences among the post-test means of all the groups of the pre and post-test scores among the groups, the adjusted post-test mean

scores were calculated and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on leg explosive power.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XXXVIII.

TABLE -XXXVIII

PAIRED MEAN SIGNIFICANT DIFFERENCE ON

LEG EXPLOSIVE POWER (Scores in Centimeters)

Adjusted Post Test Means				Mean Difference	"p" Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	103.02	88.45	14.51*	0.01
-	103.22	-	88.45	14.74*	0.01
-	103.22	103.02	-	0.23	0.95
99.91	-	-	88.45	11.47*	0.01
99.91	-	103.02	-	3.04	0.43
99.91	103.22	-	-	3.27	0.40

**Significant at 0.05 level of confidence.*

The above table XXXVIII clearly indicates that the paired mean significant difference on the level of leg explosive power among the experimental and control groups. And the variation in leg explosive power among the experimental and control groups were found to be significant difference between the paired means of asana straining group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG), and aerobic exercises with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asana straining group (ATG) and recreational games training group (RGTG) asana straining group (ATG) and aerobic exercise with stretching training

group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asana straining group and aerobic exercise with stretching training group as well as recreational games training group and aerobic exercise with stretching training group on leg explosive power.

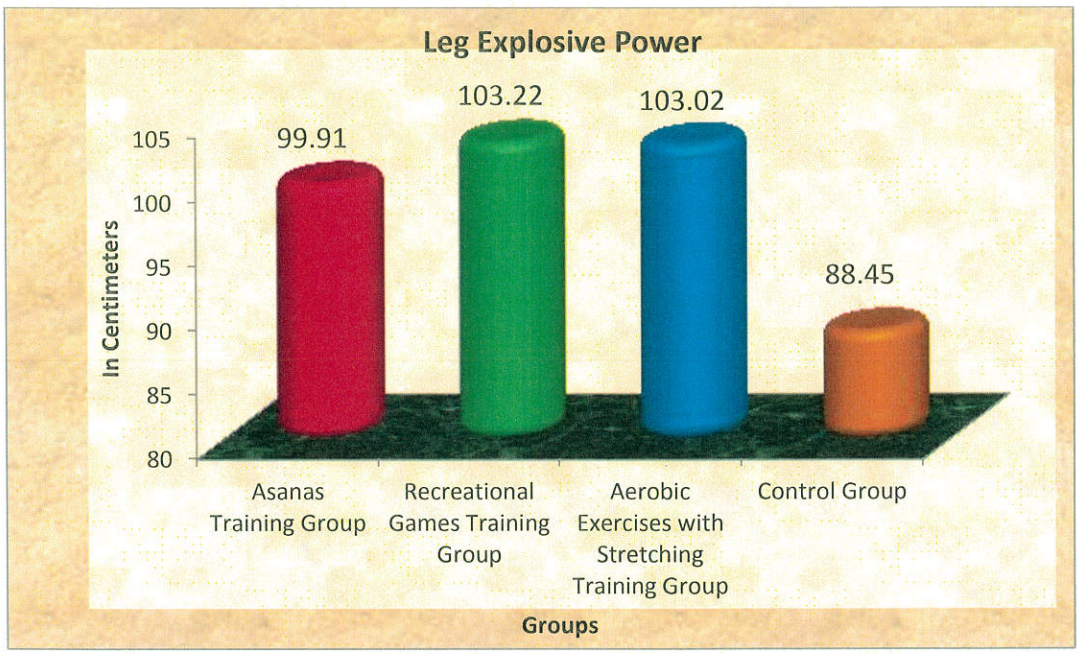

FIGURE –36: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF LEG EXPLOSIVE POWER

4.4.8.1 DISCUSSIONS ON FINDINGS OF LEG EXPLOSIVE POWER

The results presented in table-XXXVII showed that the obtained adjusted post-test means on leg explosive power of asanas training group (ATG) was 99.91, recreational games training group (RGTG) was 103.22 aerobic exercise with stretching training group (AEWSTG) with mean value of 103.02, control group (CG) mean values of 88.45.

The differences among pretest scores, post test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.97, 0.09 and 0.01 respectively. It was found that obtained 'p' value on adjusted post-test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 4.28%), recreational games training group (RGTG = 16.38%) and aerobic exercise with stretching training group (AEWSTG = 15.56%) training would be effective in causing significant improvement among the experimental groups on leg explosive power. And also when comparing the adjusted post-test mean values of leg explosive power the recreational games training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the leg explosive power of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to increase the leg explosive power.

The result of this investigation is supported by the following studies. Laura Guidetti et al., (2010) investigated that the effects of exercise and physical activity on health and well-being for individuals with intellectual disabilities. Before and after a 9-month period, all participants performed fitness tests assessing body composition, arm muscular strength (HG), flexibility (SR) lower and upper-body muscular strength and

endurance (SUP and PUP), cardiovascular endurance (ST), explosive leg power (SLJ) balance ability (FT), motor coordination (TUGT). Findings of this study showed that physical activity improved fitness in adult athletes with intellectual disabilities, decreasing health risks. Athletes with lower intellectual disabilities obtained higher performance scores in motor coordination test.

Hence the results of the study are inconsonance with the research done by Laura Guidetti et al., (2010).

4.4.9 RESULTS ON ORIENTATION ABILITY

The co-ordinative ability variable namely orientation ability was measured through medicine ball run test. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XXXIX.

TABLE –XXXIX

COMPUTATION OF ANALYSIS OF COVARIANCE ON ORIENTATION ABILITY (Scores in Seconds)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	34.30	32.40	35.40	36.80	**B**	103.48	3	34.49	1.46	0.24
					W	850.50	36	23.63		
Post test	29.40	28.00	30.30	36.30	**B**	401.40	3	133.80	6.78*	0.01
					W	710.60	36	19.74		
Adjusted post test	29.72	29.74	29.80	34.75	**B**	175.89	3	58.63	8.74*	0.01
					W	234.70	35	6.71		
Mean gain	4.90	4.40	5.10	0.50						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XXXIX shows that the pretest mean scores of orientation ability of asanas training group (ATG) was 34.30, recreational games training group (RGTG) was 32.40, aerobic exercise with stretching training group (AEWSTG) was 35.40 and control group (CG) was 36.80.

The obtained 'p' value on pretest scores 0.24 was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on orientation ability.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XL.

TABLE -XL

PAIRED MEAN SIGNIFICANT DIFFERENCE ON ORIENTATIONABILITY (Scores in Seconds)

Adjusted Post Test Means				Mean Difference	"p" Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	29.74	34.75	4.95*	0.01
-	29.55	-	34.75	5.01*	0.01
-	29.55	29. 74	-	0.06	0.96
29.72	-	-	34.75	5.03*	0.01
29.72	-	29. 74	-	0.08	0.95
29.72	29.55	-	-	0.02	0.99

**Significant at 0.05 level of confidence.*

The above table XL clearly indicates that the paired mean significant difference on the level of leg explosive power among the experimental and control groups. And the variation in leg explosive power among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG) and recreational games training group (RGTG) and control group (CG) and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and recreational games training group (RGTG), asanas training group (ATG) and aerobic exercises with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asana straining group and aerobic exercise with stretching training group as well as recreational games training group and aerobic exercise with stretching training group on orientation ability.

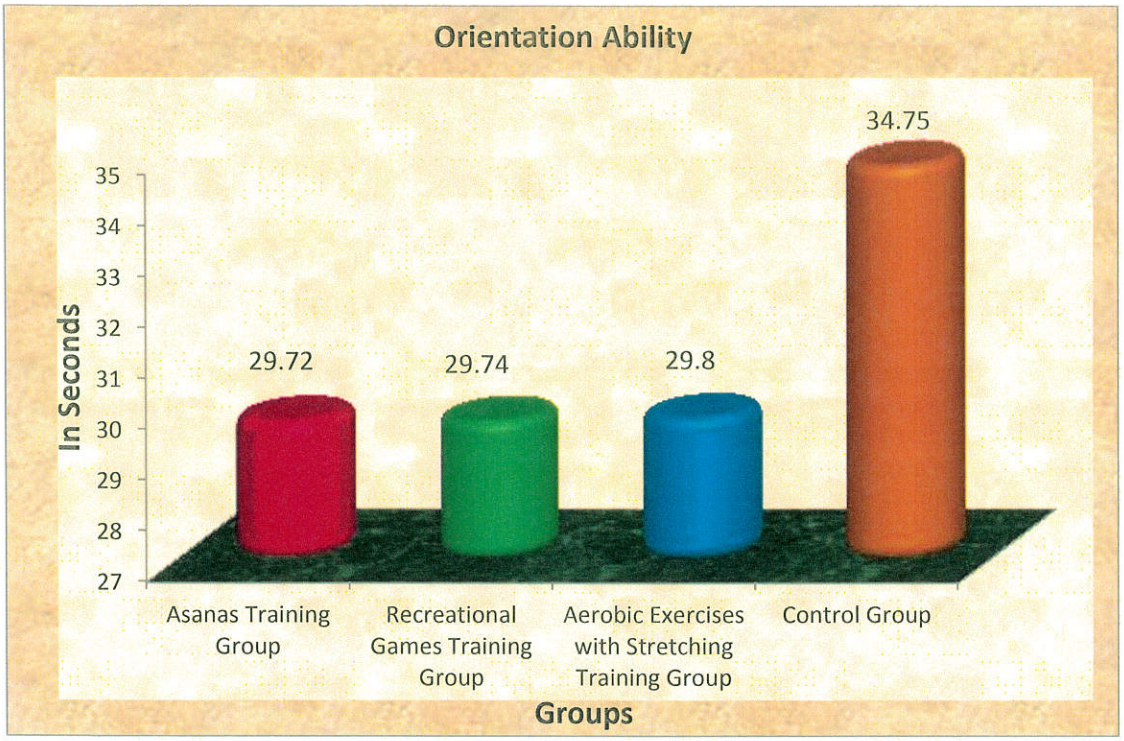

FIGURE –37: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF ORIENTATION ABILITY

4.4.9.1 DISCUSSIONS ON FINDINGS OF ORIENTATION ABILITY

The results presented in table-XXXIX showed that the obtained adjusted post-test means on orientation ability of asanas training group (ATG) was 29.72, recreational games training group (RGTG) was 29.74 aerobic exercises with stretching training group (AEWSTG) with mean value of 29.80 control group (CG) mean values of 34.75.

The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.24, 0.01 and 0.01 respectively. It was found that obtained 'p' value on, posttest scores and adjusted post-test scores means were significant as the obtained 'p' values were lesser than the required table 'p' value of 0.05.

Asanas training group (ATG =14.29%), recreational games training group (RGTG =13.58%) and aerobic exercises with stretching training group (AEWSTG =14.41%) training would be effective in causing significant improvement among the experimental groups on orientation ability. And also when comparing the mean gain values of orientation ability the aerobic exercise with stretching training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly decreased the orientation ability of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to decrease the orientation ability.

The result of this investigation are supported by the following studies done by study is inconsonance with the research done by Koushik Bhowmik, (2018). Conducted a study was to determine the effect of fartlek training on selected co-ordinative abilities and physical fitness variables among intercollegiate football players. To achieve the purpose eighteen intercollegiate players were selected from the Michael Madhusudan Dutta College, Sabroom and Tripura. The age of the subject ranged from 18 to 24 years. The selected subjects were considered as only one group. The following criterion variables were selected for the co-ordinative abilities namely, space orientation ability and complex reaction ability and for the physical fitness variables such as speed and agility. It was

found that there is significant improvement in space orientation ability and reaction ability due to the treatment of fartlek training.

Hence the results of the study are inconsonance with the research done by Koushik Bhowmik, (2018).

4.4.10 RESULTS IN DIFFERENTIATION ABILITY

The coordinative ability variable namely differentiation ability were measured through throw backward medicine ball test. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XLI.

TABLE –XLI

COMPUTATION OF ANALYSIS OF COVARIANCE ON DIFFERENTIATION ABILITY (In Scores)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	8.80	9.00	8.90	8.70	B	0.50	3	0.17	0.09	0.97
					W	70.60	36	1.96		
Post test	10.40	11.40	11.80	8.60	B	61.10	3	20.37	18.90*	0.01
					W	38.80	36	1.08		
Adjusted Post test	10.40	11.38	11.79	8.62	B	59.34	3	19.70	18.58*	0.01
					W	37.27	35	1.07		
Mean gain	1.60	2.40	2.90	0.10						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XLI shows that the pretest mean scores of differentiation ability of asanas training group (ATG) was 8.80, recreational games training group (RGTG) was 9.00,

aerobic exercises with stretching training group (AEWSTG) was 8.90 and control group (CG) was 8.70.

The obtained 'p' value on pretest scores 0.97 was greater than the required 'p' value of 0.05 to be significant. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post-test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the post-test means of all the groups.

Taking into consideration of the pre and post-test scores among the groups, the adjusted post-test mean scores were calculated and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on differentiation ability.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XLII.

TABLE -XLII

PAIRED MEAN SIGNIFICANT DIFFERENCE

ON DIFFERENTIATION ABILITY (In Scores)

Adjusted Post Test Means				Mean Difference	"P" Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	11.79	8.62	3.17*	0.01
-	11.38	-	8.62	2.76*	0.01
-	11.38	11.79	-	-0.42	0.38
10.40	-	-	8.62	1.79*	0.01
10.40	-	11.79	-	-1.39*	0.01
10.40	11.38	-	-	-0.97*	0.04

**Significant at 0.05 level of confidence.*

The above table XLII clearly indicates that the paired mean significant difference on the level of differentiation ability among the experimental and control groups. And the variation in differentiation ability among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG), aerobic exercise with stretching training group (AEWSTG) and control group (CG). Asanas training group (ATG) and recreational games training group (RGTG) asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG). There were no significant differences between recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG). .

However there was no significant difference found between the recreational games training group and aerobic exercise with stretching training group on differentiation ability.

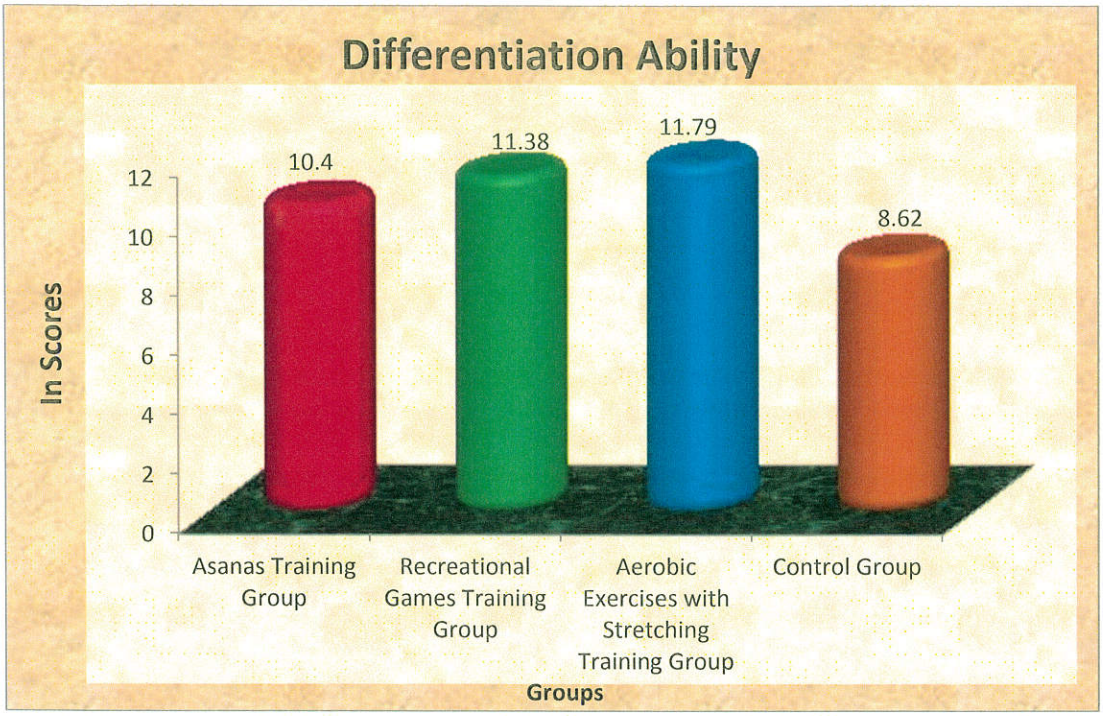

FIGURE –38: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF DIFFERENTIATION ABILITY

4.4.10.1 DISCUSSIONS ON FINDINGS OF DIFFERENTIATION ABILITY

The results presented in table-XLI showed that the obtained adjusted post-test means on differentiation ability of asanas training group (ATG) was 10.40, recreational games training group (RGTG) was 11.38 aerobic exercises with stretching training group (AEWSTG) with mean value of 11.79, control group (CG) mean values of 8.62.

The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.97, 0.01and0.01 respectively. It was found that obtained 'p' value on, posttest scores and adjusted post-tests cores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 18.18%), recreational games training group (RGTG = 26.67%) and aerobic exercise with stretching training group (AEWSTG

=32.58%) training would be effective in causing significant improvement among the experimental groups on differentiation ability. And also when comparing the mean gain values on differentiation ability, the recreational games training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the differentiation ability of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to decrease the differentiation ability.

The result of this investigation are supported the following studies by study is inconsonance with the research done by M. Srinivasan and M. Ravi, (2016) conducted a study on effect of yogic practice and SAQ training on selected co-coordinative abilities of students with hearing impairment. For this study, forty five hearing impaired students male were selected as subjects from Industrial Training Institute, of Sri Ramakrishna Mission Vidyalaya, Coimbatore, Tamil Nadu, Infant Jesus Higher Secondary School, Periyanaickenpalayam, Coimbatore, Tamil Nadu. The study would be confined to hearing impaired male students between the age group of 12 and 18 years. The following dependent variables were selected for the study viz reaction ability and upper body differentiation ability. It was concluded that SAQ training was better than yogic practice for improving reaction ability and upper body differentiation ability of the selected students.

Hence the results of the study are inconsonance with the research done by M. Srinivasan and M. Ravi, (2016).

4.4.11 RESULTS ON FAT MASS AT RIGHT ARM

The body composition variable namely fat mass at right arm was measured through tanita body composition monitor. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XLIII.

TABLE –XLIII

COMPUTATION OF ANALYSIS OF COVARIANCE ON FAT MASS AT RIGHT ARM (Scores in Kilograms)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	0.62	0.60	0.61	0.64	B	0.01	3	0.00	0.04	0.99
					W	3.03	36	0.08		
Post test	0.36	0.37	0.30	0.67	B	0.83	3	0.28	4.77*	0.01
					W	2.09	36	0.06		
Adjusted Post test	0.36	0.38	0.30	0.66	B	0.78	3	0.26	5.19*	0.01
					W	1.76	35	0.05		
Mean gain	0.26	0.23	0.31	0.03						

**Significant at 0.05 level of confidence*. B=Between, W= Within.

Table-XLIII shows that the pretest mean scores of fat mass at right arm of asanas training group (ATG) was 0.62, recreational games training group (RGTG) was 0.60, aerobic exercise with stretching training group (AEWSTG) was 0.61 and control group (CG) was 0.64.

The obtained 'p' value on pretest scores 0.99 was greater than the required 'p' value of 0.05 to be significant at 0.05 levels. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on fat mass at right arm.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-XLIV

TABLE -XLIV

PAIRED MEAN SIGNIFICANT DIFFERENCEON FAT MASS AT RIGHT ARM (Scores in Kilograms)

Adjusted Post Test Means				Mean Difference	"P" Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	0.30	0.66	0.36*	0.01
-	0.38	-	0.66	0.28*	0.01
-	0.38	0.30	-	0.08	0.47
0.36	-	-	0.66	0.30*	0.01
0.36	-	0.30	-	0.06	0.58
0.36	0.38	-	-	-0.02	0.90

**Significant at 0.05 level of confidence.*

The above table XLIV clearly indicates that the paired mean significant difference on the level of fat mass at right arm among the experimental and control groups. And the variation in differentiation ability among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG), aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and recreational games training group (RGTG) asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asana straining group and aerobic exercise

with stretching training group, as well as recreational games training group and aerobic exercise with stretching training group on fat mass at right arm.

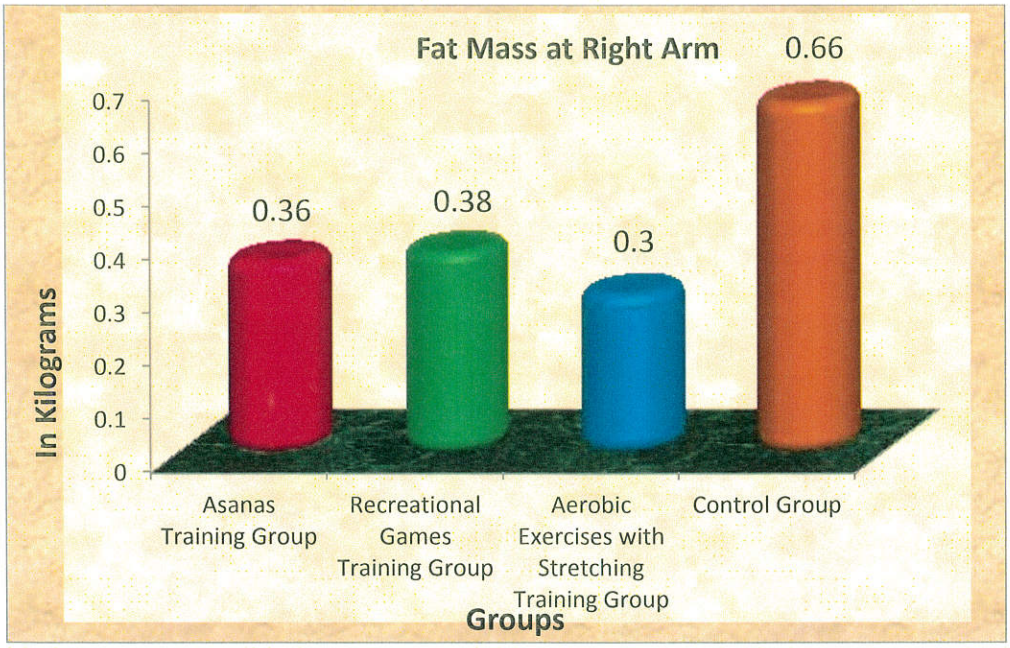

FIGURE –39: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF FAT MASS AT RIGHT ARM

4.4.11.1 DISCUSSIONS ON FINDINGS OF FAT MASS AT RIGHT ARM

The results presented in table-XLIII showed that the obtained adjusted post-test means on fat mass at right arm of asanas training group (ATG) was 0.36, recreational games training group (RGTG) was 0.38 aerobic exercise with stretching training group (AEWSTG) with mean value of 0.30, control group (CG) mean values of 0.66.

The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.99, 0.01 and 0.01 respectively. It was found that obtained 'p' value on, post-test scores and adjusted post-test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 41.94%), recreational games training group (RGTG =40%) and aerobic exercise with stretching training group (AEWSTG =40.98%) training would be effective in causing significant improvement among the experimental groups on fat mass at right arm. And also when comparing the mean gain values on fat mass at right arm, the aerobic exercise with stretching training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly increased the fat mass at right arm of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to decrease the fat mass at right arm.

The result of this investigation is supported by the following studies. Ronald, (1990) conducted a study on the effects of an aerobic fitness programme and dietary intervention with external control components on three obese adults with severe mental retardation. A visual inspection of the data indicated that subjects improved from their baseline scores on all measurements. Subjects' mean body weight and percent body fat decreased 7.73% and 19.31% respectively.

Sami Mohammed Elmahgoub et al., (2009) investigated that the effect of combined exercise training on indices of body composition, physical fitness and lipid profile in adolescents with mental retardation. In comparison with the control group, weight, body mass index, waist circumference and fat mass were decreased significantly,

while relative fat-free mass was increased. In conclusion, combined exercise training had a significant impact on indices of physical fitness, obesity, and lipid profile in adolescents with intellectually disability.

Andrew Graham and Greg Reid. (2000) conducted a study to describe the change in physical fitness of middle-aged adults with an intellectual disability over a period of 13 years. In this study we could observe that sprint interval training had better beneficial influence on body composition and physical fitness.

Boer et al. (2014) assessed the impact of sprint interval training on metabolic and physical fitness in adolescents and young adults with mental retardation when contrasted with continuous aerobic training and no training (group). Sprint interval training showed a significant positive evolution for waist circumference, fat%, systolic fitness compared with control.

Seron et al. (2014) investigated the effects of a 12 week aerobic and resistance exercise on body composition of adolescents with down syndrome. The aerobic and resisted training programme maintained body fat levels. ATG significantly reduced body mass index and Waist circumference measures. Individuals who did not attend the training intervention increased their percentage of fat. The trial results will determine the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Ronald, (1990), Sami Mohammed Elmahgoub et al., (2009) Andrew Graham and Greg Reid. (2000), Boer et al., (2014) and Seron et al. (2014).

4.4.12 RESULTS ON FAT MASS AT LEFT ARM

The body composition variables namely fat mass at left arm were measured through tanita body composition monitor. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XLV.

TABLE –XLV

COMPUTATION OF ANALYSIS OF COVARIANCE ON FAT MASS AT LEFT ARM (Scores in Kilograms)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'P' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	0.66	0.63	0.67	0.70	**B**	0.03	3	0.01	0.05	0.99
					W	5.99	36	0.17		
Post test	0.38	0.31	0.34	0.74	**B**	1.21	3	0.40	5.37*	0.01
					W	2.69	36	0.08		
Adjusted Post test	0.38	0.32	0.34	0.73	**B**	1.10	3	0.37	6.69*	0.01
					W	1.91	35	0.006		
Mean gain	0.28	0.32	0.33	0.04						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-XLV shows that the pretest mean scores of fat mass at left arm of asanas training group (ATG) was 0.66, recreational games training group (RGTG) was 0.63, aerobic exercise with stretching training group (AEWSTG) was 0.67 and control group (CG) was 0.70.

The obtained 'p' value on pretest scores 0.99 was greater than the required 'p' value of 0.05 to be significant. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained p value of 0.01 was lesser than the required p value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on fat mass at left arm.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table- XLVI

TABLE -XLVI

PAIRED MEAN SIGNIFICANT DIFFERENCEON FAT MASS AT LEFT ARM (Scores in Kilograms)

Adjusted Post Test Means				Mean Difference	"P" Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	0.34	0.73	0.39*	0.01
-	0.32	-	0.73	0.41*	0.01
-	0.32	0.34	-	0.02	0.88
0.38	-	-	0.73	0.35*	0.01
0.38	-	0.34	-	0.04	0.68
0.38	0.32	-	-	0.06	0..58

**Significant at 0.05 level of confidence.*

The above table XLVI clearly indicates that the paired mean significant difference on the level of fat mass at left arm among the experimental and control groups. And the variation in differentiation ability among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and

control group (CG), recreational games training group (RGTG) and control group (CG), aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and recreational games training group (RGTG) asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asanas training group and aerobic exercise with stretching training group, as well as recreational games training group and aerobic exercise with stretching training group on fat mass at left arm.

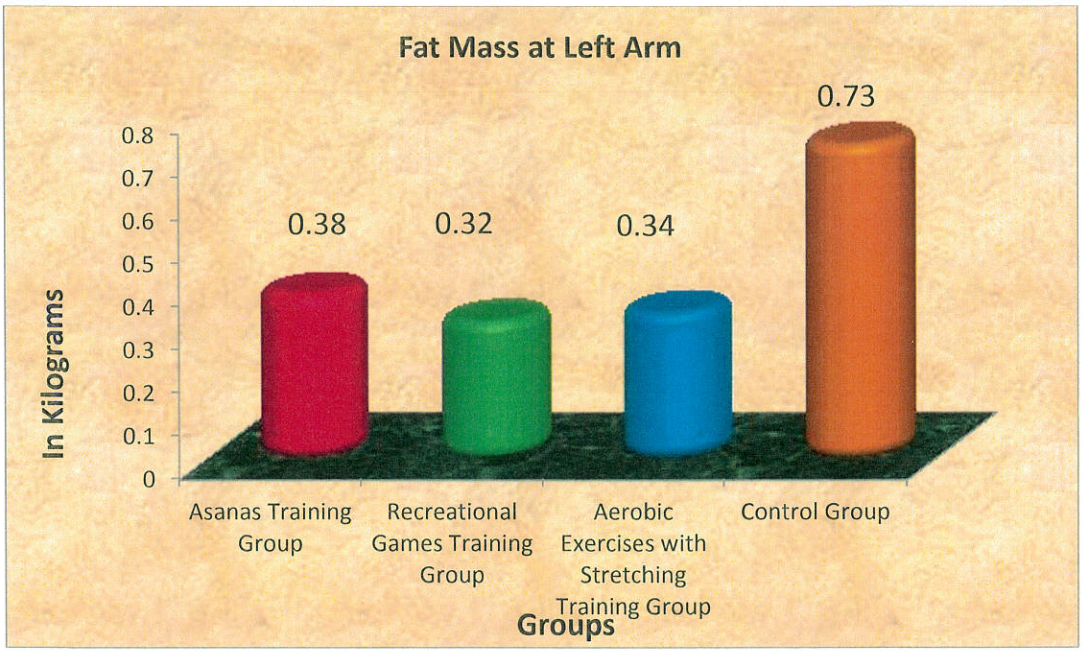

FIGURE – 40: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF FAT MASS AT LEFT ARM

4.4.12.1 DISCUSSIONS ON THE FINDINGS OF FAT MASS AT LEFT ARM

The results presented in table-XLV showed that the obtained adjusted post test means on fat mass at left arm of asanas training group (ATG) was 0.38, recreational games training group (RGTG) was 0.32 aerobic exercises with stretching training group (AEWSTG) with mean value of 0.34, control group (CG) mean values of 0.73.

The differences among pretest scores, post-test scores and adjusted post test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.99, 0.01 and 0.01 respectively. It was found that obtained 'p' value on pretest scores, post-test scores and adjusted post test scores means were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 42.42%), recreational games training group (RGTG =50.79%) and aerobic exercise with stretching training group (AEWSTG =49.25%) training would be effective in causing significant improvement among the experimental groups on fat mass at left arm. And also when comparing the mean gain values on fat mass at left arm, recreational games training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly decreased the fat mass at left arm of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to decrease the fat mass at left arm.

The results of this investigation are supported by the following studies. Ronald, (1990) conducted a study on the effects of an aerobic fitness programme and dietary intervention with external control components on three obese adults with severe mental retardation. A visual inspection of the data indicated that subjects improved from their baseline scores on all measurements. Subjects' mean body weight and percent body fat decreased 7.73% and 19.31% respectively.

Sami Mohammed Elmahgoub et al., (2009) investigated that the effect of combined exercise training on indices of body composition, physical fitness and lipid profile in adolescents with mental retardation. When compared with the no training group, body weight, body mass index, circumference of waist and fat mass decreased significantly, while relative fat-free mass was increased. It was concluded, that combined exercise training has a positive impact on indices of physical fitness, lipid profile and obesity, in person with intellectually disability.

Andrew Graham and Greg Reid., (2000) conducted a study to describe the change in physical fitness of middle-aged adults with an intellectual disability over a period of 13 years. In this study we could observe that sprint interval training had higher beneficial influence on physical fitness and body composition.

Boer et al. (2014) evaluated the effect of sprint interval training on metabolic and physical fitness in adolescents and intellectual disability adults when contrasted with continuous aerobic training and control group. Sprint interval training showed a significant positive evolution for waist circumference, fat%, systolic fitness compared with control.

Seron et al., (2014) investigated the effects of a 12 week aerobic and resistance exercise on body composition of adolescents with down syndrome. The aerobic and resisted training programme maintained body fat levels. ATG significantly reduced body mass index and Waist circumference measures. Individuals who did not attend the training intervention increased their percentage of fat. The trial results will determine the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Ronald, (1990), Sami Mohammed Elmahgoub et al., (2009), Andrew Graham and Greg Reid., (2000), Boer et al., (2014) and Seron et al., (2014).

4.4.13 RESULTS ON FAT MASS AT TRUNK

The body composition variable namely fat mass at trunk was measured through tanita body composition monitor. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-XLVII.

TABLE –XLVII

COMPUTATION OF ANALYSIS OF COVARIANCE ON FAT MASS AT TRUNK (Scores in Kilograms)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'P' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	6.32	6.07	5.81	5.90	**B**	1.51	3	0.50	0.06	0.98
					W	310.89	36	8.64		
Post test	5.50	5.39	5.14	6.30	**B**	7.55	3	2.52	0.34	0.80
					W	270.31	36	7.51		
Adjusted post test	5.23	5.35	6.34	6.42	**B**	0.55	3	0.18	15.30*	0.01
					W	7.11	35	0.20		
Mean gain	0.82	0.68	0.67	0.40						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table - XLVII shows that the pretest mean scores of fat mass at trunk of asanas training group (ATG) was 6.32, recreational games training group (RGTG) was 6.07, aerobic exercise with stretching training group (AEWSTG) was 5.81 and control group (CG) was 5.90.

The obtained 'p' value on pretest scores 0.98 was greater than the required 'p' value of 0.05 to be significant. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post-test scores analysis proved that there were no significant differences among the groups, as the obtained 'p' value 0.80 was greater than the required 'p' value of 0.05. This proved that there were no significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on fat mass at trunk.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table XLVIII

TABLE -XLVIII

PAIRED MEAN SIGNIFICANT DIFFERENCE

ON FAT MASS AT TRUNK (Scores in Kilograms)

Adjusted Post Test Means				Mean Difference	'p' Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	5.34	6.42	1.08*	0.01
-	5.35	-	6.42	1.07*	0.01
-	5.35	5.34	-	0.01	0.96
5.23	-	-	6.42	1.19*	0.01
5.23	-	5.34	-	0.11	0.59
5.23	5.35	-	-	0.12	0.56

*Significant at 0.05 level of confidence.

The above table XLVIII clearly indicates that the paired mean significant difference on the level of fat mass at trunk among the experimental and control groups. And the variation in differentiation ability among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG), aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group

(ATG) and recreational games training group (RGTG) asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asanas training group and aerobic exercise with stretching training group, as well as recreational games training group and aerobic exercise with stretching training group on fat mass at trunk.

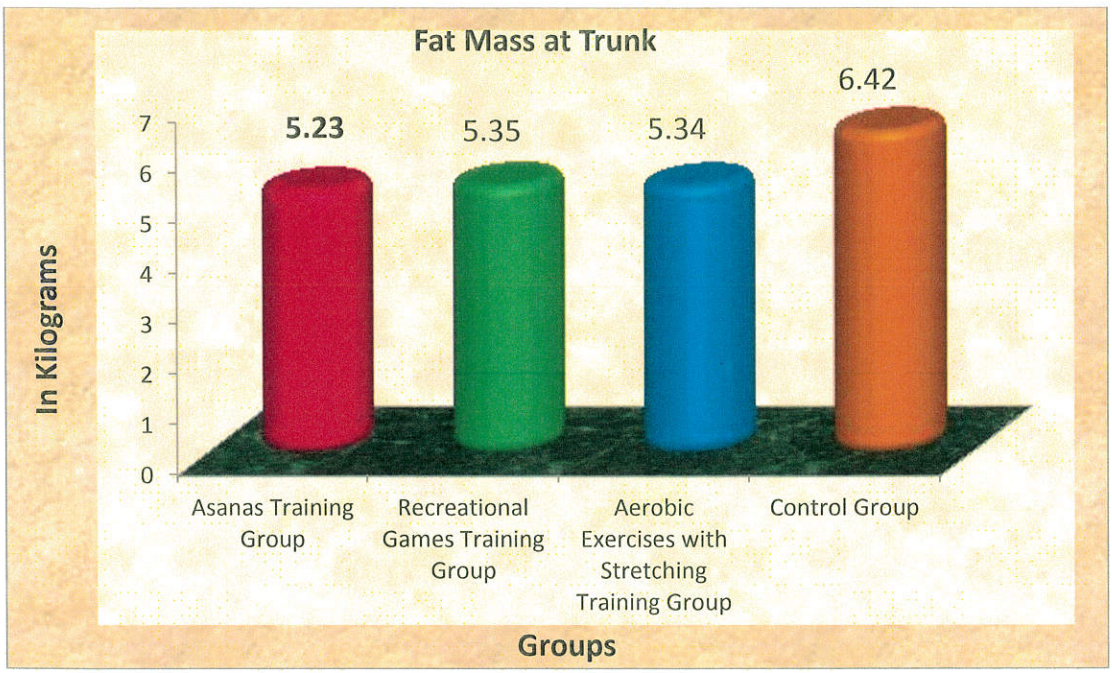

FIGURE –41: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF FAT MASS AT TRUNK

4.4.13.1 DISCUSSIONS ON FINDINGS OF FAT MASS AT TRUNK

The results presented in table XLVII showed that the obtained adjusted post-test means on fat mass at trunk of asanas training group (ATG) was 5.23, recreational games training group (RGTG) was 5.35 aerobic exercises with stretching training group (AEWSTG) with mean value of 5.34, control group (CG) mean values of 6.42.

The differences among pretest, post-test and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.98, 0.80 and 0.01. It was found that obtained p value on pretest, post-test scores means were no significant as the obtained 'p' values were greater than the required 'p' value of 0.05. And adjusted post-test mean scores were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 12.97%), recreational games training group (RGTG =11.20%) and aerobic exercise with stretching training group (AEWSTG =11.53%) training would be effective in causing significant improvement among the experimental groups on fat mass at trunk. And also when comparing the mean gain values on fat mass at trunk, recreational games training group had decreased than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly decreased the fat mass at trunk of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to decrease the fat mass at trunk.

The results of this investigation are supported by the following studies. Ronald, (1990) conducted a study on the effects of an aerobic fitness programme and dietary intervention with external control components on three obese adults with severe mental retardation. A visual inspection of the data indicated that subjects improved from their

baseline scores on all measurements. Subjects' mean body weight and percent body fat decreased 7.73% and 19.31% respectively.

Sami Mohammed Elmahgoub et al., (2009) investigated that the effect of combined exercise training on indices of body composition, physical fitness and lipid profile in adolescents with mental retardation. In comparison with the control group, weight, body mass index, waist and fat mass decreased significantly, while relative fat-free mass increased.

Andrew Graham and Greg Reid., (2000) conducted a study to describe the change in physical fitness of middle-aged adults with an intellectual disability over a period of 13 years. In this study we could observe that interval sprint training had better beneficial effects on body composition and physical fitness variables.

Boer et al., (2014) investigated the effect of sprint interval training on metabolic and physical fitness in persons with intellectual disabilities when compared with (continuous) aerobic training and control group. Sprint interval training showed a significant positive evolution for waist circumference, fat%, systolic fitness compared with control.

Seron et al., (2014) investigated the effects of a 12 week aerobic and resistance exercise on body composition of adolescents with Down syndrome. The aerobic and resisted training programme maintained body fat levels. ATG significantly reduced body mass index and Waist circumference measures. Individuals who did not attend the training intervention increased their percentage of fat. The trial results will determine the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Ronald, (1990), Sami Mohammed Elmahgoub et al., (2009), Andrew Graham and Greg Reid. (2000), Boer et al. (2014) and Seron et al. (2014).

4.4.14 RESULTS ON FAT MASS AT RIGHT LEG

The body composition variable namely fat mass at right leg was measured through tanita body composition monitor. The result, on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table XLIX.

TABLE –XLIX

COMPUTATION OF ANALYSIS OF COVARIANCE ON FAT MASS AT RIGHT LEG (Scores in Kilograms)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means square	Obtained 'F' Ratio	'p' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	4.72	4.48	4.45	4.91	B	1.41	3	0.47.	0.04	0.99
					W	413.25	36	11.48		
Post test	3.92	3.72	3.87	5.06	B	11.44	3	3.81	0.38	0.80
					W	407.78	36	11.33		
Adjusted post test	3.84	3.88	4.05	4.80	B	6.00	3	2.00	3.18*	0.04
					W	22.03	35	0.63		
Mean gain	0.80	0.76	0.58	0.15						

**Significant at 0.05 level of confidence*. B=Between, W= Within.

Table-XLIX shows that the pretest mean scores of fat mass at right leg of asanas training group (ATG) was 4.72, recreational games training group (RGTG) was 4.48, aerobic exercise with stretching training group (AEWSTG) was 4.45 and control group (CG) was 4.91.

The obtained 'p' value on pretest scores 0.99 was greater than the required 'p' value of 0.05 to be significant. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post-test scores analysis proved that there were no significant differences among the groups, as the obtained 'p' value 0.80 was greater than the required 'p' value of 0.05. This proved that there were no significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.04 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on fat mass at right leg.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table - L

TABLE -L

PAIRED MEAN SIGNIFICANT DIFFERENCEON FAT MASS AT RIGHT LEG (Scores in Kilograms)

Adjusted Post Test Means				Mean Difference	'p' Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	4.05	4.80	0.75*	0.01
-	3.88	-	4.80	0.93*	0.01
-	3.88	4.05	-	0.18	0.96
3.84	-	-	4.80	0.96*	0.01
3.84	-	4.05	-	0.21	0.59
3.84	3.88	-	-	0.32	0..56

**Significant at 0.05 level of confidence.*

The above table-L clearly indicates that the paired mean significant difference on the level of fat mass at right leg among the experimental and control groups. And the variation in fat mass at right leg among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and control group (CG), recreational games training group (RGTG) and control group (CG), and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and recreational games training group (RGTG) asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asanas training group and aerobic exercise with stretching training group, as well as recreational games training group and aerobic exercise with stretching training group on fat mass at right leg.

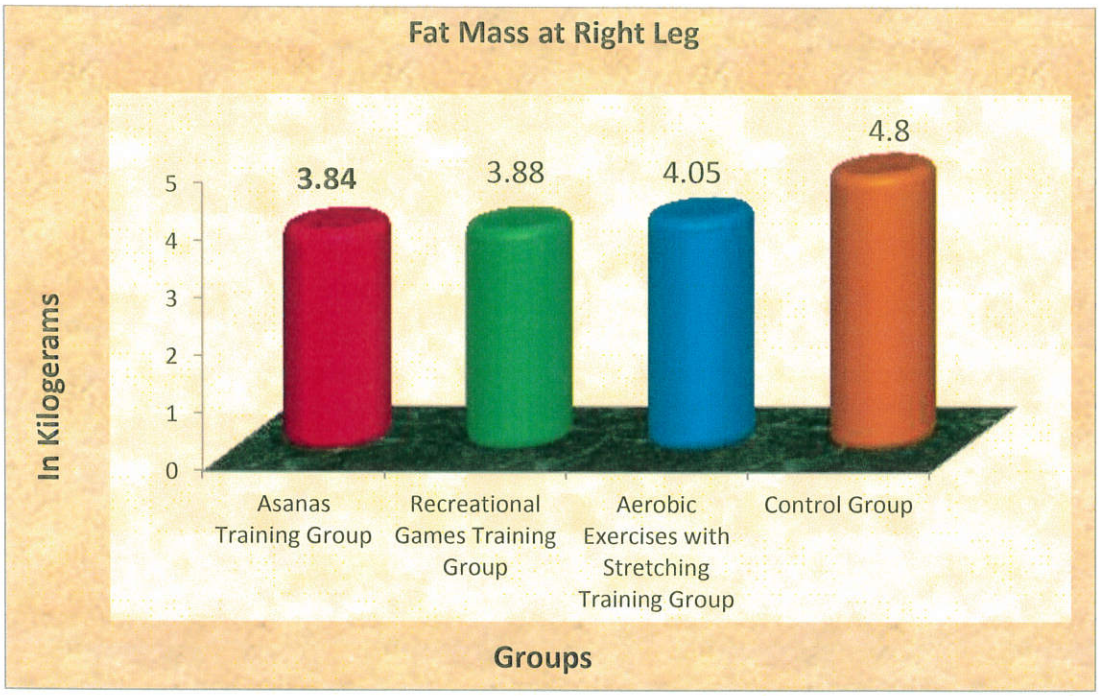

FIGURE –42: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF FAT MASS AT RIGHT LEG

4.4.14.1 DISCUSSIONS ON FINDINGS OF FAT MASS AT RIGHT LEG

The results presented in table-XLIX showed that the obtained adjusted post-test means on fat mass at right leg of asanas training group (ATG) was 3.84, recreational games training group (RGTG) was 3.88 aerobic exercise with stretching training group (AEWSTG) with mean value of 4.05, control group (CG) mean values of 4.80. The differences among pretest, post-test and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.99, 0.80 and 0.04 respectively. It was found that obtained 'p' value on pretest, post-test scores means were no significant as the obtained 'p' values were greater than the required 'p' value of 0.05. And adjusted post-test mean scores were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 16.95%), recreational games training group (RGTG =16.96%) and aerobic exercise with stretching training group (AEWSTG =13.03%) training would be effective in causing significant improvement among the experimental groups on fat mass at right leg. And also when comparing the mean gain values on fat mass at right leg, aerobic exercise with stretching training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly decreased the fat mass at right leg of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to decrease the fat mass at right leg.

The results of this investigation are supported by the following studies. Ronald, (1990) conducted a study on the effects of an aerobic fitness programme and dietary intervention with external control components on three obese adults with severe mental retardation. A visual inspection of the data indicated that subjects improved from their baseline scores on all measurements. Subjects' mean body weight and percent body fat decreased 7.73% and 19.31% respectively.

Sami Mohammed Elmahgoub et al., (2009) investigated that the effect of combined exercise training on indices of body composition, physical fitness and lipid profile in adolescents with mental retardation. While comparing with the no training group, body mass index, body weight, waist circumference and fat mass decreased

moderately, while relative fat-free mass was increased. Remarkably in conclusion, combined exercise training had a significant impact on indices of lipid profile, physical fitness and obesity in adolescents with intellectual disability.

Andrew Graham and Greg Reid., (2000) conducted a study to describe the change in physical fitness of middle-aged adults with an intellectual disability over a period of 13 years. In this study we could see that sprint interval training had beneficial influence on body composition, metabolic and physical fitness.

Seron et al., (2014) investigated the effects of a 12 week aerobic and resistance exercise on body composition of adolescents with Down syndrome. The aerobic and resisted training programme maintained body fat levels. ATG significantly reduced body mass index and Waist circumference measures. Individuals who did not attend the training intervention increased their percentage of fat. The trial results will determine the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Ronald, (1990), Sami Mohammed Elmahgoub et al., (2009), Andrew Graham and Greg Reid., (2000), Boer et al., (2014) and Seron et al., (2014).

4.4.14 RESULTS ON FAT MASS AT LEFT LEG

The body composition variable namely fat mass at left leg was measured through tanita body composition monitor. The result, on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table LI.

TABLE –LI

COMPUTATION OF ANALYSIS OF COVARIANCE ON

FAT MASS AT LEFT LEG (Scores in Kilograms)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'P' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	4.45	4.34	4.41	4.66	**B**	0.57	3	0.19	0.02	0.99
					W	403.64	36	11.21		
Post test	3.72	3.64	3.75	5.56	**B**	25.92	3	8.64	0.83	0.49
					W	373.35	36	10.37		
Adjusted post test	3.73	3.60	3.80	5.38	**B**	0.39	3	6.48	23.10*	0.01
					W	51.97	35	0.28		
Mean gain	0.73	0.70	0.66	0.90						

*Significant at 0.05 level of confidence. B=Between, W= Within.

Table–LI shows that the pretest mean scores of fat mass at left leg of asanas training group (ATG) was 4.45, recreational games training group (RGTG) was 4.34, aerobic exercise with stretching training group (AEWSTG) was 4.41 and control group (CG) was 4.66.

The obtained 'p' value on pretest scores 0.99 was greater than the required 'p' value of 0.05 to be significant. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post-test scores analysis proved that there were no significant differences among the groups, as the obtained 'p' value 0.49 was greater than the required 'p' value

of 0.05. This proved that there were no significant differences among the post-test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on fat mass at left leg.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table -LII

TABLE -LII

PAIRED MEAN SIGNIFICANT DIFFERENCE

ON FAT MASS AT LEFT LEG (Scores in Kilograms)

Adjusted Post Test Means				Mean Difference	"p" Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	3.80	5.38	1.57*	0.01
-	3.60	-	5.38	1.62*	0.01
-	3.60	3.80	-	0.04	0.86
3.73	-	-	5.38	1.64*	0.01
3.73	-	3.80	-	0.07	0.78
3.73	3.60	-	-	0.02	0.92

*Significant at 0.05 level of confidence.

The above table LII clearly indicates that the paired mean significant difference on the level of fat mass at left leg among the experimental and control groups. And the variation in fat mass at left leg among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and

control group (CG), recreational games training group (RGTG) and control group (CG), and aerobic exercise with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and recreational games training group (RGTG), asanas training group (ATG) and aerobic exercises with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and recreational games training group, asanas training group and aerobic exercise with stretching training group, as well as recreational games training group and aerobic exercise with stretching training group on fat mass at left leg.

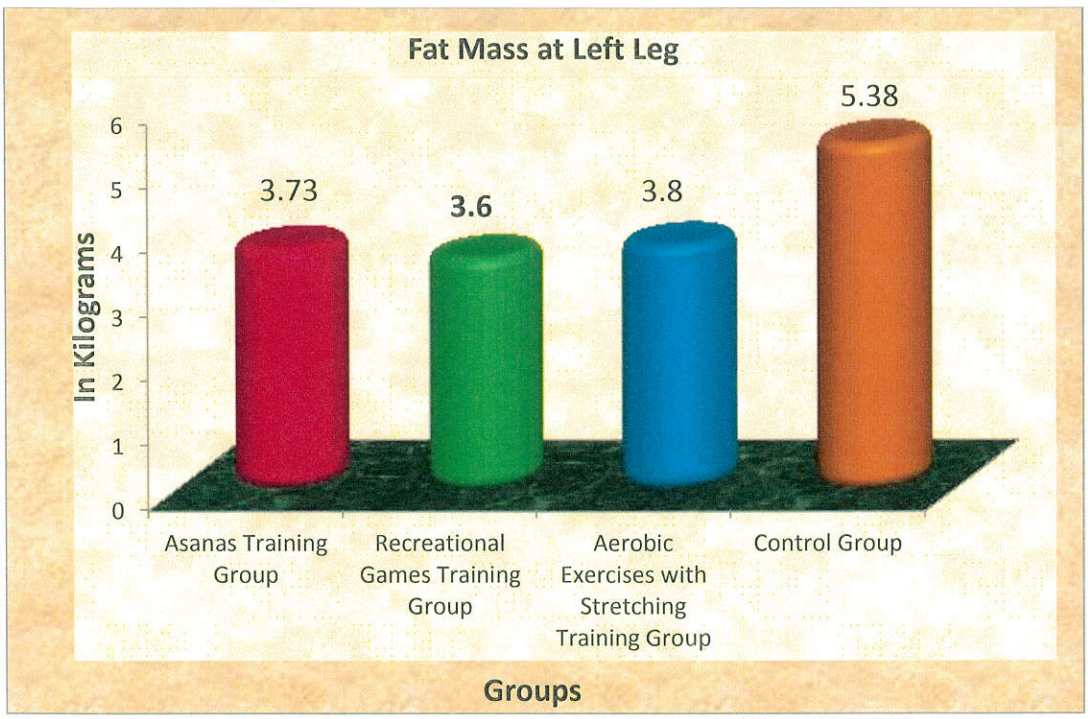

FIGURE- 43: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POST TEST MEANS OF FAT MASS AT LEFT LEG

4.4.15.1 DISCUSSIONS ON FINDINGS OF FAT MASS AT LEFT LEG

The results presented in table-LI showed that the obtained adjusted posttest means on fat mass at left leg of asanas training group (ATG) was 3.73, recreational games training group (RGTG) was 3.60 aerobic exercises with stretching training group (AEWSTG) with mean value of 3.80, and the control group (CG) mean values of 5.38.

The differences among pretest scores, post- test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.99, 0.49 and 0.01 respectively. It was found that obtained 'p' value on pretest; posttest scores means were no significant as the obtained 'p' values were greater than the required 'p' value of 0.05. And adjusted post-test mean scores were significant as the obtained 'p' values were lesser than the required 'p' value of 0.05.

Asanas training group (ATG = 16.40%), recreational games training group (RGTG =16.13%) and aerobic exercise with stretching training group (AEWSTG =14.97%) training would be effective in causing significant improvement among the experimental groups on fat mass at left leg. And also when comparing the mean gain values on fat mass at left leg, recreational games training group had better improvement than the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly decreased the fat mass at left leg of intellectually challenged persons.

Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to decrease the fat mass at left leg.

The results of this investigation are supported by the following studies. Ronald, (1990) conducted a study on the effects of an aerobic fitness programme and dietary intervention with external control components on three obese adults with severe mental retardation. A visual inspection of the data indicated that subjects improved from their baseline scores on all measurements. Subjects' mean body weight and percent body fat decreased 7.73% and 19.31% respectively.

Sami Mohammed Elmahgoub et al., (2009) investigated that the effect of combined exercise training on indices of body composition, physical fitness and lipid profile in adolescents with mental retardation. In comparison with the control group, weight, body mass index, waist and fat mass decreased significantly, while relative fat-free mass increased. In results, combined exercise training had a positive effect on indices of obesity, physical fitness and lipid profile in adolescents with intellectual disability.

Andrew Graham and Greg Reid., (2000) conducted a study to describe the change in physical fitness of middle-aged adults with an intellectual disability over a period of 13 years. In this study we could observe that sprint interval training had higher beneficial effects on body composition, physical fitness and metabolic.

Seron et al., (2014) investigated the effects of a 12 week aerobic and resistance exercise on body composition of adolescents with Down syndrome. The aerobic and

resisted training programme maintained body fat levels. ATG significantly reduced body mass index and Waist circumference measures. Individuals who did not attend the training intervention increased their percentage of fat. The trial results will determine the effectiveness and sustainability of two approaches to increasing physical activity and exercise among adults with intellectual disability.

Hence the results of the study are in consonance with the research done by Ronald, (1990), Sami Mohammed Elmahgoub et al. (2009), Andrew Graham and Greg Reid. (2000), Boer et al. (2014) and Seron et al., (2014).

4.4.16 RESULTS ON BODY MASS INDEX

The body composition variable namely body mass index was measured through tanita body composition monitor. The results on the effect of asanas, recreational games and aerobic exercise with stretching training are presented in table-LIII.

TABLE –LIII

COMPUTATION OF ANALYSIS OF COVARIANCE ON BODY MASS INDEX (In Scores)

Test	Means				Source of Variance	Sum of Square	Degrees of Freedom	Means Square	Obtained 'F' Ratio	'P' Value
	AT Group	RGT Group	AEWST Group	Control Group						
Pre test	21.14	20.87	20.37	21.89	B	12.07	3	4.02	2.31	0.09
					W	62.68	36	1.74		
Post test	18.67	19.76	19.21	21.84	B	57.69	3	19.23	8.34*	0.01
					W	82.96	36	2.30		
Adjusted Post test	18.63	19.88	19.62	21.36	B	35.91	3	11.97	6.82*	0.01
					W	61.40	35	1.75		
Mean Gain	2.47	1.11	1.16	0.05						

**Significant at 0.05 level of confidence.* B=Between, W= Within.

Table-LIII shows that the pretest mean scores of body mass index of asanas training group (ATG) was 21.14, recreational games training group (RGTG) was 20.87, aerobic exercise with stretching training group (AEWSTG) was 20.37 and control group (CG) was 21.89.

The obtained p value on pretest scores 0.09 was greater than the required p value of 0.05 to be significant. This proved that there were no significant differences among the experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test scores analysis proved that there were significant differences among the groups, as the obtained 'p' value 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the post test means of all the groups.

While considering of the pre and post-test scores among the experimental and control groups, the adjusted post-test were computed and subjected to statistical treatment. The obtained 'p' value of 0.01 was lesser than the required 'p' value of 0.05. This proved that there were significant differences among the means of experimental groups due to the experimental trainings on body mass index.

Since the significant differences were recorded, the results were subjected to pair wise comparison among the groups. The results were presented in table-LIV.

TABLE –LIV

PAIRED MEAN SIGNIFICANT DIFFERENCE

ON BODY MASS INDEX (In Scores)

Adjusted Post Test Means				Mean Difference	"p" Value
AT Group	RGT Group	AEWST Group	Control Group		
-	-	19.62	21.36	1.74*	0.01
-	19.88	-	21.36	1.48*	0.02
-	19.88	19.62	-	0.26	0.67
18.63	-	-	21.36	2.73*	0.01
18.63	-	19.62	-	0.99	0.11
18.63	19.88	-	-	1.25*	0.04

**Significant at 0.05 level of confidence.*

The above table LIV clearly indicates that the paired mean significant difference on the level of body mass index among the experimental and control groups. And the variation in body mass index among the experimental and control groups were found to be significant difference between the paired means of asanas training group (ATG) and recreational games training group (RGTG) asanas training group (ATG) and control group (CG), recreational games training group (RGTG), and control group (CG) and aerobic exercises with stretching training group (AEWSTG) and control group (CG). There were no significant differences between asanas training group (ATG) and aerobic exercise with stretching training group (AEWSTG) and recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG).

However there was no significant difference found between the asanas training group and aerobic exercise with stretching training group, as well as recreational games training group and aerobic exercise with stretching training group on body mass index.

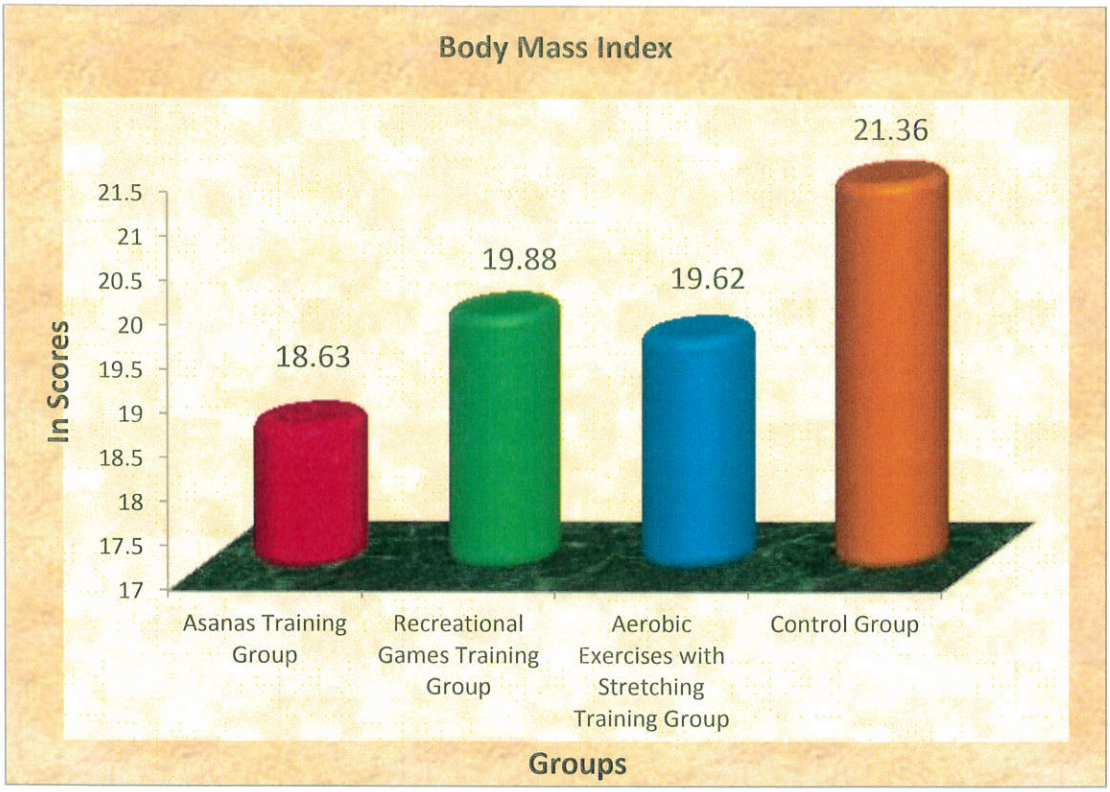

FIGURE –44: CYLINDER DIAGRAM SHOWS THAT THE ADJUSTED POSTTEST MEANS OF BODY MASS INDEX

4.4.16.1 DISCUSSIONS ON FINDINGS OF BODY MASS INDEX

The results presented in table-LIII showed that the obtained adjusted post-test means nobody mass index of asanas training group (ATG) was 18.63, recreational games training group (RGTG) was 19.88 aerobic exercises with stretching training group (AEWSTG) with mean value of 19.62, control group (CG) mean values of 21.36. The differences among pretest scores, post-test scores and adjusted post-test mean scores of the subjects were statistically treated by using ANCOVA and 'p' values obtained were 0.09, 0.01 and 0.01 respectively. It was found that obtained 'p' value on, post test scores and adjusted post-test scores means were significant as the obtained 'p' values was lesser than the required 'p' value of 0.05.

Asanas training group (ATG =11.68%), recreational games training group (RGTG =5.27%) and aerobic exercise with stretching training group (AEWSTG = 5.69%) training would be effective in causing significant improvement among the experimental groups on body mass index. And also when comparing the mean gain values body mass index, the recreational games training group had better improvement then the other groups.

While testing the effect of isolated asanas (ATG), recreational games training group (RGTG) and aerobic exercise with stretching training group (AEWSTG) each one had significantly decreased the body mass index of intellectually challenged persons. Whereas the control group was concerned the observed mean difference from base line to post-test was not differ significantly. Hence it is understood that the selected training means of the respective experimental group had influenced significantly to decrease the body mass index.

The results of this investigation are also supported by the following studies. Sami Mohammed Elmahgoub et al., (2009) investigated that the effect of combined exercise training on indices of body composition, physical fitness and lipid profile in adolescents with mental retardation. In comparison with the control group, weight, body mass index, waist and fat mass decreased significantly, while relative fat-free mass increased. It was concluded combined exercise training group had an effect on indices of obesity, lipid profile and physical fitness and in person with mental retardation.

Andrew Graham and Greg Reid., (2000) conducted a study to describe the change in physical fitness of middle-aged adults with an intellectual disability over a period of 13

years. In this study we could observe that sprint interval training had greater effects on physical fitness, body composition, and metabolic.

Kastanias et al., (2015) conducted a study on the influence of aerobic exercise intervention on obesity, lipid profile and hemodynamic adaptations in individuals with intellectual disability with the Down Syndrome (DS) or without the Down Syndrome (NDS). The present study provides a practical model for the prediction of cardiac function and suggests that a 12-week regular aerobic exercise programme improves body composition, lipid profile and hemodynamic response in people with intellectual disability with or without the Down syndrome.

Seron et al., (2014) investigated the effects of a 12 week aerobic and resistance exercise on body composition of adolescents with Down syndrome. The aerobic and resisted training programme maintained body fat levels. ATG significantly reduced body mass index and Waist circumference measures. Individuals who did not attend the training intervention increased their percentage of fat. The trial results were determined the effectiveness and sustainability of two approaches to increase physical activity and exercise among person with mental retardation.

Guillermo et al., (2014) assessed that the adults with mental retardation had decreased cardiovascular fitness and strength present with lower rates of physical activity (PA), and often had balance and functional impairments. It was concluded that body weight and body mass index decreased in the IG group. The control group showed no difference in any dependent parameter. These data suggest a combined aerobic, strength and balance exercise training programme were beneficial among person with intellectual disability.

Babalola et al., (2008) determined strength and flexibility of the spinal and hamstring muscles among University of Ibadan students and the reliability of Kraus-Weber (K-W) exercise test. It was concluded that K-W test was reliable and an easy to administer exercise test.

Hence the results of the study are in consonance with the research done by Sami Mohammed Elmahgoub et al., (2009), Andrew Graham and Greg Reid., (2000), Kastanias et al., (2015), Seron et al., (2014) Guillermo et al., (2014) and Babalola et al., (2008).

4.5 DISCUSSIONS ON HYPOTHESES

1. It was hypothesized that the asanas training may significantly improve the selected physical fitness, co-ordinative ability and body composition variables of the intellectually challenged persons.

   It was found that there were significant improvement in the selected physical fitness, co-ordinative abilities and body composition variables due to asanas training, when comparing the pre and posttest values of asanas training group. The physical fitness variables namely abdominal plus psoas strength, abdominal minus psoas strength, psoas and lower abdomen strength, upper back strength, lower back strength, hamstring muscles strength, flexibility and leg explosive power, coordinative abilities variables namely orientation ability and differentiation ability and body composition variables namely fat mass at right arm, fat mass at left arm, fat mass at trunk, fat mass at right leg, fat mass at left leg and body mass index was significantly improved through asanas training whereas control group showed

insignificant improvement, hence the improvements were due to the specific training alone. Hence the first hypothesis was accepted.

2. It was hypothesized that the recreational games may significantly improve the selected physical fitness, co-ordinative ability and body composition variables, of the intellectually challenged persons.

It was found that there were significant improvement in the selected physical fitness, co-ordinative abilities and body composition variables due to recreational games training, when comparing the pre and posttest values of recreational games training group. The physical fitness variables namely abdominal plus psoas strength, abdominal minus psoas strength, psoas and lower abdomen strength, upper back strength, lower back strength, hamstring muscles strength, flexibility and leg explosive power, coordinative abilities variables namely orientation ability and differentiation ability and body composition variables namely fat mass at right arm, fat mass at left arm, fat mass at trunk, fat mass at right leg, fat mass at left leg and body mass index was significantly improved through the recreational games training whereas control group showed insignificant improvement, hence the improvements were due to the specific training alone. Hence the second hypothesis was accepted.

3. It was hypothesized that the aerobic exercises with stretching may significantly improve the selected physical fitness, co-ordinative ability and body composition variables of the intellectually challenged persons.

It was found that there were significant improvement in the physical fitness, co-ordinative abilities and body composition variables due to aerobic exercises with stretching training, when comparing the pre and posttest values of aerobic exercises

with stretching training group. The physical fitness variables namely abdominal plus psoas strength, abdominal minus psoas strength, psoas and lower abdomen strength, upper back strength, lower back strength, hamstring muscles strength, flexibility and leg explosive power, coordinative abilities namely orientation ability and differentiation ability and body composition variable namely fat mass at right arm, fat mass at left arm, fat mass at trunk, fat mass at right leg, fat mass at left leg and body mass index were significantly improved through the aerobic exercises with stretching training whereas control group showed insignificant improvement, hence the improvements were due to the specific training alone. Hence the third hypothesis was accepted.

4. It was hypothesized that there may be significant difference among the experimental and control groups on the selected physical fitness, co-ordinative ability and body composition variables of the intellectually challenged persons.

It was found that there were significant difference in the physical fitness, co-ordinative abilities and body composition variables due to the specific training. Hence the hypothesis point four was accepted.