CHAPTER – IV

ANALYSIS AND INTERPRETATION OF DATA

4.1 INTRODUCTION

The statistical analysis of data collected pertaining to experimental study on the effects of low intensity of aquatic and land plyometric training on selected motor fitness variables among school boys were presented in this chapter.

The selected subjects were initially tested on criterion variables used in this study and this is considered as the pre-test. After assessing the pre-test, the subjects in the experimental groups namely aquatic and land plyometric training were treated with their respective treatments for three alternative days a week and for a duration of twelve weeks.

The statistical tool of Analysis of covariance (ANCOVA) was applied to determine whether the two programmes of training produced significantly different improvements in selected variables after twelve weeks of training. If the mean difference was significant the pairs of adjusted final group means was tested for significance by applying Scheffe's post hoc test.

To test the obtained results, 0.05 level of significance was chosen, which was considered as an appropriate for the purpose of the study.

The influence of low intensity of aquatic and land plyometric training on selected motor fitness variables among school students were analyzed separately for each variable and presented in table I - table VI.

4.2 RESULTS

The analysis of pre test, post test and adjusted post test of speed, were computed and analysed in the table I. The scheffes post hoc test analysis for paired mean defences on speed analysed in the table I(a).

TABLE – I

ANALYSIS OF COVARIANCE ON SPEED OF DIFFERENT GROUPS

(scores in seconds)

Test Conditions		Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	SV	SS	Df	MS	'F' Ratio
Pre test	Mean	7.04	7.06	7.05	Between	0.0029	2	0.0014	0.04
	S.D.	0.13	0.14	0.27	Within	1.6743	42	0.0399	
Post test	Mean	6.74	6.88	7.04	Between	0.6642	2	0.3321	10.28*
	S.D.	0.06	0.11	0.27	Within	1.3562	42	0.0323	
Adjusted post test	Mean	6.75	6.88	7.04	Between	0.6470	2	0.3235	18.66*
					Within	0.7108	41	0.0173	

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively).

4.2 RESULTS OF SPEED

Pre-test observation:

The pre test mean and standard deviation on Speed of G1, G2, and G3 were 7.04 ±0.13, 7.06 ± 0.14 and 7.05 ± 0.27 respectively; the obtained pre test F value of 0.04 was lesser than the required table F value of 3.222. Hence the pre test mean value of low intensity of aquatic and land plyometric training and control group on speed before start of the respective treatments were found to be in significant at 0.05 level of confidence for the degrees of freedom 2 and 42. Thus this analysis confirmed that the random assignment of subject in to three groups were successful.

Post-test observation:

The post test mean and standard deviation on speed scores of G1, G2, and G3 were 6.74 ± 0.06, 6.88 ± 0.11 and 7.04 ± 0.27 respectively. The obtained post test F value of 10.28 was greater than the required table F value of 3.222. Hence the pos – test means value of speed show significant at 0.05 level of confidence for the degree of freedom 2 and 42 thus the result obtained proved that the interventions namely low intensity of aquatic and land plyometric training on speed produced significantly different improvements between the training groups.

Adjusted Pre-test observation:

The adjusted post test mean on speed scores of G1, G2, and G3 were 6.75, 6.88 and 7.04 respectively. The obtained adjusted post-test F value 18.66 was greater than the required table f value of 3.226. Hence the adjusted post test means value of speed show significant at 0.05 level of confidence for the degrees of freedom 2 and 41. Since the observed F value on adjusted post test mean such as low intensity of aquatic and land plyometric training on speed produced significantly different improvements between the training groups.

In order to find out which intervention programme used in the present study was the source for the significance f adjusted mean was tested by scheffe's post hoc test. The results of the same are presented in the table I (a)

TABLE - I(a)
SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON SPEED AMONG THREE GROUPS
(scores in seconds)

G 1 LI-APT	G 2 LI-LPT	G3 C G	Mean Differences	Confidence Interval Value
6.75	6.68		0.13*	0.11
6.75		7.04	0.19*	0.11
	6.68	7.04	0.16*	0.11

* Significant at .05 level of confidence.

4.2.1 Results of Post - hoc test on Speed
Comparison 1

The paired mean difference of group 1 and 2, was 0.13 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.11. This comparison exactly shows that selected both training produced significant improvement at 0.05 levels.

Comparison 2

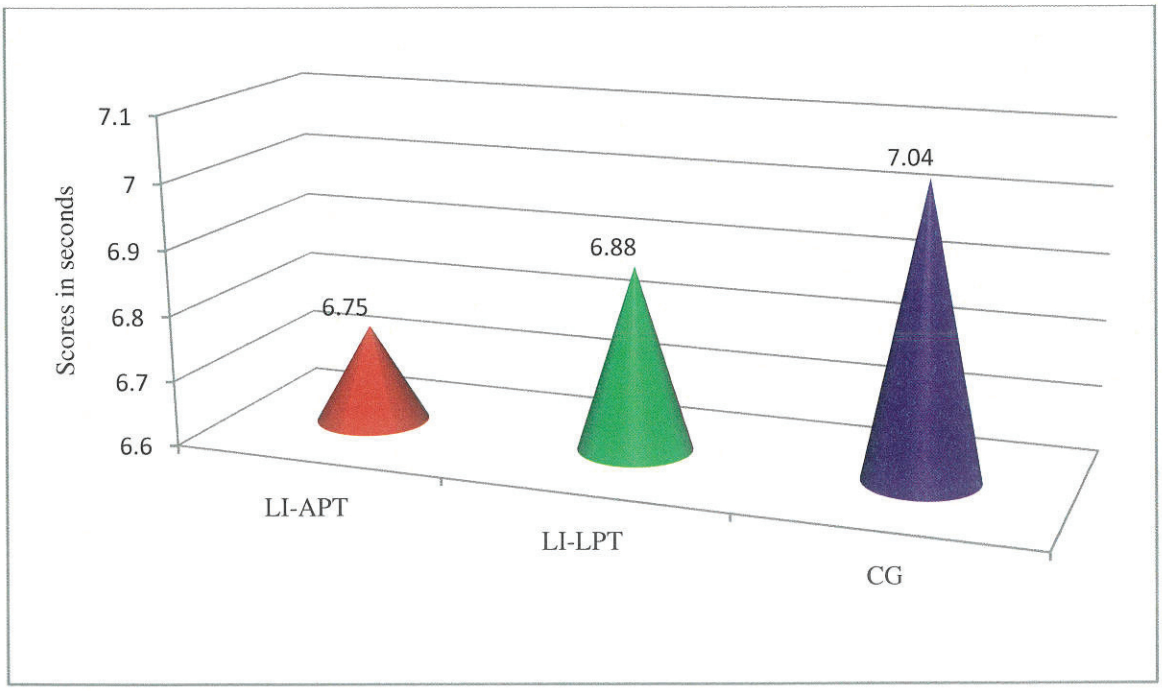
The paired mean difference of group 1 and 3, was 0.19 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.11. This comparison perfectly shows that selected both training produced significant improvement at 0.05 levels.

Comparison 3

The paired mean difference of group 2 and 3 was 0.16 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.11.This comparison precisely shows that selected both training produced significant improvement at 0.05 levels. The adjusted post test mean values on speed represented in figure 1.

FIGURE-1

THE ADJUSTED POST-TEST MEAN VALUES OF EXPERIMENTAL AND CONTROL GROUPS ON SPEED



(red)	Group I	LI-APT	Low Intensity Aquatic Plyometric Training
(green)	Group II	LI-LPT	Low Intensity Land Plyometric Training
(purple)	Group III	CG	Control Group

TABLE – II

ANALYSIS OF COVARIANCE ON FLEXIBILITY OF DIFFERENT GROUPS

(scores in centimetres)

Test Conditions		Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	SV	SS	Df	MS	'F' Ratio
Pre test	Mean	15.06	15.08	14.99	Between	0.06	2	0.03	0.10
	S.D.	0.56	0.52	0.52	Within	12.93	42	0.31	
Post test	Mean	16.60	16.21	14.93	Between	22.77	2	11.38	42.91*
	S.D.	0.57	0.44	0.48	Within	11.14	42	0.27	
Adjusted post test	Mean	16.59	16.18	14.96	Between	21.40	2	10.70	70.07*
					Within	6.26	41	0.15	

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively).

4.3 RESULTS OF FLEXIBILITY

Pre-test observation:

The pre test mean and standard deviation on flexibility of G1, G2, and G3 were 15.06 ± 0.56, 15.08 ± 0.52 and 14.99 ± 0.52 respectively; the obtained pre test F value of 0.10 was lesser than the required table F value of 3.222. Hence the pre test mean value of low intensity of aquatic and land plyometric training and control group on flexibility before start of the respective treatments were found to be in significant at 0.05 level of confidence for the degrees of freedom 2 and 42. Thus this analysis confirmed that the random assignment of subject in to three groups were successful.

Post-test observation:

The post test mean and standard deviation on flexibility scores of G1, G2, and G3 were 16.60 ± 0.57, 16.21 ± 0.44 and 14.93 ± 0.48 respectively. The obtained post test F value of 42.91 was greater than the required table F value of 3.222. Hence the pos – test means value of flexibility show significant at 0.05 level of confidence for the degree of freedom 2 and 42 thus the result obtained proved that the interventions namely low intensity of aquatic and land plyometric training on flexibility produced significantly different improvements between the training groups.

Adjusted post-test observation:

The adjusted post test mean on flexibility scores of G1, G2, and G3 were 16.59, 16.18 and 14.96 respectively. The obtained adjusted post-test F value 70.07 was greater than the required table f value of 3.226. Hence the adjusted post test means value of flexibility show significant at 0.05 level of confidence for the degrees of freedom 2 and 41. Since the observed F value on adjusted post test mean such as low intensity of aquatic and land plyometric training on flexibility produced significantly different improvements between the training groups.

In order to find out which intervention programme used in the present study was the source for the significance f adjusted mean was tested by scheffe's post hoc test. The results of the same are presented in the table II (a)

TABLE - II(a)

SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON FLEXIBILITY AMONG THREE GROUPS

(scores in centimetres)

Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	Mean Differences	Confidence Interval Value
16.59	16.18		0.41*	0.36
16.59		14.96	0.63*	0.36
	16.18	14.96	0.22*	0.36

* Significant at .05 level of confidence.

4.3.1Results of Post - hoc test on Flexibility

Comparison 1:

The paired mean difference of group 1 and 2, was 0.41 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.36. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels.

Comparison 2:

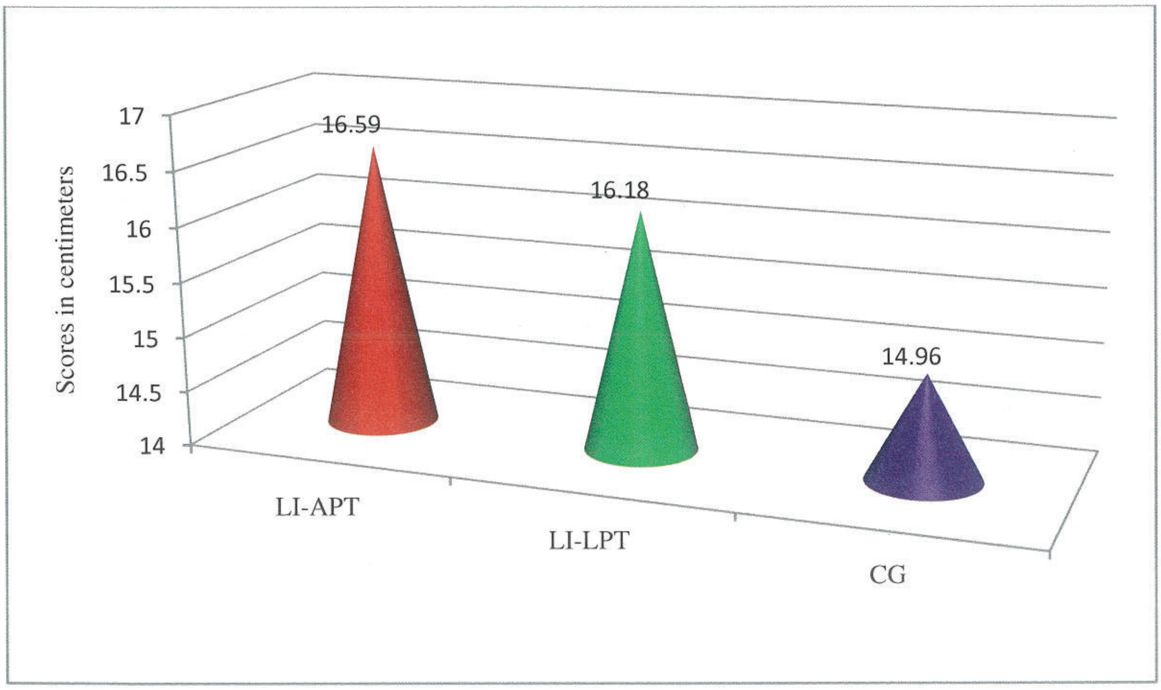
The paired mean difference of group 1 and 3 was 0.63 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.36.This comparison accurately shows that selected both training produced significant improvement at 0.05 levels.

Comparison 3:

The paired mean difference of group 2 and 3, was 0.22 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.36. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels. The adjusted post test mean values on flexibility represented in figure 2.

FIGURE-2

THE ADJUSTED POST-TEST MEAN VALUES OF EXPERIMENTAL AND CONTROL GROUPS ON FLEXIBILITY



(red)	Group I	LI-APT	Low Intensity Aquatic Plyometric Training
(green)	Group II	LI-LPT	Low Intensity Land Plyometric Training
(purple)	Group III	CG	Control Group

TABLE – III

ANALYSIS OF COVARIANCE ON MUSCULAR ENDURANCE OF DIFFERENT GROUPS

(scores in counts)

Test Conditions		Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	SV	SS	Df	MS	'F' Ratio
Pre test	Mean	12.00	12.20	12.33	Between	0.84	2	0.42	0.42
	S.D.	0.89	0.98	1.01	Within	41.73	42	0.99	
Post test	Mean	14.73	14.60	12.00	Between	71.24	2	35.62	30.83*
	S.D.	0.57	1.08	1.32	Within	48.53	42	1.16	
Adjusted post test	Mean	14.83	14.59	11.91	Between	77.53	2	38.77	44.60*
					Within	35.64	41	0.87	

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively).

4.4 RESULTS OF MUSCULAR ENDURANCE

Pre-test observation:

The pre test mean and standard deviation on muscular endurance of G1, G2, and G3 were 12.00 ± 0.89, 12.20 ± 0.98 and 12.33 ± 1.01 respectively; the obtained pre test F value of 0.42 was lesser than the required table F value of 3.222. Hence the pre test mean value of low intensity of aquatic and land plyometric training and control group on muscular endurance before start of the respective treatments were found to be in significant at 0.05 level of confidence for the degrees of freedom 2 and 42. Thus this analysis confirmed that the random assignment of subject in to three groups were successful.

Post-test observation:

The post test mean and standard deviation on muscular endurance scores of G1, G2, and G3 were 14.73 ± 0.57, 14.60 ±1.08 and 12.00 ± 1.32 respectively. The obtained post test F value of 30.83 was greater than the required table F value of 3.222. Hence the pos – test means value of muscular endurance show significant at 0.05 level of confidence for the degree of freedom 2 and 42 thus the result obtained proved that the interventions namely low intensity of aquatic and land plyometric training on muscular endurance produced significantly different improvements between the training groups.

Adjusted post-test observation:

The adjusted post test mean on muscular endurance scores of G1, G2, and G3 were 14.83, 14.59 and 11.91 respectively. The obtained adjusted post-test F value 44.60 was greater than the required table f value of 3.226. Hence the adjusted post test means value of muscular endurance show significant at 0.05 level of confidence for the degrees of freedom 2 and 41. Since the observed F value on adjusted post test mean such as low intensity of aquatic and land plyometric training on muscular endurance produced significantly different improvements between the training groups.

In order to find out which intervention programme used in the present study was the source for the significance f adjusted mean was tested by scheffe's post hoc test. The results of the same are presented in the table III (a)

TABLE - III(a)
SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON MUSCULAR ENDURANCE AMONG THREE GROUPS
(scores in counts)

Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	Mean Differences	Confidence Interval Value
14.83	14.59		0.24	0.86
14.83		11.91	2.92*	0.86
	14.59	11.91	2.67*	0.86

* Significant at .05 level of confidence.

4.4.1Results of Post - hoc test on Muscular endurance
Comparison 1:

The paired mean difference of group 1 and 2, was 0.24 the obtained mean difference value of these comparisons was lesser than the confidence interval value of 0.86. This comparison accurately shows that selected both training not produced significant improvement at 0.05 levels.

Comparison 2:

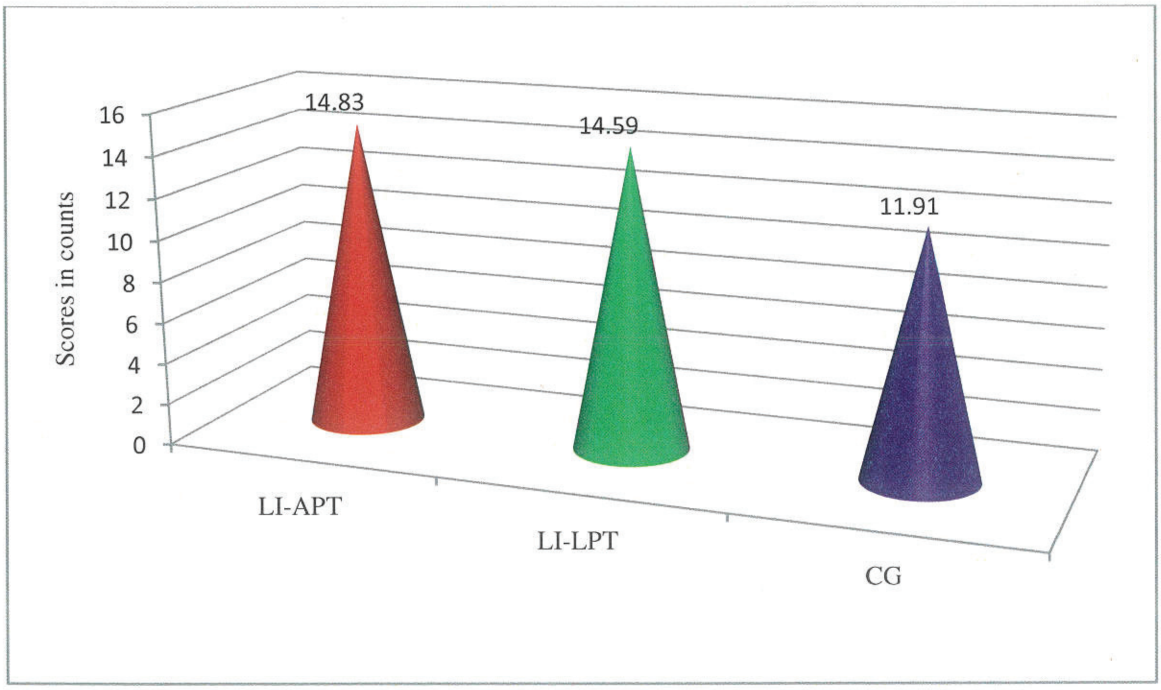
The paired mean difference of group 1 and 3, was 2.92 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.86. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels.

Comparison 3:

The paired mean difference of group 2 and 3 was 2.67 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.86.This comparison accurately shows that selected both training produced significant improvement at 0.05 levels. The adjusted post test mean values on muscular endurance represented in figure 3.

FIGURE-3

THE ADJUSTED POST-TEST MEAN VALUES OF EXPERIMENTAL AND CONTROL GROUPS ON MUSCULAR ENDURANCE



(red)	Group I	LI-APT	Low Intensity Aquatic Plyometric Training
(green)	Group II	LI-LPT	Low Intensity Land Plyometric Training
(purple)	Group III	CG	Control Group

TABLE – IV

ANALYSIS OF COVARIANCE ON AGILITY OF DIFFERENT GROUPS

(scores in seconds)

Test Conditions		Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	SV	SS	Df	MS	'F' Ratio
Pre test	Mean	16.01	16.02	16.15	Between	0.19	2	0.10	0.16
	S.D.	0.82	0.65	0.79	Within	25.76	42	0.61	
Post test	Mean	14.97	15.14	16.16	Between	12.46	2	6.23	9.10*
	S.D.	0.83	0.78	0.79	Within	28.76	42	0.68	
Adjusted post test	Mean	15.01	15.19	16.07	Between	9.62	2	4.81	41.45*
					Within	4.76	41	0.12	

* Significant at .05 level of confidence. (The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively).

4.5 RESULTS OF AGILITY

Pre-test observation:

The pre test mean and standard deviation on agility of G1, G2, and G3 were 16.01 ± 0.82, 16.02 ± 0.65 and 16.15 ± 0.79 respectively; the obtained pre test F value of 0.16 was lesser than the required table F value of 3.222. Hence the pre test mean value of low intensity of aquatic and land plyometric training and control group on agility before start of the respective treatments were found to be in significant at 0.05 level of confidence for the degrees of freedom 2 and 42. Thus this analysis confirmed that the random assignment of subject in to three groups were successful.

Post-test observation: The post test mean and standard deviation on agility scores of G1, G2, and G3 were 14.97 ± 0.83, 15.14 ±0.78 and 16.16 ± 0.79 respectively. The obtained post test F value of 9.10 was greater than the required table F value of 3.222. Hence the pos – test means value of agility show significant at 0.05 level of confidence for the degree of freedom 2 and 42 thus the result obtained proved that the interventions namely low intensity of aquatic and land plyometric training on agility produced significantly different improvements between the training groups.

Adjusted post -test observation: The adjusted post test mean on agility scores of G1, G2, and G3 were 15.01, 15.19 and 16.07 respectively. The obtained adjusted post-test F value 41.45 was greater than the required table f value of 3.226. Hence the adjusted post test means value of agility show significant at 0.05 level of confidence for the degrees of freedom 2 and 41. Since the observed F value on adjusted post test mean such as low intensity of aquatic and land plyometric training on agility produced significantly different improvements between the training groups.

In order to find out which intervention programme used in the present study was the source for the significance f adjusted mean was tested by scheffe's post hoc test. The results of the same are presented in the table IV (a)

TABLE - IV(a)
SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON AGILITY AMONG THREE GROUPS
(scores in seconds)

Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	Mean Differences	Confidence Interval Value
15.01	15.19		0.18	0.32
15.01		16.07	1.06*	0.32
	15.19	16.07	0.88*	0.32

* Significant at .05 level of confidence.

4.5.1 Results of Post - hoc test on agility
Comparison 1:

The paired mean difference of group 1 and 2, was 0.18 the obtained mean difference value of these comparisons was lesser than the confidence interval value of 0.32. This comparison accurately shows that selected both training not produced significant improvement at 0.05 levels.

Comparison 2:

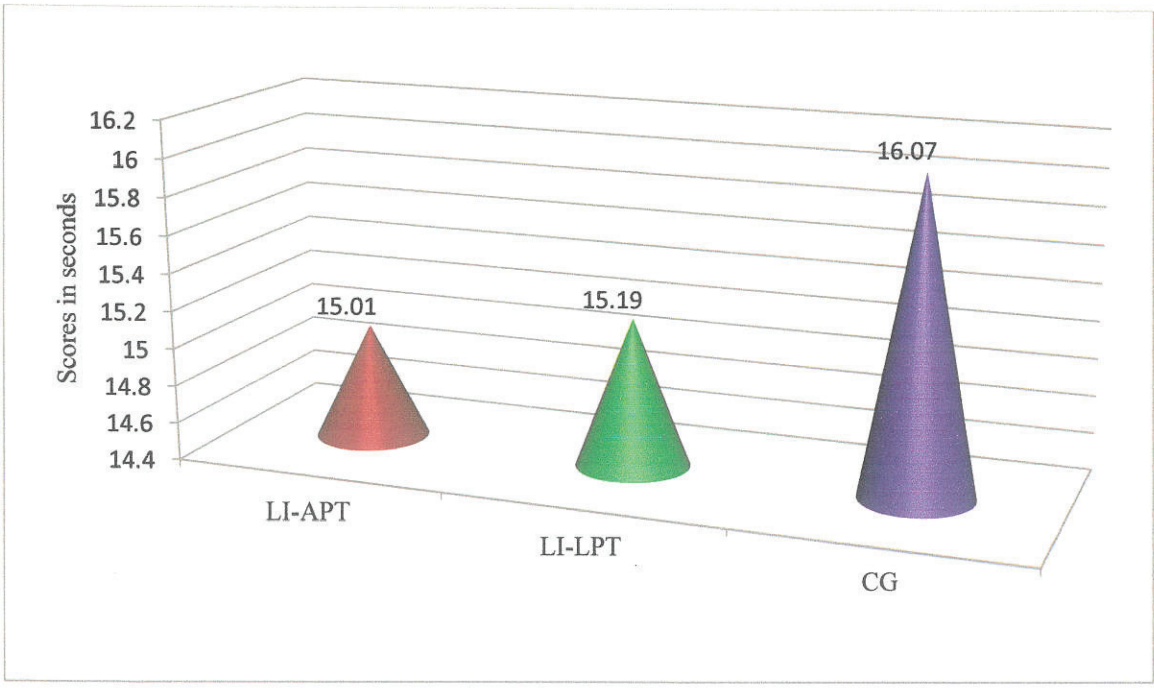
The paired mean difference of group 1 and 3, was 1.06 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.32. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels.

Comparison 3:

The paired mean difference of group 2 and 3, was 0.88 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.32. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels. The adjusted post test mean values on agility represented in figure 4.

FIGURE-4

THE ADJUSTED POST-TEST MEAN VALUES OF EXPERIMENTAL AND CONTROL GROUPS ON AGILITY



■	Group I	LI-APT	Low Intensity Aquatic Plyometric Training
■	Group II	LI-LPT	Low Intensity Land Plyometric Training
■	Group III	CG	Control Group

TABLE – V

ANALYSIS OF COVARIANCE ON LEG EXPLOSIVE POWER (HORIZONTAL ABILITY) OF DIFFERENT GROUPS

(scores in meters)

Test Conditions		Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	SV	SS	Df	MS	'F' Ratio
Pre test	Mean	1.40	1.40	1.40	Between	0.0003	2	0.0001	0.07
	S.D.	0.04	0.04	0.04	Within	0.0749	42	0.0018	
Post test	Mean	1.47	1.43	1.39	Between	0.0472	2	0.0236	14.67*
	S.D.	0.03	0.04	0.04	Within	0.0676	42	0.0016	
Adjusted post test	Mean	1.47	1.43	1.40	Between	0.0429	2	0.0215	46.01*
					Within	0.0191	41	0.0005	

* Significant at .05 level of confidence. (The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively).

4.6 RESULTS OF LEG EXPLOSIVE POWER (HORIZONTAL ABILITY)

Pre-test observation:

The pre test mean and standard deviation on explosive power (horizontal ability) of G1, G2, and G3 were 1.40 ± 0.04, 1.40 ± 0.04 and 1.40 ± 0.04 respectively; the obtained pre test F value of 0.07 was lesser than the required table F value of 3.222. Hence the pre test mean value of low intensity of aquatic and land plyometric training and control group on explosive power (horizontal ability) before start of the respective treatments were found to be in significant at 0.05 level of confidence for the degrees of freedom 2 and 42. Thus this analysis confirmed that the random assignment of subject in to three groups were successful.

Post-test observation:

The post test mean and standard deviation on explosive power (horizontal ability) scores of G1, G2, and G3 were 1.47 ± 0.03, 1.43 ±0.04 and 1.39 ± 0.04 respectively. The obtained post test F value of 14.67 was greater than the required table F value of 3.222. Hence the pos – test means value of explosive power (horizontal ability) show significant at 0.05 level of confidence for the degree of freedom 2 and 42 thus the result obtained proved that the interventions namely low intensity of aquatic and land plyometric training on explosive power (horizontal ability) produced significantly different improvements between the training groups.

Adjusted post-test observation:

The adjusted post test mean on explosive power (horizontal ability) scores of G1, G2, and G3 were 1.47, 1.43 and 1.40 respectively. The obtained adjusted post-test F value 46.01 was greater than the required table f value of 3.226. Hence the adjusted post test means value of explosive power (horizontal ability) show significant at 0.05 level of confidence for the degrees of freedom 2 and 41. Since the observed F value on adjusted post test mean such as low intensity of aquatic and land plyometric training on explosive power (horizontal ability) produced significantly different improvements between the training groups.

In order to find out which intervention programme used in the present study was the source for the significance f adjusted mean was tested by scheffe's post hoc test. The results of the same are presented in the table V(a).

TABLE - V (A)
SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON LEG EXPLOSIVE POWER (HORIZONTAL ABILITY) AMONG THREE GROUPS
(scores in meters)

Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	Mean Differences	Confidence Interval Value
1.47	1.43		0.04*	0.02
1.47		1.40	0.08*	0.02
	1.43	1.40	0.03*	0.02

* Significant at .05 level of confidence.

4.6.1 Results of Post - hoc test on leg explosive power (horizontal ability)

Comparison 1:

The paired mean difference of group 1 and 2, was 0.04 the obtained mean difference value of these comparisons was lesser than the confidence interval value of 0.02. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels.

Comparison 2:

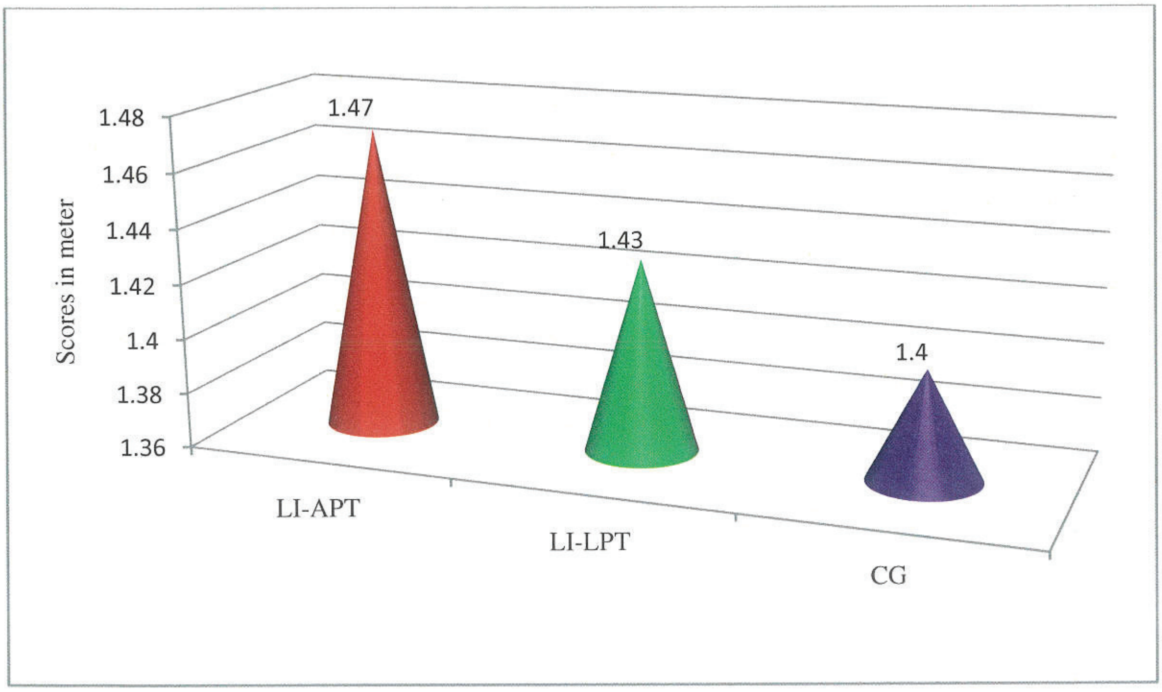
The paired mean difference of group 1 and 3, was 0.08 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.02. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels.

Comparison 3:

The paired mean difference of group 2 and 3, was 0.03 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.02. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels. The adjusted post test mean values on leg explosive power (horizontal) represented in figure 5.

FIGURE-5

THE ADJUSTED POST-TEST MEAN VALUES OF EXPERIMENTAL AND CONTROL GROUPS ON LEG EXPLOSIVE POWER (HORIZONTAL)



(red)	Group I	LI-APT	Low Intensity Aquatic Plyometric Training
(green)	Group II	LI-LPT	Low Intensity Land Plyometric Training
(purple)	Group III	CG	Control Group

TABLE – VI

ANALYSIS OF COVARIANCE ON LEG EXPLOSIVE POWER (VERTICAL ABILITY) OF DIFFERENT GROUPS

(scores in centimetres)

Test Conditions		Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	SV	SS	Df	MS	'F' Ratio
Pre test	Mean	15.15	15.31	15.29	Between	0.23	2	0.11	0.30
	S.D.	0.55	0.54	0.69	Within	16.10	42	0.38	
Post test	Mean	17.45	16.49	15.03	Between	44.32	2	22.16	49.67*
	S.D.	0.59	0.73	0.61	Within	18.74	42	0.45	
Adjusted post test	Mean	17.52	16.45	15.00	Between	47.64	2	23.82	105.44*
					Within	9.26	41	0.23	

* Significant at .05 level of confidence. (The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively).

4.7 RESULTS OF LEG EXPLOSIVE POWER (VERTICAL ABILITY)

Pre-test observation:

The pre test mean and standard deviation on explosive power (vertical ability) of G1, G2, and G3 were 15.15 ± 0.55, 15.31 ± 0.54 and 15.29 ± 0.69 respectively; the obtained pre test F value of 0.30 was lesser than the required table F value of 3.222. Hence the pre test mean value of low intensity of aquatic and land plyometric training and control group on explosive power (vertical ability) before start of the respective treatments were found to be in significant at 0.05 level of confidence for the degrees of freedom 2 and 42. Thus this analysis confirmed that the random assignment of subject in to three groups were successful.

Post-test observation:

The post test mean and standard deviation on (explosive power vertical ability) scores of G1, G2, and G3 were 17.45 ± 0.59, 16.49 ±0.73 and 15.03 ± 0.61 respectively. The obtained post test F value of 49.67 was greater than the required table F value of 3.222. Hence the pos – test means value of explosive power (vertical ability) show significant at 0.05 level of confidence for the degree of freedom 2 and 42 thus the result obtained proved that the interventions namely low intensity of aquatic and land plyometric training on explosive power (vertical ability) produced significantly different improvements between the training groups.

Adjusted post-test observation:

The adjusted post test mean on explosive power (vertical ability) scores of G1, G2, and G3 were 17.52, 16.45 and 15.00 respectively. The obtained adjusted post-test F value 105.44 was greater than the required table f value of 3.226. Hence the adjusted post test means value of explosive power (vertical ability) show significant at 0.05 level of confidence for the degrees of freedom 2 and 41. Since the observed F value on adjusted post test mean such as low intensity of aquatic and land plyometric training on explosive power (vertical ability) produced significantly different improvements between the training groups.

In order to find out which intervention programme used in the present study was the source for the significance f adjusted mean was tested by scheffe's post hoc test. The results of the same are presented in the table VI (a).

TABLE - VI (A)

SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON LEG EXPLOSIVE POWER (VERTICAL ABILITY) AMONG THREE GROUPS

(scores in centimetres)

Group 1 LI-APT	Group 2 LI-LPT	Group 3 C G	Mean Differences	Confidence Interval Value
17.52	16.45		1.08*	0.44
17.52		15.00	2.52*	0.44
	16.45	15.00	1.45*	0.44

* Significant at .05 level of confidence.

4.7.1 Results of Post - hoc test on leg explosive power (vertical ability)

Comparison 1:

The paired mean difference of group 1 and 2, was 1.08 the obtained mean difference value of these comparisons was lesser than the confidence interval value of 0.44. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels.

Comparison 2:

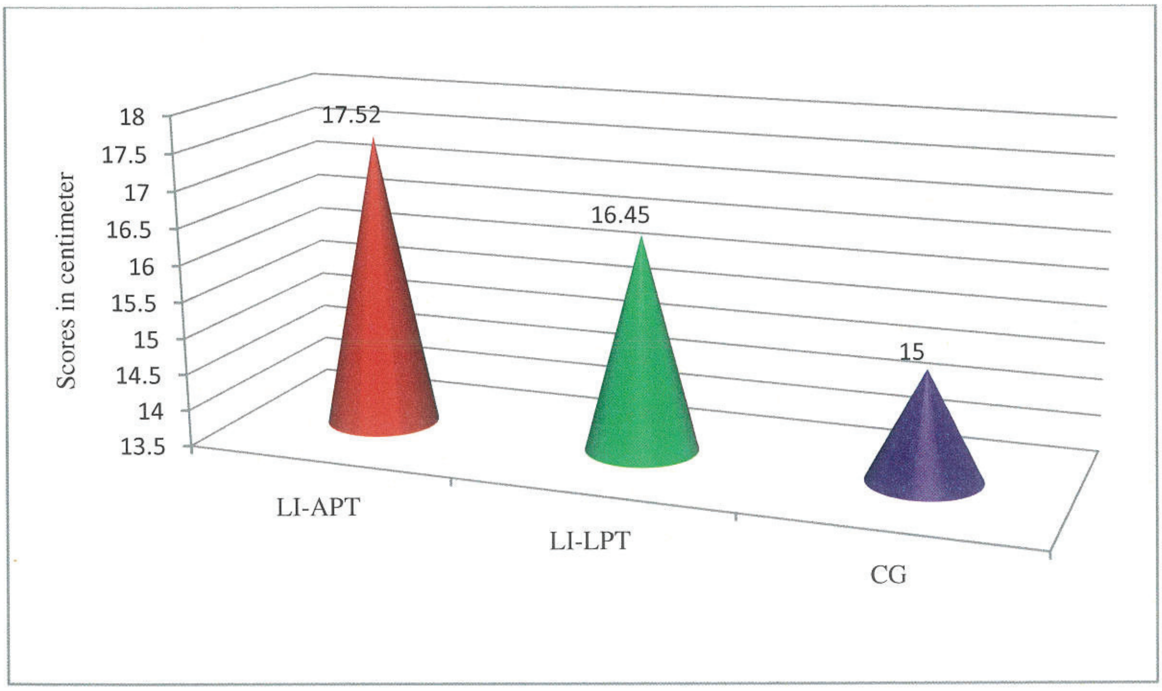
The paired mean difference of group 1 and 3, was 2.52 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.44. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels.

Comparison 3:

The paired mean difference of group 2 and 3, was 1.45 the obtained mean difference value of these comparisons was greater than the confidence interval value of 0.44. This comparison accurately shows that selected both training produced significant improvement at 0.05 levels. The adjusted post test mean values on leg explosive power (vertical) represented in figure 6.

FIGURE-5

THE ADJUSTED POST-TEST MEAN VALUES OF EXPERIMENTAL AND CONTROL GROUPS ON LEG EXPLOSIVE POWER (VERTICAL)



	Group I	LI-APT	Low Intensity Aquatic Plyometric Training
	Group II	LI-LPT	Low Intensity Land Plyometric Training
	Group III	CG	Control Group

4.8 DISCUSSION OF FINDINGS

Lower extremity plyometric exercises are commonly used by athletes to develop explosive speed, strength, and power(Colado JC, Garcia-Masso X, González L-M, et al,1992) They involve stretch-shortening cycle activity, where eccentric muscle contraction is quickly followed by concentric contraction of the same muscle (or muscles). During the eccentric phase (prestretch), the musculotendinous unit is stretched, which stores elastic energy, and the muscle spindles activate the stretch reflex(.Nigg BM 1983) Potach and Chu,(1983) suggested that both these mechanisms are responsible for increased muscle recruitment, which allows force production to be maximized during the concentric action. Plyometric training can enhance jumping performance (Kpury, 1996) and improve balance and neuromuscular control during landing (Miller,MG,Hernimars,JJ and Richard,MD,et.al,2006)

Plyometric drills may include jumps, hops, bounds, or shock drills, which vary in intensity (Miller M, Berry D, Buliard S, et al.2002) and training often involves repeated maximum efforts. The eccentric activity and high forces generated in plyometric training are also associated with injuries such as patellar tendinopathy (DePalma MJ, Perkins RH. Patellar tendinosis, 2004 and Nigg BM 1983) Typically, the intensity of an exercise increases with greater ground reaction force (GRF), when jumping up or down from a higher height, and during single-leg exercises. Consequently, landing impacts, joint reaction forces, eccentric rate of force development (RFD), and muscle activity are important factors in assessing intensity(Ebben WsP, Simenz C, Jensen RL.,2008, Fowler NE, Lees A,1998. Jensen RL, Ebben WP, 2002 and Jensen RL, Ebben WP. 2007) Only a limited number of studies have compared the intensities of a range of plyometric exercises(Jensen RL, Ebben WP.2002, Jensen RL, Ebben WP2007)

The majority of plyometric training sessions take place on land. However, there is increasing interest in aquatic-based exercise because this environment provides both physiological and psychological benefit (Jensen R, Flanagan E, Jensen N, et al.,1999) has similar performance effects as land-based training(Markovic G,2007, Melvill Jones G, Watt D ,1971, Potach D, Chu D. 2004) and may be useful in rehabilitation and injury prevention. The effects of gravity are reduced in water because of buoyancy of the body and the increased density of water compared to air Jensen R, Flanagan E, Jensen N, et al.1999). The percentage of weight bearing decreases with greater immersion; an individual standing in water to the level of the xiphoid process will bear approximately 28% to 35% body weight (BW), depending on sex(Rosenthal R.1991, . Stemm JD, Jacobson BH.2007) Percentage weight bearing will increase with activity (walking) and increasing speed of movement (.Harrison RA, Hillman M, Bulstrode S. 1992, Jensen R, Flanagan E, Jensen N, et al. 1999).

4.9 DISCUSSIONS ON PRESENT STUDY STATUS

The results of the clearly revealed that there was a significant difference noticed among the groups in respective of speed, muscle endurance,flexibility,leg explosive power in terms of vertical and horizontal nature. Further there was a significant improvement were observed on selected motor fitness variables in-between the treatment interventions namely low intensity of aquatic and land plyometric training owing to the 12 weeks training effects.

4.9.1: Speed:

Low intensity of aquatic and land plyometric training were significantly improved the speed than the control. Further it reveals that low intensity of land plyometric training has better effect on improving speed when compared to low intensity of aquatic plyometric training of school boys. Arazi &Asadi (2014) recommended that, sand depth jump improves agility and strength and land depth jump training enhance sprint and jump ability. Johnson et.al (2014) suggested plyometric training improves gross motor ability, agility and upper extremity power and inconsistency on lower extremity power and running speed in boys with untrained cerebral palsy. Ramirez, et al(2014) found that integrated vertical plyometric training with regular soccer practice improve explosive actions, endurance, horizontal explosive enhance sprinting performance. The above said findings are in conformity with the present research. Further, it is understand that, plyometric training may improve the lower extremity power and strength. In addition to this ground reaction force and quick leg movement may be developed. Hence all these comparative effect may influence the both experimental groups to develop speed quality. Among the training low intensity land plyometric training shows better improvement on speed than low intensity of aquatic plyometric training. This may be due to the **aqua shock** observing and slowdown of reactive ability of the lower extremity. Hence it was concluded that low intensity land plyometric training is the best method to develop speed and paralley low intensity aquatic plyometric training also contributes better effect for the improvement of speed of school boys.The percentage of improvement of two selected training intervention on speed were 0.003%, and 0.001% for low intensity of aquatic and land plyometric training respectively. The above said finding is, in conformity with the present research.

4.9.2: Flexibility

Low intensity of aquatic and land plyometric training were significantly improved the flexibility than the control. Further it reveals that low intensity of aquatic plyometric training has better effect on improving flexibility when compared to low intensity of land plyometric training of school boys.

Robinson et.al (2004) compared the impact of land and in water plyometric training on muscle soreness. They found out that muscle soreness was higher for land plyometric than in water training. The above said finding is, in conformity with the present research. Further, it is understand that, plyometric training may improve the overall flexibility quality. During the plyometric exercise, the muscular spindles are stimulated by a rapid stretch, causing a reflexive muscle action. The reflexive response potentiates or increases the activity in the agonist muscle; thereby increasing the force the muscle produces. Aquatic training resulted in similar training effects as land-based training with a possible reduction in stress due to the reduction of impact afforded by the buoyancy and resistance of the water upon landing (Stemm &Jacobsen, 2007). Aquatic exercise does not worsen the joint condition or result in injury (Wang, 2006). The resistance of the water promotes strengthening. Water acts as a variable 'accommodating' resistance. An aquatic training programme can decrease compression forces, vibration forces and tensional forces that a player may ensure while training on land. In recent years aquatic training became one of the most important training to improve the physical and physiological variables (Krishnan et al., 2005). Hence it was concluded that low intensity aquatic plyometric training is the best method to develop flexibility and paralley low intensity land plyometric training also contributes better effect for the improvement of flexibility of school boys.The percentage of improvement of two selected training intervention on flexibility were 0.02%, and 0.01% for low intensity of aquatic and land plyometric training respectively. The above said finding is, in conformity with the present research.

4.9.3: Muscular Endurance

Low intensity of aquatic and land plyometric training were significantly improved the capacity of muscular endurance than the control. Further it reveals that low intensity of land plyometric training and aquatic plyometric training has produced similar effect on improving muscular endurance. Ramirez et.al (2014) revealed combined and isolated vertical and horizontal jump training improves meaning improvement in explosive action, balance and intermittent endurance capacity. Ramirez, et al(2014) found that integrated vertical plyometric training with regular soccer practice improve explosive actions, endurance, horizontal explosive enhance sprinting performance. Ramirez, et al(2014) conducted that Plyometric and non Plyometric training ensured significant improvement in muscle explosive and endurance measures. Hence it was concluded that low intensity of land and aquatic plyometric training is the best method to develop the capacity of muscular endurance due to the 12 weeks training interventions of school boys. The percentage of improvement of two selected training intervention on muscular endurance were 0.02%, and 0.02% for low intensity of aquatic and land plyometric training respectively. The above said finding is, in conformity with the present research.

4.9.4: Agility

Low intensity of aquatic and land plyometric training were significantly improved the nature of agility than the control. Further it reveals that low intensity of land plyometric training and aquatic plyometric training has produced similar effect on improving agility. Ramachandran and Pradhan(2014) conducted that short term Plyometric combined with dynamic stretching is effective method to improve vertical jump and agility. Roopchand (2010) stated that, three weeks of Plyometric training can lead to significant improvement in jump performance and agility of netball players. Thomas (2009) reported depth jump and countermovement jump plyometrics are worthwhile for improving power and agility in youth soccer players. Meylan and Malatesta(2009)concluded short term Plyometric programme had a beneficial impact on explosive actions, such as sprinting ,change of direction and jumping of soccer players. The percentage of improvement of two selected training intervention on agility were

0.01%, and 0.01% for low intensity of aquatic and land plyometric training respectively. The above said finding is, in conformity with the present research.

4.9.5: Leg explosive power (Horizontal)

Low intensity of aquatic and land plyometric training were significantly improved the horizontal jumping ability than the control. Further it reveals that low intensity of aquatic plyometric training has better effect on improving horizontal jumping ability when compared to low intensity of land plyometric training of school boys. Shankar, Rajpal, and Arora (2008) conducted a study of effect of high intensity and low intensity plyometric on vertical jump height and maximum voluntary isometric contraction in football players. They found that high Intensity Plyometric training improved the vertical jump height. Kevin Carlson, Marshall Magnusen & Peter Walters. (2009) said vertical jump was increased due to 6weeks of plyometric training. Singh Harmandeep et.al (2015) reported plyometric training program as more beneficial and effective than general training program and have more positive effect on vertical jump performance.Hence it was concluded that low intensity of land and aquatic plyometric training is the best method to develop the leg explosive power (horizontal) due to the 12 weeks training interventions of school boys.The percentage of improvement of two selected training intervention on explosive power (horizontal) were 0.007%, and 0.003% for low intensity of aquatic and land plyometric training respectively. The above said finding is, in conformity with the present research.

4.9.6: Leg explosive power (Vertical)

Low intensity of aquatic and land plyometric training were significantly improved the vertical jumping ability than the control. Further it reveals that low intensity of aquatic plyometric training has better effect on improving vertical jumping ability when compared to low intensity of land plyometric training of school boys. Yiannis Michailidis. (2013) conducted a study on effect of plyometric training on athletic performance in preadolescent soccer players. Their results indicate that plyometric training can improve running performance at 30 m sprint and the performance at standing long jump in preadolescent soccer players.Raj Kumar & Harish Kumar (2005) conducted a study on effect of six-weeks of plyometric circuit training on the jumping performance of female college players. They found that plyometric jump training improved explosive power. Hence it was concluded that low intensity of land and aquatic plyometric training is the best method to develop the leg explosive power (vertical) due to the 12 weeks training interventions of school boys. The percentage of improvement of two selected training intervention on explosive power (vertical) were 0.02%, and 0.01% for low intensity of aquatic and land plyometric training respectively. The above said finding is, in conformity with the present research.

The results of the presence study clearly indicated that the selected training interventions produced significant improvements on selected motor fitness variables namely speed, muscular endurance, flexibility, agility and leg explosive power in terms of horizontal and vertical ability. Further the above mentioned earlier studies also showed the significant improvement on selected variables. Hence the results of the present study in line with the above mention earlier studies.

The results of the study undoubtedly prove that low intensity of aquatic plyometric training produced significant improvement on selected motor fitness variable such as speed, flexibility, and explosive power in terms of vertical and horizontal ability, superior than the land plyometric training. Hence the researcher third hypothesis partially accepted based on the above said variables, and partially rejected on muscular endurance and agility, based on the results of the present study.

The fourth hypothesis stated that, low intensity of land plyometric training would significantly improved the selected motor fitness variable such as speed, muscular endurance, flexibility, agility and explosive power in terms of vertical and horizontal ability, superior than the low intensity of aquatic plyometric training of school boys.

The results of the study show that low intensity of land plyometric training produced similar improvement of aquatic plyometric training on muscular endurance and agility, hence the researcher fourth hypothesis accepted on the above said variables and rejected on speed, flexibility, explosive power in terms of vertical and horizontal ability based on the results of the present study.