CHAPTER-IV

ANALYSIS OF THE DATA AND RESULTS OF THE STUDY

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4.1 Overview

The aim of the study was to investigate the effect of continuous and alternating pace endurance training on a selected physical and physiological variable. Ninety male long-distance runners were selected at random to participate in the study in order to fulfil this objective. Three groups of thirty subjects each; two experimental groups and a control group were created. The two experimental groups conducted slow continuous and alternate pace endurance training (three days per week) for eight weeks, while the third group served as the control and received no additional training. Before and after the training programme, tests on specific criteria variables were administered to all three groups' subjects.

To find out if there were any differences between the groups before and after the training period on selected physical and physiological variables, the analysis of covariance (ANCOVA) was performed. The LSD test was used as a post-hoc test to ascertain the paired mean differences whenever the adjusted post-test 'F' ratio was determined to be significant. To assess the analysis's 'F' ratio, the level of significance was set at 0.05 level of confidence. On a selected physical and physiological variable, the magnitude of improvements was calculated for each group separately.

Data Analysis

In order to determine the impact of independent factors on the selected criteria variables, the acquired data underwent an analysis of covariance.

Significant Level

The significance level of 0.05 was determined to be appropriate for the current study's assessment of the obtained results on the variables.

Analysis of Data

The following analysis and presentation show how the independent variables affected each selected variable.

4.2.1 Physical Variables

4.2.1.1 Speed Endurance:

The results of the analysis of covariance on speed endurance for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.1.

Table – 4.1

Results of Analysis of Covariance on Speed Endurance among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	42.49	43.09	43.13	B	7.73	2	3.86	1.25	0.29
	SD	1.87	2.02	1.30	W	269.11	87	3.09		
Post Test	M	40.81	40.67	42.28	B	47.63	2	23.81	10.95*	0.00
	SD	1.80	1.32	1.24	W	189.17	87	2.17		
Adjusted Post Test	M	41.10	40.54	42.12	B	38.36	2	19.18	28.91*	0.00
					W	57.06	86	0.66		

***Significant at 0.05 level of significance if p-value is < 0.05**

The 300-meter run test findings from the speed endurance analysis has shown in Table 4.1. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test speed endurance means of 42.49, 43.09, and 43.13, respectively. F ratio was computed as (1.25, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 40.81, 40.67, and 42.28, respectively. The calculated F ratio was (10.95, $p<0.05$). As a result, the post-test was significant with a confidence level of 0.05. This reveals that there was a significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 41.10, 40.54, and 42.12, respectively. The adjusted post-test F ratio was (28.91, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for speed endurance.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.2, post hoc results are presented.

Table - 4.2

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Speed Endurance

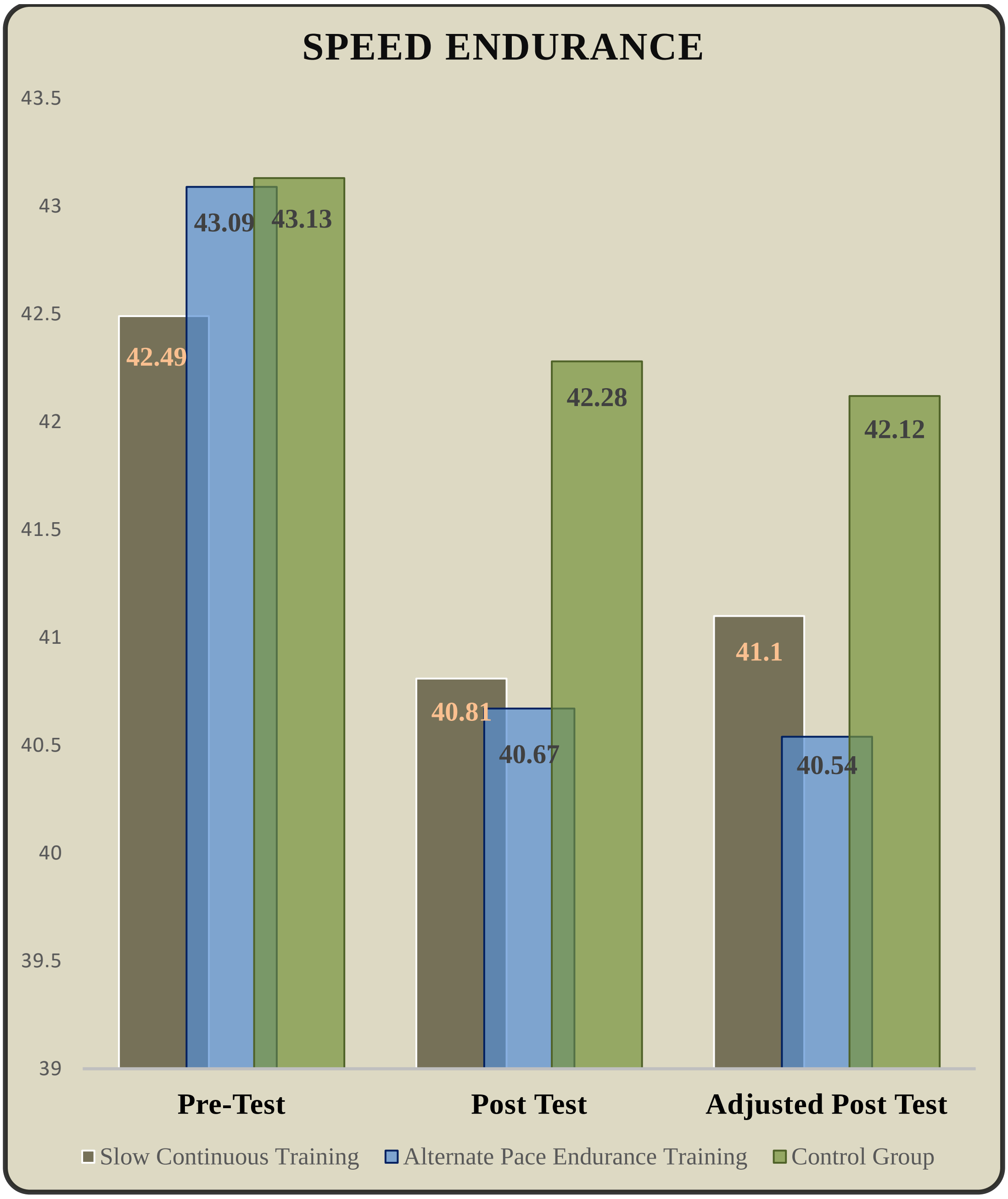
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
41.10	40.54	-	0.56*	0.01
41.10	-	42.12	1.02*	0.00
-	40.54	42.12	1.58*	0.00

***Significant at 0.05 Level of Significance if $p<0.05$.**

Table 4.2's multiple comparisons demonstrate that there are significant differences between the slow continuous training with alternate pace endurance training groups (0.56, $p<0.05$), slow continuous training with control group (1.02, $p<0.05$), alternate pace endurance training with the control group (1.58, $p<0.05$).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable increase in speed endurance after completing their respective training regimens. The study's findings also revealed a significant difference in the training groups' capacity for speed endurance, with the alternate pace endurance training having better speed endurance than the slow continuous training and control group.

Figure 4.1's bar chart serves as an illustration of the pre, post, and adjusted speed endurance means.



The Mean value of Speed Endurance are shown

Graphically in Fig .4.1

4.2.1.2 Cardio Respiratory Endurance:

The results of the analysis of covariance on cardio respiratory endurance for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.3.

Table – 4.3

Results of Analysis of Covariance on Cardio Respiratory Endurance among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	2305.67	2326.33	2308.00	B	7686.67	2	3843.33	0.10	0.90
	SD	170.31	220.84	186.53	W	3264513.33	87	37523.14		
Post Test	M	2422.33	2497.00	2327.00	B	435635.56	2	217817.78	7.77*	0.00
	SD	161.94	162.59	177.40	W	2439796.67	87	28043.64		
Adjusted Post Test	M	2428.69	2486.23	2331.42	B	366942.73	2	183471.37	79.32*	0.00
					W	198921.76	86	2313.04		

***Significant at 0.05 level of significance if p-value is < 0.05.**

The coopers 12 minutes run test findings from the cardio respiratory endurance analysis has shown in Table 4.3. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test cardio respiratory endurance means of 2305.67, 2326.33, and 2308.00, respectively. F ratio was computed as (0.10, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 2422.33, 2497.00, and 2327.00, respectively. The calculated F ratio was (7.77, $p<0.05$). As a result, the post-test was significant with a confidence level of 0.05. This reveals that there was a significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 2428.69, 2486.23, and 2331.42, respectively. The adjusted post-test F ratio was (79.32, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for cardio respiratory endurance.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.4, post hoc results are presented.

Table - 4.4

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Cardio Respiratory Endurance

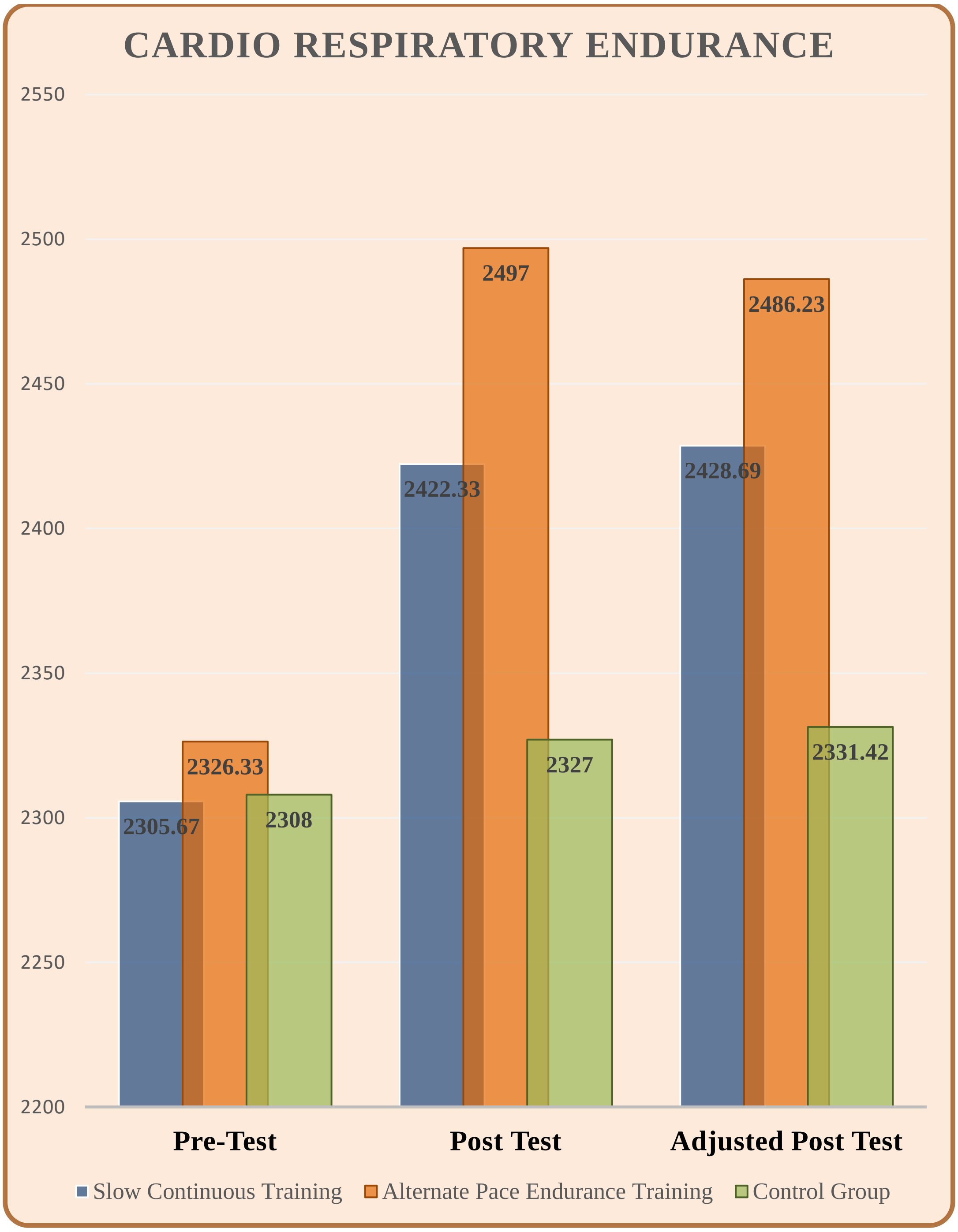
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
2428.69	2486.23	-	57.54*	0.00
2428.69	-	2331.42	97.27*	0.00
-	2486.23	2331.42	154.81*	0.00

***Significant at 0.05 Level of Significance if p<0.05.**

Table 4.4's multiple comparisons demonstrate that there are significant differences between the slow continuous training with alternate pace endurance training groups (57.54, $p<0.05$), slow continuous training with control group (97.27, $p<0.05$), alternate pace endurance training with the control group (154.81, $p<0.05$).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable increase in cardio respiratory endurance after completing their respective training regimens. The study's findings also revealed a significant difference in the training groups' capacity for cardio respiratory endurance, with the alternate pace endurance training having better cardio respiratory endurance than the slow continuous training and control group.

Figure 4.2's bar chart serves as an illustration of the pre, post, and adjusted cardio respiratory endurance means.



The Mean value of Cardio Respiratory Endurance are shown Graphically in Fig .4.2

4.2.1.3 Endurance:

The results of the analysis of covariance on endurance for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.5.

Table – 4.5

Results of Analysis of Covariance on Endurance among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	**M**	4.75	4.67	4.68	B	0.11	2	0.06	0.73	0.49
	SD	0.35	0.26	0.20	W	6.78	87	0.08		
Post Test	**M**	4.43	4.31	4.57	B	1.02	2	0.51	19.72*	0.00
	SD	0.17	0.10	0.20	W	2.26	87	0.03		
Adjusted Post Test	**M**	4.41	4.33	4.58	B	1.03	2	0.51	65.91*	0.00
					W	0.67	86	0.01		

***Significant at 0.05 level of significance if p-value is < 0.05.**

The 1600 m run test findings from the endurance analysis has shown in table 4.5. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test endurance means of 4.75, 4.67, and 4.68, respectively. F ratio was computed as (0.73, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 4.43, 4.31, and 4.57, respectively. The calculated F ratio was (19.72, $p<0.05$). As a result, the post-test was significant with a confidence level of 0.05. This reveals that there was a significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 4.41, 4.33, and 4.58, respectively. The adjusted post-test F ratio was (65.91, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for endurance.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.6, post hoc results are presented.

Table - 4.6

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Endurance

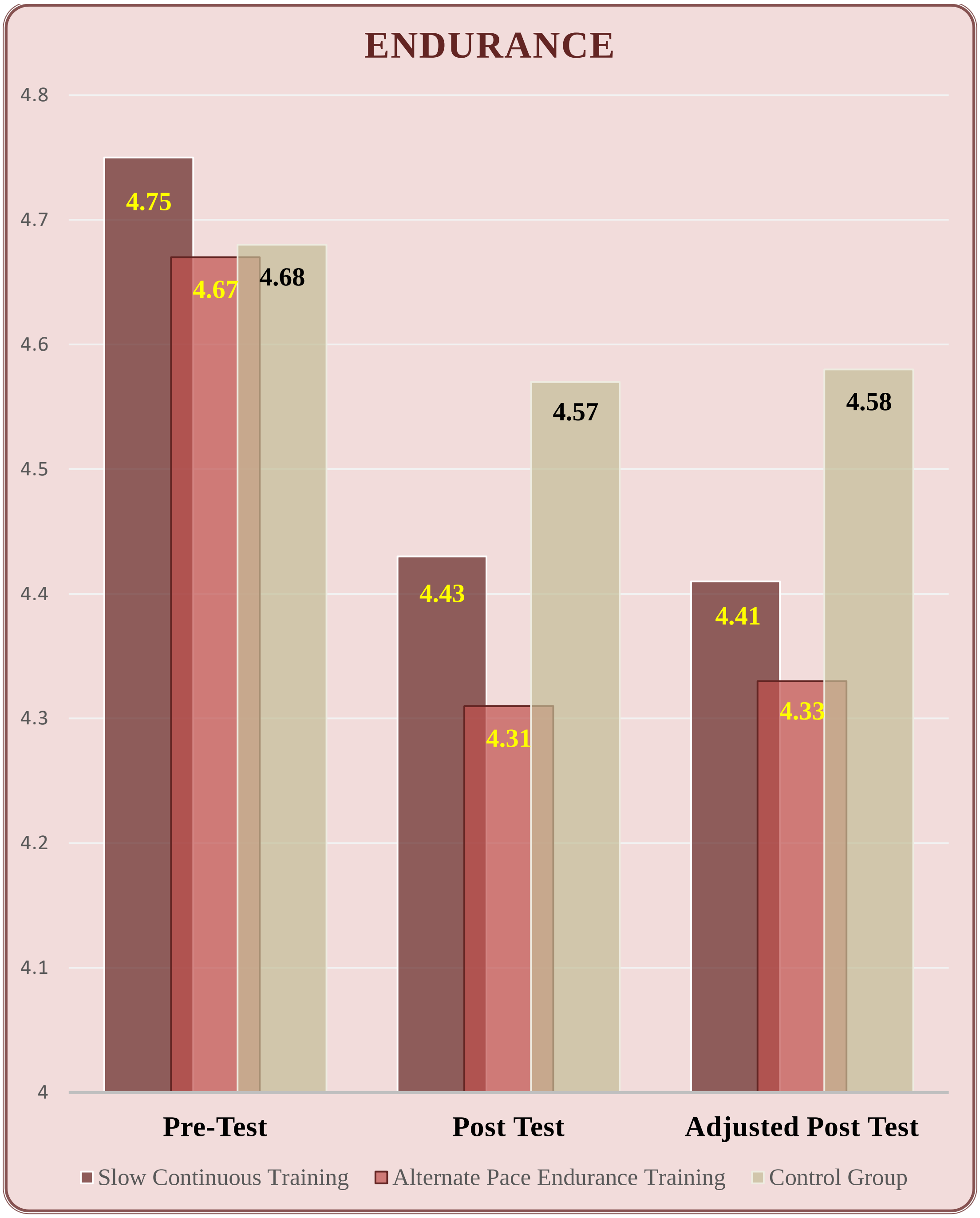
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
4.41	4.33	-	0.08*	0.00
4.41	-	4.58	0.17*	0.00
-	4.33	4.58	0.25*	0.00

***Significant at 0.05 Level of Significance if p<0.05.**

Table 4.6's multiple comparisons demonstrate that there are significant differences between the slow continuous training with alternate pace endurance training groups (0.08, p<0.05), slow continuous training with control group (0.17, p<0.05), alternate pace endurance training with the control group (0.25, p<0.05).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable increase in endurance after completing their respective training regimens. The study's findings also revealed a significant difference in the training groups' capacity for endurance, with the alternate pace endurance training having better endurance than the slow continuous training and control group.

Figure 4.3's bar chart serves as an illustration of the pre, post, and adjusted endurance means.



The Mean value of Endurance are shown

Graphically in Fig .4.3

4.2.1.4 Abdominal Strength Endurance:

The results of the analysis of covariance on abdominal strength endurance for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.7.

Table – 4.7

Results of Analysis of Covariance on Abdominal Strength Endurance among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	**M**	34.03	34.93	33.37	B	37.09	2	18.54	1.02	0.37
	SD	4.37	5.04	3.19	W	1583.80	87	18.21		
Post Test	**M**	37.80	39.17	33.73	B	479.27	2	239.63	13.91*	0.00
	SD	4.01	5.19	2.93	W	1498.83	87	17.23		
Adjusted Post Test	**M**	37.87	38.40	34.43	B	274.99	2	137.49	88.51*	0.00
					W	133.59	86	1.55		

***Significant at 0.05 level of significance if p-value is < 0.05.**

The bent knee sit ups test findings from the abdominal strength endurance analysis has shown in table 4.7. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test abdominal strength endurance means of 34.03, 34.93, and 33.37, respectively. F ratio was computed as (1.02, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 37.80, 39.17, and 33.73, respectively. The calculated F ratio was (13.91, $p<0.05$). As a result, the post-test was significant with a confidence level of 0.05. This reveals that there was a significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 37.87, 38.40, and 34.43, respectively. The adjusted post-test F ratio was (88.51, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for abdominal strength endurance.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.8, post hoc results are presented.

Table - 4.8

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Abdominal Strength Endurance

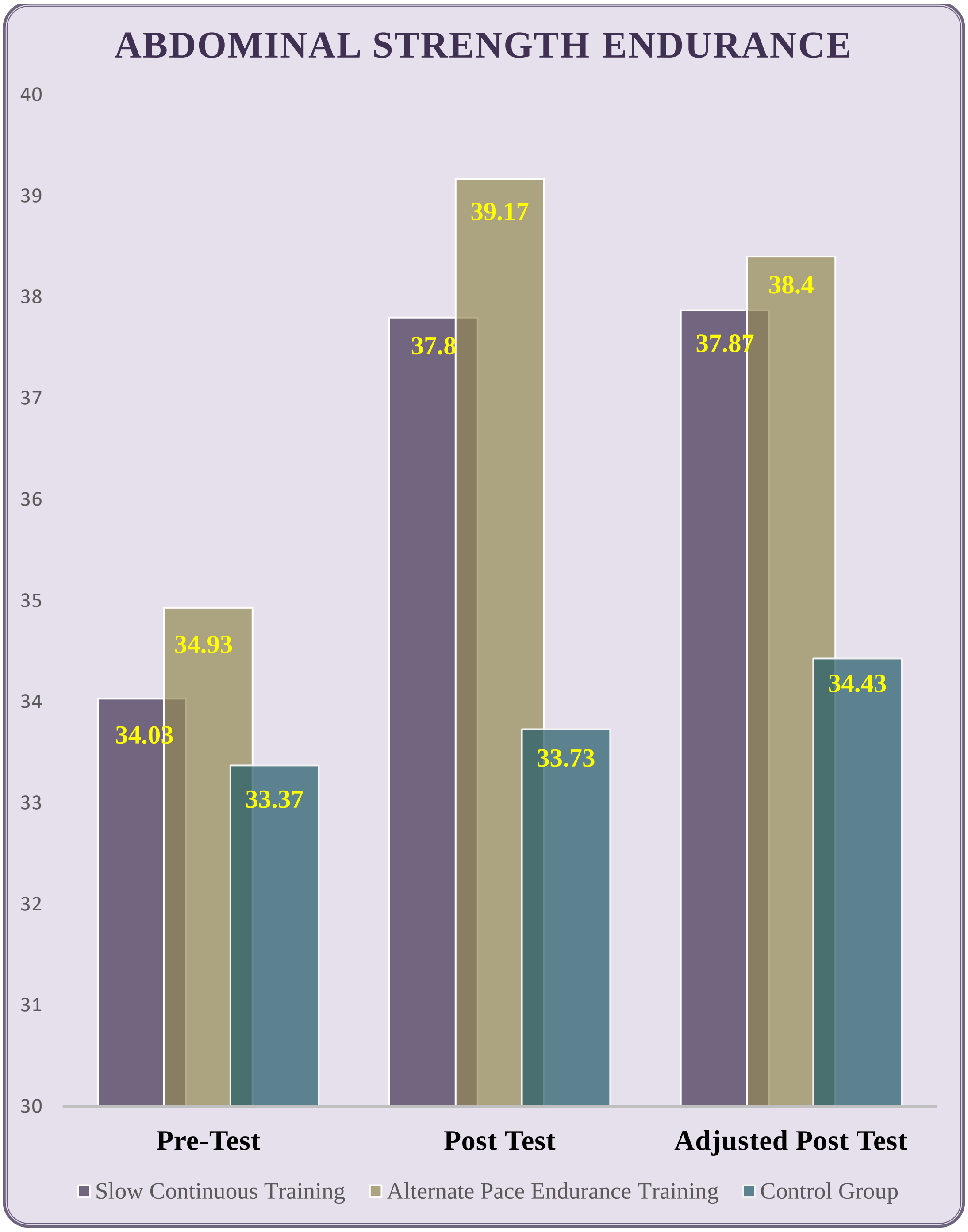
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
37.87	38.40	-	0.53	0.10
37.87	-	34.43	3.44*	0.00
-	38.40	34.43	3.97*	0.00

***Significant at 0.05 Level of Significance if p<0.05.**

Table 4.8's multiple comparisons demonstrate that there are significant differences between the slow continuous training with control group (3.44, $p<0.05$), alternate pace endurance training with the control group (3.97, $p<0.05$). The table also reveals that there no significant difference between slow continuous training and alternate pace endurance training (0.53, $p>0.05$).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable increase in abdominal strength endurance after completing their respective training regimens. The study's findings also revealed a significant difference in the training groups' capacity for abdominal strength endurance, with the alternate pace endurance training having better abdominal strength endurance than the slow continuous training and control group.

Figure 4.4's bar chart serves as an illustration of the pre, post, and adjusted abdominal strength endurance means.



The Mean value of Abdominal Strength Endurance are shown Graphically in Fig .4.4

4.2.1.5 Leg Strength:

The results of the analysis of covariance on leg strength for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.9.

Table – 4.9

Results of Analysis of Covariance on leg strength among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	**M**	57.84	58.02	57.49	B	4.31	2	2.15	1.60	0.21
	SD	1.06	1.21	1.20	W	116.87	87	1.34		
Post Test	**M**	60.23	60.46	58.22	B	91.12	2	45.56	30.40*	0.00
	SD	1.44	0.95	1.23	W	130.40	87	1.50		
Adjusted Post Test	**M**	60.18	60.25	58.49	B	57.57	2	28.79	78.36*	0.00
					W	31.59	86	0.37		

***Significant at 0.05 level of significance if p-value is < 0.05.**

The leg dynamometer test findings from the leg strength analysis has shown in table 4.9. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test leg strength means of 57.84, 58.02, and 57.49, respectively. F ratio was computed as (1.60, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 60.23, 60.46, and 58.22, respectively. The calculated F ratio was (30.40, $p<0.05$). As a result, the post-test was significant with a confidence level of 0.05. This reveals that there was a significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 60.18, 60.25, and 58.49, respectively. The adjusted post-test F ratio was (78.36, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for leg strength.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.10, post hoc results are presented.

Table - 4.10

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Leg Strength

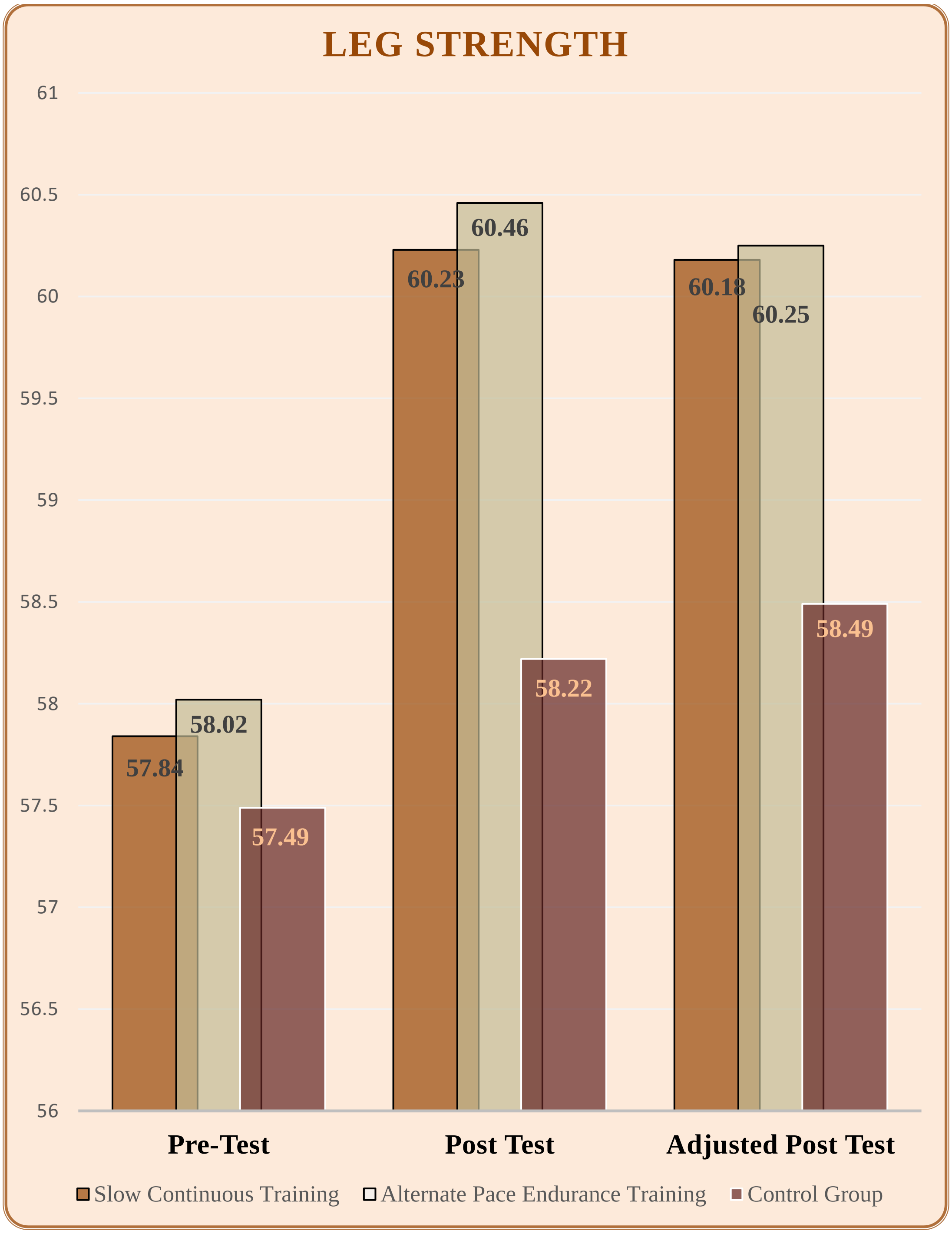
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
60.18	60.25	-	0.07	0.67
60.18	-	58.49	1.69*	0.00
-	60.25	58.49	1.76*	0.00

***Significant at 0.05 Level of Significance if p<0.05.**

Table 4.10's multiple comparisons demonstrate that there are significant differences between the slow continuous training with control group (1.69, $p<0.05$), alternate pace endurance training with the control group (1.76, $p<0.05$). The table also reveals that there no significant difference between slow continuous training and alternate pace endurance training (0.07, $p>0.05$).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable increase in leg strength after completing their respective training regimens. The study's findings also revealed a significant difference in the training groups' capacity for leg strength, with the alternate pace endurance training having better leg strength than the slow continuous training and control group.

Figure 4.5's bar chart serves as an illustration of the pre, post, and adjusted leg strength.



The Mean value of Leg Strength are shown

Graphically in Fig .4.5

4.2.2 Physiological Variables

4.2.2.1 Heart Rate:

The results of the analysis of covariance on heart rate for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.11.

Table – 4.11

Results of Analysis of Covariance on Heart Rate among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	**M**	70.63	69.83	70.50	B	11.02	2	5.51	1.23	0.30
	SD	2.14	2.00	2.21	W	390.63	87	4.49		
Post Test	**M**	67.93	67.50	70.03	B	110.16	2	55.08	25.18*	0.00
	SD	1.20	1.50	1.69	W	190.33	87	2.19		
Adjusted Post Test	**M**	67.75	67.79	69.93	B	93.10	2	46.55	70.30*	0.00
					W	56.95	86	0.66		

***Significant at 0.05 level of significance if p-value is < 0.05.**

The findings from the heart rate analysis has shown in table 4.11. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test heart rate means of 70.63, 69.83, and 70.50, respectively. F ratio was computed as (1.23, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 67.93, 67.50, and 70.03, respectively. The calculated F ratio was (25.18, $p<0.05$). As a result, the post-test was significant with a confidence level of 0.05. This reveals that there was a significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 67.75, 67.79, and 69.93, respectively. The adjusted post-test F ratio was (70.30, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for heart rate.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.12, post hoc results are presented.

Table - 4.12

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Heart Rate

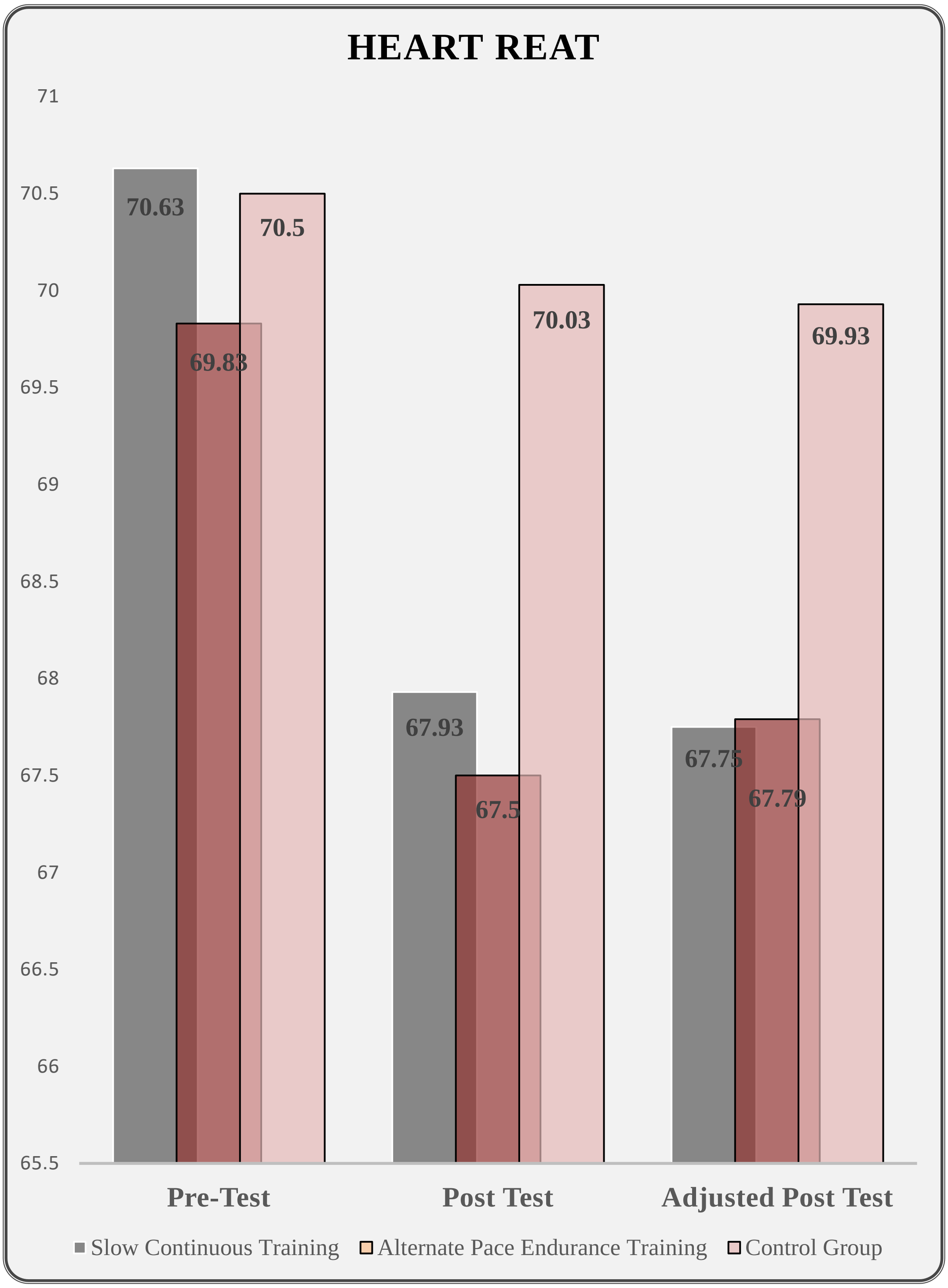
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
67.75	67.79	-	0.04	0.87
67.75	-	69.93	2.18*	0.00
-	67.79	69.93	2.14*	0.00

***Significant at 0.05 Level of Significance if p<0.05.**

Table 4.12's multiple comparisons demonstrate that there are significant differences between the slow continuous training with control group (2.18, p<0.05), alternate pace endurance training with the control group (2.14, p<0.05). The table also reveals that there no significant difference between slow continuous training and alternate pace endurance training (0.04, p>0.05).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable decrease in heart rate after completing their respective training regimens. The study's findings revealed a significant difference in the training groups' capacity for heart rate. Also, both experimental groups showed equal improvement in the performance of heart rate.

Figure 4.6's bar chart serves as an illustration of the pre, post, and adjusted heart rate.



The Mean value of Heart Rate are shown

Graphically in Fig .4.6

4.2.2.2 Vital Capacity:

The results of the analysis of covariance on vital capacity for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.13.

Table – 4.13

Results of Analysis of Covariance on Vital Capacity among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	3.75	3.72	3.71	B	0.02	2	0.02	0.20	0.82
	SD	0.31	0.25	0.14	W	5.15	87	0.06		
Post Test	M	4.01	4.02	3.74	B	1.51	2	0.76	24.38*	0.00
	SD	0.21	0.16	0.16	W	2.70	87	0.03		
Adjusted Post Test	M	4.00	4.03	3.75	B	1.37	2	0.69	117.54*	0.00
					W	0.50	86	0.01		

***Significant at 0.05 level of significance if p-value is < 0.05.**

The findings from the vital capacity analysis has shown in table 4.13. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test vital capacity means of 3.75, 3.72, and 3.71, respectively. F ratio was computed as (0.20, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 4.01, 4.02, and 3.74, respectively. The calculated F ratio was (24.38, $p<0.05$). As a result, the post-test was significant with a confidence level of 0.05. This reveals that there was a significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 4.00, 4.03, and 3.75, respectively. The adjusted post-test F ratio was (117.54, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for vital capacity.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.14, post hoc results are presented.

Table - 4.14

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Vital Capacity

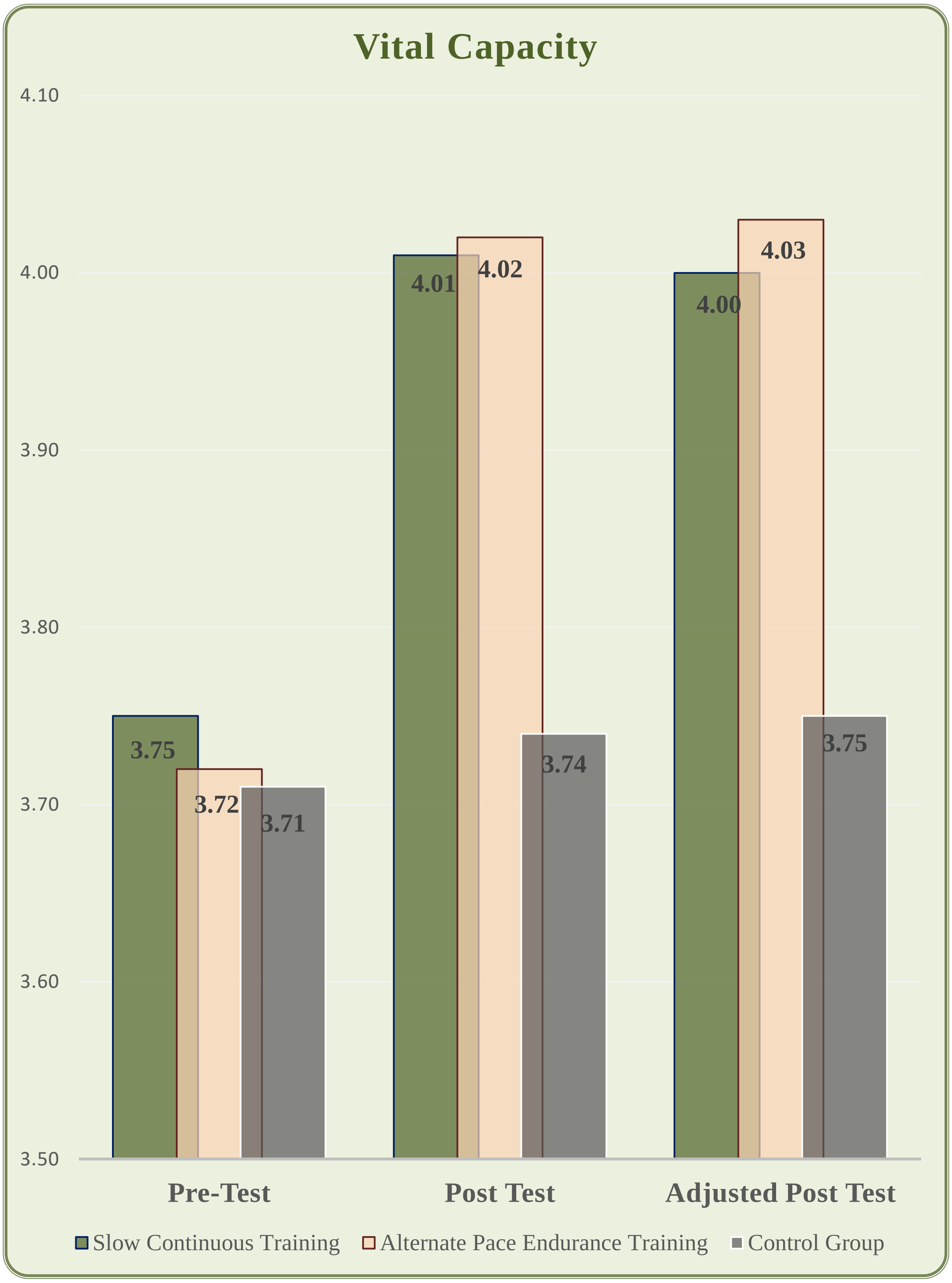
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
4.00	4.03	-	0.03	0.12
4.00	-	3.75	0.25*	0.00
-	4.03	3.75	0.28*	0.00

***Significant at 0.05 Level of Significance if p<0.05.**

Table 4.14's multiple comparisons demonstrate that there are significant differences between the slow continuous training with control group (0.25, p<0.05), alternate pace endurance training with the control group (0.28, p<0.05). The table also reveals that there no significant difference between slow continuous training and alternate pace endurance training (0.03, p>0.05).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable increase in vital capacity after completing their respective training regimens. The study's findings also revealed a significant difference in the training groups' capacity for vital capacity, with the alternate pace endurance training having better vital capacity than the slow continuous training and control group.

Figure 4.7's bar chart serves as an illustration of the pre, post, and adjusted vital capacity.



The Mean value of Vital Capacity are shown

Graphically in Fig .4.7

4.2.2.3 Systolic Blood Pressure:

The results of the analysis of covariance on systolic blood pressure for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.15.

Table – 4.15

Results of Analysis of Covariance on Systolic Blood Pressure among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	116.43	115.23	116.20	B	24.29	2	12.14	0.36	0.70
	SD	5.44	6.18	5.72	W	2915.53	87	33.51		
Post Test	M	112.30	112.33	115.23	B	170.16	2	85.08	2.73	0.17
	SD	5.32	6.04	5.35	W	2710.33	87	31.13		
Adjusted Post Test	M	111.86	112.99	115.01	B	152.45	2	76.22	24.11*	0.00
					W	271.84	86	3.16		

***Significant at 0.05 level of significance if p-value is < 0.05.**

The findings from the systolic blood pressure analysis has shown in table 4.15. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test systolic blood pressure means of 116.43, 115.23, and 116.20, respectively. F ratio was computed as (0.36, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 112.30, 112.33, and 115.23, respectively. The calculated F ratio was (2.73, $p>0.05$). As a result, the post-test was not significant with a confidence level of 0.05. This reveals that there was a no significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 111.86, 112.99, and 115.01, respectively. The adjusted post-test F ratio was (24.11, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for systolic blood pressure.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.16, post hoc results are presented.

Table - 4.16

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Systolic Blood Pressure

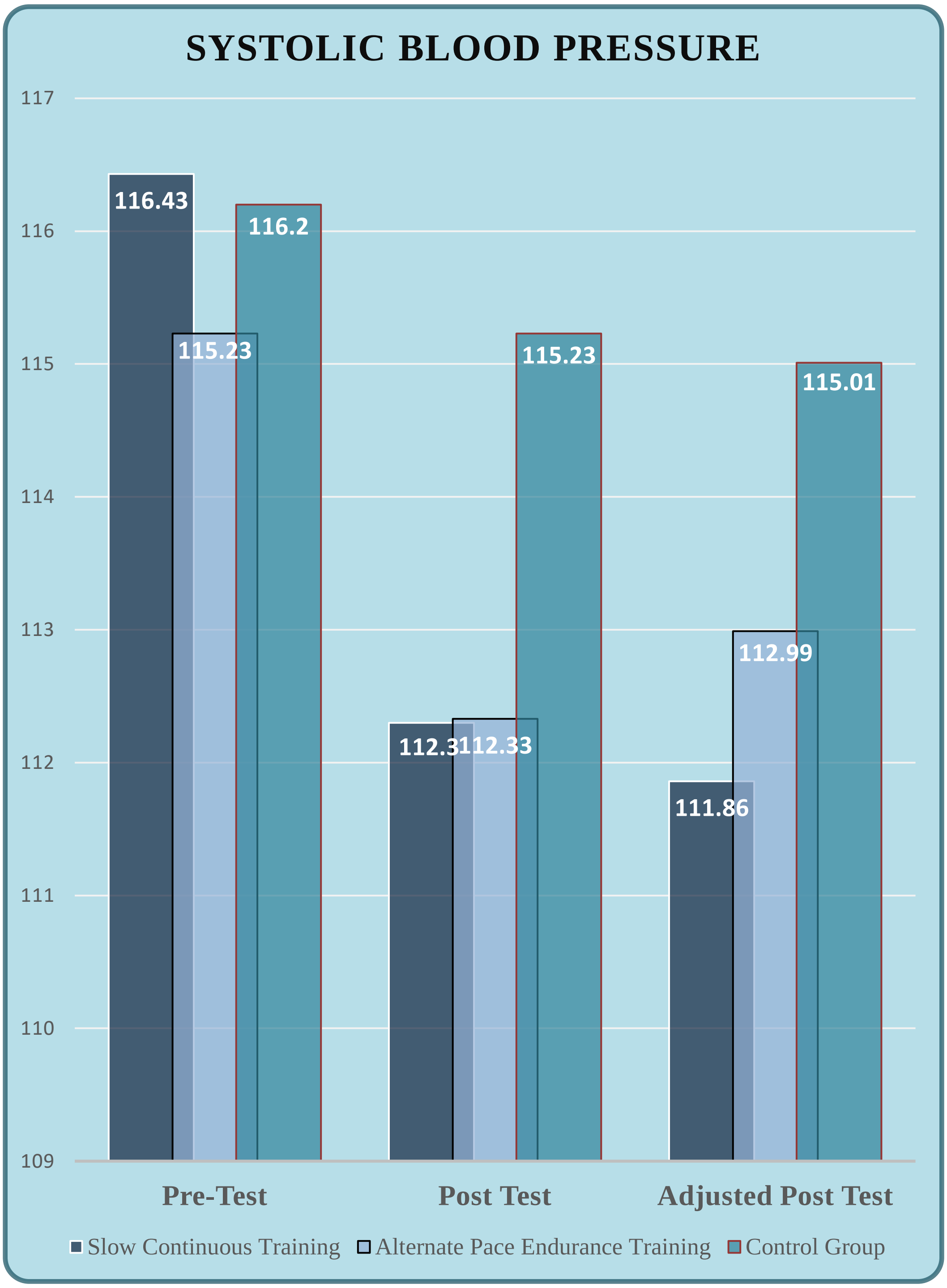
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
111.86	112.99	-	1.13*	0.01
111.86	-	115.01	3.15*	0.00
-	112.99	115.01	2.02*	0.00

***Significant at 0.05 Level of Significance if p<0.05.**

Table 4.16's multiple comparisons demonstrate that there are significant differences between the slow continuous training with alternate pace endurance training groups (1.13, $p<0.05$), slow continuous training with control group (3.15, $p<0.05$), alternate pace endurance training with the control group (2.02, $p<0.05$).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable decrease in systolic blood pressure after completing their respective training regimens. The study's findings also revealed a significant difference in the training groups' capacity for systolic blood pressure, with the slow continuous training having better systolic blood pressure than the alternate pace endurance training and control group.

Figure 4.8's bar chart serves as an illustration of the pre, post, and adjusted systolic blood pressure.



The Mean value of Systolic Blood Pressure are shown Graphically in Fig .4.8

4.2.2.4 Diastolic Blood Pressure:

The results of the analysis of covariance on diastolic blood pressure for the slow continuous and alternate pace endurance training and the control group are presented in Table 4.17.

Table – 4.17

Results of Analysis of Covariance on Diastolic Blood Pressure among Experimental and Control Groups

Test		Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Sources of Variance	Sum of Square	DF	Mean of Square	Obtain F ratio	Sig. (2-tailed)
Pre-Test	M	78.33	78.93	79.43	B	18.20	2	9.10	1.01	0.37
	SD	3.79	2.90	2.04	W	781.90	87	8.99		
Post Test	M	75.20	76.20	78.20	B	140.00	2	70.00	10.99*	0.00
	SD	2.86	2.38	2.30	W	554.40	87	6.37		
Adjusted Post Test	M	75.62	76.18	77.81	B	76.30	2	38.15	24.61*	0.00
					W	133.32	86	1.55		

***Significant at 0.05 level of significance if p-value is < 0.05.**

The findings from the diastolic blood pressure analysis has shown in table 4.17. The slow continuous training group, alternate pace endurance training group, and control group all had pre-test heart rate means of 78.33, 78.93, and 79.43, respectively. F ratio was computed as (1.01, $p>0.05$). Thus, the pre-test was not significant with a 0.05 level of confidence. This showed that there were no significant differences between the slow continuous training group, the alternating pace endurance training group and control group.

The slow continuous training group, alternate pace endurance training group, and control group all had post-test means were 75.20, 76.20, and 78.20, respectively. The calculated F ratio was (10.99, $p<0.05$). As a result, the post-test was significant with a confidence level of 0.05. This reveals that there was a significant difference between the subjects' post-test means.

The slow continuous training group, alternate pace endurance training group, and control group all had adjusted post-test means were 75.62, 76.18, and 77.81, respectively. The adjusted post-test F ratio was (24.61, $p<0.05$) with a confidence level of 0.05, therefore, the adjusted post-test mean f-ratio was considered significant. This proved that the experimental training was the reason for the significant difference in the adjusted post-test means for diastolic blood pressure.

A post hoc analysis employing the LSD test is performed on the adjusted post-test means, which demonstrate significant differences. In table - 4.18, post hoc results are presented.

Table - 4.18

LSD Post Hoc Test for Difference between Adjusted Post Test Paired Means on Diastolic Blood Pressure

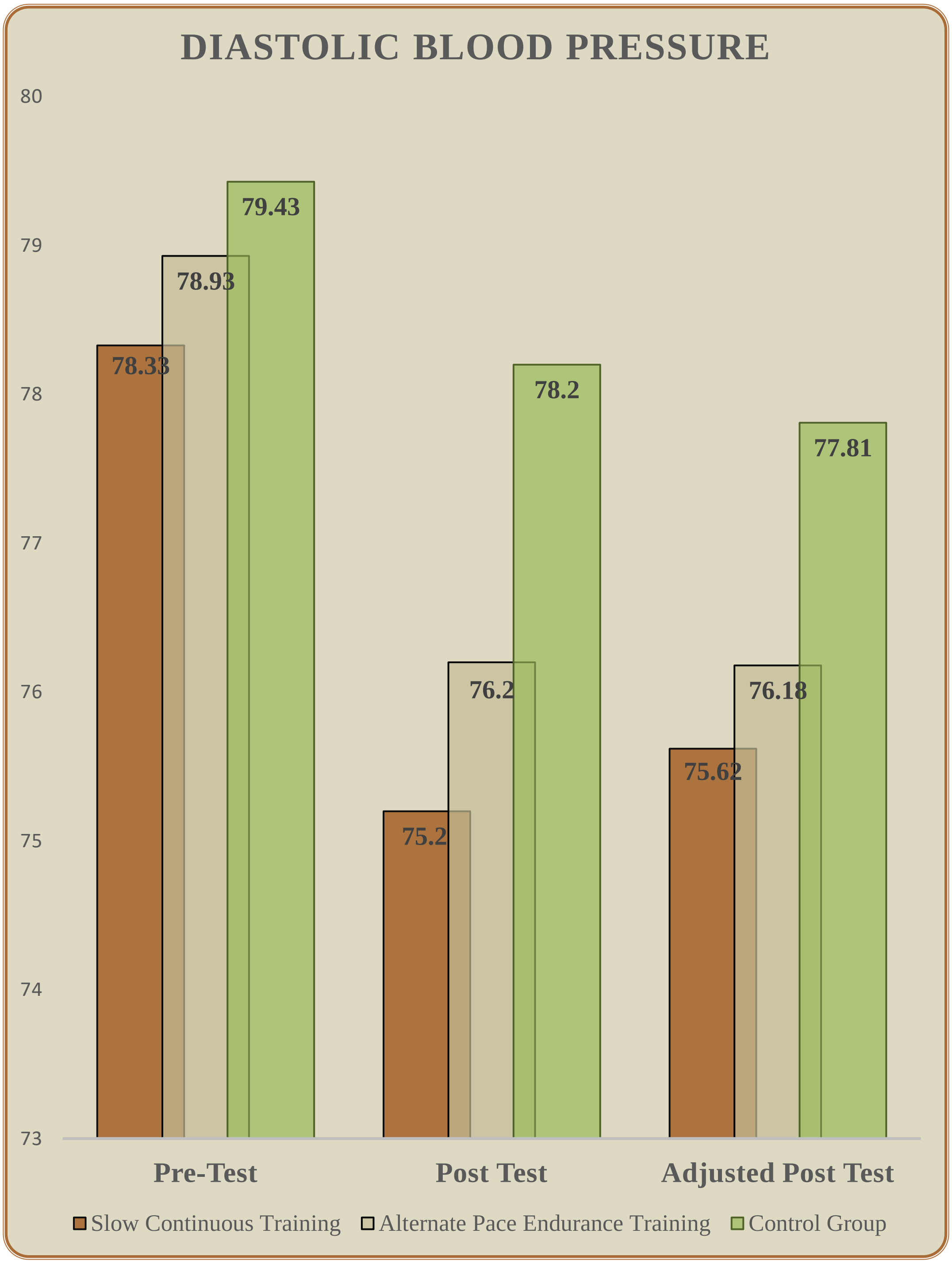
Slow Continuous Training	Alternate Pace Endurance Training	Control Group	Mean Difference	Sig.
75.62	76.18	-	0.56	0.08
75.62	-	77.81	2.19*	0.00
-	76.18	77.81	1.63*	0.00

***Significant at 0.05 Level of Significance if p<0.05.**

Table 4.18's multiple comparisons demonstrate that there are significant differences between the slow continuous training with control group (2.19, p<0.05), alternate pace endurance training with the control group (1.63, p<0.05). The table also reveals that there no significant difference between slow continuous training and alternate pace endurance training (0.56, p>0.05).

Based on the study's findings, it can be said that both the slow continuous training and alternative pace endurance training groups had a noticeable decrease in diastolic blood pressure after completing their respective training regimens. The study's findings also revealed a significant difference in the training groups' capacity for diastolic blood pressure, with the slow continuous training having better diastolic blood pressure than the alternate pace endurance training and control group.

Figure 4.9's bar chart serves as an illustration of the pre, post, and adjusted diastolic blood pressure.



The Mean value of Diastolic Blood Pressure are shown Graphically in Fig .4.9

4.3 Discussion of Findings

The findings of the investigational study indicate that alternative pace endurance training improves improvisation on a subset of dependent variables. Each dependent variable in the two experimental groups has improved since the original data. Below, we'll review the findings of earlier studies in relation to the study's current findings.

4.3.1 Physical Variables:

Due to the training effects of slow continuous and alternate pace endurance training programmes, the results of speed endurance, endurance, cardio respiratory endurance, abdominal strength endurance, and leg strength had all significantly improved. On speed endurance, endurance, cardio respiratory endurance, abdominal strength endurance, and leg strength among the long distance runners, alternating pace endurance training had a significantly stronger impact than slow continuous training. The outcome also shows that none of the specified physical factors in the control group had significantly improved, according to the results.

The following past research investigations that used one and other dependent and independent variables also lend support to the findings of this studies.

The impact of 12-week endurance training packages with different repetition lengths on middle distance runners' physiological, psychological, and physical fitness is examined by **Kumar (2022).** The study's findings demonstrated that a combined repetition endurance training programme considerably enhanced the selected dependent variables, such as speed endurance, aerobic endurance, and abdominal strength endurance.

In 2020, **Vigneshwaran and Sundar;** The benefits of interval and strength endurance training for long distance athletes include increased speed, cardiopulmonary endurance, and muscular strength.

A study by **Paavolainen et al. (2020)** to examine the effects of concurrent explosive-strength and endurance training on physical performance traits. The study's findings show that well-trained endurance athletes' 5K times improved while receiving the current simultaneous explosive-strength and endurance training, with no alterations to their VO2 max.

Kumar and Kumar's study (2020) to determine the impact of uphill training on specific physical and physiological factors in long-distance runners. The experimental groups differed significantly in terms of their ability to maintain speed and cardio respiratory endurance. **Assefa (2020)** found that 8 weeks of intermittent training enhanced athletes' aerobic fitness more than continuous training did. Hill running and fartlek running benefit middle- and long-distance runners by increasing their lower body strength and resilience to exhaustion, claims **Kumar (2018).** The development of aerobic fitness is encouraged.

Arunprasanna et al. (2019) investigated the effects of continuous running, running at a different pace, and mixed training on abdominal strength endurance in male athletes. Rendering to the study, the combined group that received both endurance trainings outperformed the other groups in the selected variables.

The 2018; **Engel et al.** Even said, HIIT may be advantageous for young athletes because it takes less time per training session, which means more time for developing sport-specific abilities.

Sharma et al. 2017. At 2100 m natural altitude, elite middle-distance runners experience negative effects on their running speed, with the severity of the impairment depending on the amount of training. A greater sense of exertion may be felt if RS is maintained at particular intensities when training at altitude. **Gleason and others (2014)** To improve running performance on the 1.5 and 2-mile run tests required by the military, a combination of conventional strength training, high intensity interval training, and distance training should be performed. According to **Chtara et al. (2005),** endurance training improved the 4 km time trial and aerobic capacity more than the other training regimens or each one done independently.

4.3.2 Physiological Variables:

The current study clearly demonstrates that, when compared to the other groups, the alternative pace endurance training group's enhanced vital capacity and the slow continuous training group's considerable improvement in systolic and diastolic blood pressure. And the performance of heart rate in both experimental groups improved equally.

Krishnan et al. (2020) investigate the impact of continuous and interval training on a number of physiological indicators in male college students. The study's findings demonstrated a considerably greater improvement in resting pulse rate, vital capacity, and VO2 Max in the experimental group when compared to the control group.

The impact of continuous running, alternate-pace running, and fartlek training on resting pulse rate and breath holding capacity is examined by **Arunprasanna, Prasanna, and Vaithianathan (2019)**. The results of the study showed that the combined group with the three endurance trainings outperformed the other groups in the physiological variable that was chosen.

According to **G. Molina et al. (2017),** rookie runners' spatiotemporal characteristics and physiological variables are examined after 8 weeks of concurrent plyometric and running training. In conclusion, concurrent plyometric and running training involves a decrease in heart rate as well as increases in peak speed and VO2max.

The results of the **Silva et al. (2017)** study indicate that 4 weeks of HIIT can enhance some conventional physiological indicators connected to endurance performance.

Etxebarria et al. (2014) investigated the benefits of two cycle HIT (high-intensity interval training) variations on cycling and running specifically for triathlons. Long high-intensity intervals increase cycling physiology and performance while short high-intensity interval training reduces heart rate, blood lactate, and perceived exertion in both groups. Performance over a 5 km run is more likely to be improved by longer 5-min cycling intervals.

Brandon (1995), This distinguishes middle distance runners from long distance runners because middle distance runners can succeed with physiological profiles that encompass a variety of aerobic and anaerobic capabilities.

The material mentioned above makes it abundantly evident that slow continuous and alternative pace endurance training must be performed frequently and with adequate supervision. As a result, it is concluded that long distance runners may benefit from a carefully planned programme of slow continuous and alternate pace endurance training. This will help them develop their physical and physiological performance parameters as well as prevent them from getting injured too soon.

4.4 Discussion of Hypotheses

1. In the first hypothesis, it was mentioned that there would be significant improvement on selected physical fitness variables due to the effect of slow continuous and alternate pace endurance training of long-distance runner. Similar findings were obtained in the present study. As a result, the investigator's initial research hypothesis was accepted.
2. In the second hypothesis, it was mentioned that there would be significant improvement on selected physiological variables due to the effect of slow continuous and alternate pace endurance training of long-distance runner. Similar findings were obtained in the present study. As a result, the investigator's second research hypothesis was accepted.
3. In the third hypothesis, it was mentioned that there would be significant differences on selected physical and physiological variable among the slow continuous and alternate pace endurance training programmes and control groups. Similar findings were obtained in the present study. As a result, the investigator's third research hypothesis was accepted.