CHAPTER - IV

RESULTS AND DISCUSSIONS

4.1 OVERVIEW

This part of the thesis deals with the Analysis of the data collected from the sample under study as a result of Run & Walk and Interval training. The Control, Run & Walk and Interval Training groups were compared with each other for the difference in the measures of selected haemoglobin concentration, Mean arterial Pressure, Blood Glucose and Blood lactic acid concentration. Variables in relation to pre and post test scores.

The subjects were selected at random, but the groups were not equated in relation to the factors in which they were examined hence the differences among the means of three groups in pre-test had to taken into account during the analysis of the post test difference among the means. This was achieved by the applications of analysis of covariance. Where in the final means were adjusted for the difference in the initial means were adjusted for the difference in the initial means and the adjusted means were listed for significance. The Significance of difference of Pairs of
adjusted final group means were tested for significance by applying Scheffe’s post-hoc test.

4.2 TEST OF SIGNIFICANCE

This is the crucial portion of the thesis as it arrives at the conclusion by examining the hypothesis. The procedure of testing the hypothesis was ended either by accepting the hypothesis or rejecting the same in accordance with the results obtained in relation to the level of confidence. The level of confidence was fixed at 0.05 level, which was considered sufficient for this study.

The test is usually called the test of significance as we test whether the differences among the pre and post-test scores of the sample are significant or not. In the present study, if the obtained values were greater than the tabulated value, the hypothesis was accepted to the effect that there existed significant differences among the means of the groups compared. If the obtained values were less than the required values at 0.05 level, then the hypothesis were rejected to the effect that there existed no significant difference among the means of the groups under study.
4.3 LEVEL OF SIGNIFICANCE

The probability level was below, which we reject, the hypothesis is termed as the level of significance. The F. ratios obtained by analysis of covariance need 3.11 for significance at the 0.05 level.

4.4 COMPUTATION OF ANALYSIS OF COVARIANCE

The following tables illustrate the statistical results of the effect of packages of training on functions of Haemoglobin concentration, Mean arterial pressure, Blood glucose and Blood lactic acid concentration among school boys.
TABLE - IV

COMPUTATION OF ANALYSIS OF COVARIANCE OF HAEMOGLOBIN CONCENTRATION SCORES OF CONTROL, RUN & WALK AND INTERVAL TRAINING GROUPS.
(Scores in gm/ 100ml)

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Run &amp; Walk Group</th>
<th>Interval training Group</th>
<th>Source of variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Means Squares</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test means</td>
<td>13.01</td>
<td>13.12</td>
<td>12.70</td>
<td>B</td>
<td>2.76</td>
<td>2</td>
<td>1.38</td>
<td>5.52*</td>
</tr>
<tr>
<td>Post-test means</td>
<td>12.96</td>
<td>13.32</td>
<td>13.54</td>
<td>B</td>
<td>5.04</td>
<td>2</td>
<td>2.52</td>
<td>21.00*</td>
</tr>
<tr>
<td>Adjusted Post-test means</td>
<td>12.93</td>
<td>13.24</td>
<td>13.65</td>
<td>W</td>
<td>7.33</td>
<td>2</td>
<td>3.67</td>
<td>30.12*</td>
</tr>
</tbody>
</table>

B - Between Group Means
W - Within Group Means
Df - Degrees of freedom
NS - Not Significant
* - Significant
(Table Value for 0.05 Level = 3.11)
4.4.1 RESULTS OF HAEMOGLOBIN CONCENTRATION

An Examination of table IV indicated that the Haemoglobin concentration scores of pretest means of control, Run & Walk and interval training groups were 13.01, 13.12, and 12.70 respectively. The Obtained F-ratio of pre-test was 5.52 and the table F-ratio was 3.11. Hence the Haemoglobin concentration was significant at 0.05 level of confidence for the degree of freedom 2 and 87.

The post-test means of the control, Run & Walk, and interval training groups were 12.96, 13.32 and 13.54 respectively. The obtained F-ratio for the post-test was 21.00 and the table F-ratio was 3.11. Hence the post-test F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 87.

The adjusted post-test means of the control, Run & Walk and interval training groups were 12.93, 13.24 and 13.65 respectively. The obtained F ratio of adjusted post-test was 30.12 and the table F-ratio was 3.11. Hence the adjusted post-test F-ratio was significant at 0.05 level of confidence for the degrees of freedom 2 and 86.

Pre and post test mean difference of the control, Run & Walk and interval training groups Haemoglobin concentration was given in Figure No. 1.
FIG. 1:
PRE AND POST TEST MEAN DIFFERENCES OF THE CONTROL, RUN & WALK AND INTERVAL TRAINING GROUPS ON HAEMOGLOBIN CONCENTRATION (Scores in gm)
TABLE - V

ORDERED ADJUSTED HAEMOGLOBIN CONCENTRATION MEANS AND DIFFERENCES BETWEEN THE MEANS OF CONTROL, RUN & WALK, INTERVAL TRAINING GROUPS.
(Scores in gm/100ml)

<table>
<thead>
<tr>
<th>Control Group (N=30)</th>
<th>Run &amp; Walk Group (N=30)</th>
<th>Interval Training Group (N=30)</th>
<th>Mean Difference</th>
<th>Scheffe's Test CI Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.93</td>
<td>13.24</td>
<td>13.65</td>
<td>0.41*</td>
<td>0.25</td>
</tr>
<tr>
<td>12.93</td>
<td>13.65</td>
<td></td>
<td>0.72*</td>
<td></td>
</tr>
<tr>
<td>13.24</td>
<td>13.65</td>
<td></td>
<td>0.31*</td>
<td></td>
</tr>
</tbody>
</table>

CI – Confidence Interval Value  
*- Significant at 0.05 Level

Table-V – Shows the ordered adjusted Haemoglobin concentration means and difference between the means of control, Run & Walk, interval training groups. The mean values of control, Run & Walk, Interval training groups were 12.93, 13.24, 13.65 respectively. The mean differences between control and Run & walk, control and interval training and also Run & Walk and interval training values were 12.93, 13.24, 13.65 respectively. The Scheffe’s confidence interval value at 0.05 level was 0.25. Hence there was a significant difference occurred in three groups. The difference
between the means of Run & Walk and interval training groups were also significant.

4.4.2 DISCUSSION ON FINDINGS

The result of the study showed that experimental groups had significantly improved in Haemoglobin concentration due to Run & Walk and interval training when compared with the mean difference of the control group.

Lawrence.V (1999) supported that the endurance training had an effect on additional haemoglobin which increases the capacity of the circulatory system to carry substances to and from the active muscles.

Lamb (1984) supported that the Haemoglobin is obviously vital to exercise because it transports oxygen from the lungs to the working muscles. Since red blood cells do not ordinarily leave the vascular space during exercise, it is not surprising that total haemoglobin does not change with exercise. Haemoglobin concentration during exercise reflects the extent of any Haemoconcentration or haemodilution, haemoglobin concentration will rise with haemo concentration and fall with haemodilution.

Endurance training is associated with a small increase in the production of red blood cells. Therefore, total haemoglobin increases
slightly with such training. The concentration of haemoglobin at rest declines slightly with training because the increase in plasma volume is somewhat larger than the increase in red cells, expansion of plasma volume in trained persons further reduces haemoglobin concentration during exercise.

Schumacher (2001) The Maximal oxygen uptake is the major performance limiting factor in endurance sports. Sophisticated training methods have been developed to increase this variable. On the other hand, attempts have been made to improve maximal oxygen uptake by artificial means: blood doping and the misuse of recombinant human erythropoietin have beneficial effects on aerobic exercise capacity. Both methods have been banned by international sporting federations. A new class of substances might represent the next step of fraudulent improvement of the maximal oxygen uptake: artificial oxygen carriers, such as solutions based on recombinant, bovine or human hemoglobin and perfluorocarbon-emulsions have been shown to improve oxygen delivery to the muscle. Haemoglobin-based solutions improve aerobic exercise capacity in animal and human testing. Both substances have potentially lethal side effects including renal toxicity, increased systemic and pulmonary blood pressure and impairment of the immune system. Hemoglobin-based carriers can be detected in drug testing with routine laboratory tests based on the detection of free hemoglobin. Perfluorocarbon is not metabolized by the body and exhaled through the
lung and can be measured with chromatography. No screening for these substances in drug tests has been performed so far. International sporting federations should be aware of this new, emerging doping threat.

The result of the study supports the findings of

Connes P,
Ashenden M.J,
Heinicke.K,
Telford RD.
### TABLE - VI

**COMPUTATION OF ANALYSIS OF COVARIANCE OF MEAN ARTERIAL PRESSURE SCORE OF CONTROL, RUN & WALK AND INTERVAL TRAINING GROUPS.**

*(Scores in Millimeters of Mercury)*

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Run &amp; Walk Group</th>
<th>Interval training Group</th>
<th>Source of variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Means Squares</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test means</td>
<td>95.25</td>
<td>95.92</td>
<td>96.29</td>
<td>B, W</td>
<td>16.46</td>
<td>2</td>
<td>8.23</td>
<td>23.82</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2072.02</td>
<td>87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test means</td>
<td>94.81</td>
<td>95.26</td>
<td>94.60</td>
<td>B, W</td>
<td>6.79</td>
<td>2</td>
<td>3.40</td>
<td>10.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>939.96</td>
<td>87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted Post-test means</td>
<td></td>
<td></td>
<td></td>
<td>B, W</td>
<td>9.10</td>
<td>2</td>
<td>4.55</td>
<td>6.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>594.24</td>
<td>86</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key:**
- **B** - Between Group Means
- **W** - Within Group Means
- **df** - Degrees of freedom
- **NS** - Not Significant
- ***** - Significant

*(Table Value for 0.05 Level = 3.11)*

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4.4.3 RESULTS OF MEAN ARTERIAL PRESSURE

An Examination of table-VI indicated that the mean arterial pressure scores of pre-test means of control, Run & Walk and interval training groups were 95.25, 95.92, and 96.29 respectively. The Obtained F-ratio was 0.35 and the table F-ratio was 3.11. Hence the pre-test mean arterial pressure F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 87.

The post-test means of the control, Run & Walk, and interval training groups were 94.81, 95.26 and 94.60 respectively. The obtained F-ratio for the post-test was 0.31 and the table F-ratio 3.11. Hence the post-test F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 87.

The adjusted post-test means of the control, Run & Walk and interval training groups were not calculated as the obtained F-ratio of adjusted post-test was 0.66 and the table F-ratio was 3.11. Hence the adjusted post-test F-ratio was insignificant at 0.05 level of confidence for the degrees of freedom 2 and 86.

The difference between varied adjusted final means were not calculated as the final adjusted means were less than the table F-ratio.

Pre and post-test mean difference of the control, Run & Walk and interval training groups mean arterial pressure are given in Figure. 2
FIG. 2:
PRE AND POST TEST MEAN DIFFERENCES OF THE CONTROL, RUN & WALK AND INTERVAL TRAINING GROUPS ON MEAN ARTERIAL PRESSURE
(Scores in Millimeters of Mercury)
4.4.4 DISCUSSION ON FINDINGS

The result of the study showed that experimental groups had no significant effect on mean arterial pressure. Due to Run & Walk and interval training when compared with the mean difference of the control group.

Richard. A. Berger (1982) supported that during Exercise, the dilation of blood vessels in the working muscles reduces the arterial resistance to blood flow. More than the vaso constriction in non-working tissues, increases the resistance. Therefore, the net effect of changes in blood vessels, size, during exercise is to decrease the blood pressure simultaneously however, cardiac output causes a greater systolic pressure, that more than counteracts the tendency toward reduced pressure caused by vaso dilation in the working muscles, since only a slight fall in blood pressure.

William D (1991) although the degree to which regular exercise can benefit a hypertensive Condition is still unclear. It does appear that both systolic and diastolic blood pressure can be toward a modest degree with a program of exercise training. Aerobic exercise training in patients with documented coronary artery disease and in young, Middle, Aged and elderly "border line" hypertensive patients, the effects of exercise training on blood pressure are the most impressive. The average resting systolic pressure of seven middle aged male patients decreased from 139 to 133
mmHg after 4 to 6 weeks of interval training. In addition, at similar submaximal exercise levels systolic pressure fall from 173 to 155 mmHg and diastolic pressure was also reduced from 92 - 79 mmHg.

Hagberg (1987) measured haemodynamic changes in older normotensive and hypertensive men and women who exercised for 45 min between 50-70% Vo2 max and followed their cardiovascular changes from 1-3 hours post exercise. Mean blood pressure and cardiac out put were significantly decreased, whereas measured haemodynamic changes in older normotensive and hypertensive men and women who exercised for 45 min between 50-70% Vo2 max and followed their cardiovascular changes from 1-3 hours post exercise. Mean blood pressure and cardiac out put were significantly decreased, whereas peripheral vascular resistant increased. Stroke volume was decreased, a change attributed to a reduction in preload caused by a possible decrease in plasma volume.

Floras (1989) used the microneurographic technique to measure muscle sympathetic nerve traffic in three normotensive and 12 borderline hypertensive subjects. The subjects exercised on a treadmill for 45 min at a heart rate calculated to be 70% of their resting heart rate reserve. Mean systolic pressure was significantly reduced and muscle sympathetic nerve traffic was reduced by more than 40% in those subjects who exhibited lowered pressure after exercise.
Richerd W (1992) Training does not affect the resting blood pressure of persons under 30 years of age if their fitness level is average and their blood pressure is normal at start of training. The resting blood pressure will be significantly reduced, however, in middle aged or older trainees who start out with below average fitness level and higher than normal blood pressure.

The result of the Study supports the findings of

Sagiv.M,
Blackburn.M,
D'este D,
Kelley GA,
Kelley.G,
Franke.WD,
Banzw J,
Carter JR,
Panton LB,
Roltsch MH.
TABLE-VII

COMPUTATION OF ANALYSIS OF COVARIANCE OF BLOOD GLUCOSE SCORE OF CONTROL, RUN & WALK AND INTERVAL TRAINING GROUPS.

(Scores in per Mg/100ml)

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Run &amp; Walk Group</th>
<th>Interval training Group</th>
<th>Source of variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Means Squares</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test means</td>
<td>92.62</td>
<td>93.25</td>
<td>93.92</td>
<td>B</td>
<td>25.36</td>
<td>2</td>
<td>12.68</td>
<td>1.00 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>W</td>
<td>1098.75</td>
<td>87</td>
<td>12.63</td>
<td></td>
</tr>
<tr>
<td>Post-test means</td>
<td>91.46</td>
<td>92.38</td>
<td>93.37</td>
<td>B</td>
<td>54.36</td>
<td>2</td>
<td>27.18</td>
<td>1.62 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>W</td>
<td>1462.76</td>
<td>87</td>
<td>16.81</td>
<td></td>
</tr>
<tr>
<td>Adjusted Post-test means</td>
<td>27.81</td>
<td>445.10</td>
<td></td>
<td>B</td>
<td>2</td>
<td>86</td>
<td>5.18</td>
<td>2.69 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B - Between Group Means  NS - Not Significant
W - Within Group Means   * - Significant
Df - Degrees of freedom  (Table Value for 0.05 Level = 3.11)
4.4.5 RESULTS OF BLOOD GLUCOSE

An Examination of Table VII indicates that the blood glucose scores of pre-test means of control, Run & Walk and interval training groups were 92.62, 93.25 and 93.92 respectively. The obtained F-ratio was 1.00 and the table F-ratio was 3.11 Hence the pre-test blood glucose F-ratio was insignificant at 0.05 level of confidence for the degrees of freedom 2 and 87.

The post-test means of the control, Run & walk and interval training groups were 91.46, 92.38 and 93.37 respectively. The obtained F-ratio for the post-test was 1.62 and table F-ratio was 3.11 Hence the post-test F-ratio was insignificant at 0.05 level of confidence for the degrees of freedom 2 and 87.

The adjusted post-test means of the control, Run & Walk and internal training groups were not calculated as the obtained F-ratio of adjusted post-test was 2.69 and the table F-ratio was 3.11.

The differences between the paired adjusted final means were not calculated, as the final adjusted means were less than then table F- ratio.

Pre and post test mean difference of the control, Run & walk and interval training groups on blood glucose are given in Fig. 3
FIG. 3:
PRE AND POST TEST MEAN DIFFERENCES OF THE CONTROL,
RUN & WALK AND INTERVAL TRAINING GROUPS
ON BLOOD GLUCOSE
(Scores in mg/100 ml)

- Control Group: Pre Test 92.62, Post Test 91.46
- Run & Walk Group: Pre Test 93.25, Post Test 92.38
- Interval Training Group: Pre Test 93.92, Post Test 93.37
4.4.6 DISCUSSION ON FINDINGS

The result of the study showed that experimental groups had no significant effect on Blood glucose levels due to Run & Walk and internal training when compared with the mean difference of the control group.

Astrand (1970) had supported that during prolonged heavy exercise, the water balance may be disturbed and the stores of available energy, particularly glycogen, may be critically too. Therefore, the individuals’ ability to transport oxygen from the air to the working muscles may not always be the limiting factor. It has been found that the subjective feeling of glucose in the fasting subject and for a depletion of the glycogen depots in the working muscles. An increase in heart rate with reduction in stroke volume as work proceeds is often observed during prolonged exercise, particularly in a hot environment. If dehydration and the fall in blood sugar are prevented by proper supply of fluid and sugar, performance capacity is better maintained during prolonged exercise.

Green L.F (1972) the rate of total Carbohydrates oxidation was also similar during the first 2 Hrs of exercise in both trials. However, CHO oxidation began declining during the third hour of the placebo trial, at a time when muscle glycogen was low and blood Glucose concentration was declining. Blood glucose concentration and the rate of CHO oxidation eventually fell to 2.5 mmol/ltr and <1.4g/min respectively at the time of fatigue. Thus the lowering of blood glucose during the later stages of
prolonged strenuous exercise appeared to play a major role in the development of Muscular fatigue.

Levine, S.A (1924) The importance of carbohydrates to athletic performance was carried out on marathon runners in the Boston marathon of 1924 and 1925. After the 1924 marathon the doctors undertaking the study found that the post race blood glucose levels of six runners studied were decreased, and that there was a strong relation between their physical condition and their blood glucose concentration.

Astrand (1970) during prolonged heavy exercise the water balance may be disturbed and the stores of available energy, particularly glycogen, may be critically low. Therefore the individual’s ability to transport oxygen from the air to the working muscles may not always be the limiting factor. It has been found that the subjective feeling of fatigue during heavy work usually coincides with a drop in blood glucose in the fasting subject and a depletion of the glycogen deposits in the working muscles.

Ekblom (1986) reported lower than normal blood glucose concentration of 3.8 mmol\textsuperscript{-1} in players at the end of a match. Indeed three players had values of between 3.0 and 3.2 mmol \textsuperscript{-1}. These low levels could impair decision-marking compared with those players’ responses under normal resting blood glucose levels of approximately 5.0 mm
Hargreaves (1984) the only time that carbohydrates should possibly be avoided is in the 30-60 min immediately before competition or training. For some individuals has timing of feeding may produce a rapid fall in blood glucose levels in the first 20min or 80 of exercise and so impair performance.

Horton E S (1989) Research has shown that the type of exercise determine what type of insulin responsible occur it has been found that sustained exercise of moderate intensity results in maintenance of or even decrease in levels of blood glucose. It is recommended that diabetic athletes involved in marathons or triathlons decrease their insulin levels and increase caloric intake before a race or training session.

The Result of the study Supports the findings of the

Herman,
Oshida Y.,
Smutok M.A.,
Ribeiro L.F,
Ohkuwa. T, and
Zonderland ML.
<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Run &amp; Walk Group</th>
<th>Interval training Group</th>
<th>Source of variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Means Squares</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test means</td>
<td>10.07</td>
<td>10.50</td>
<td>10.37</td>
<td>B</td>
<td>2.96</td>
<td>2</td>
<td>1.48</td>
<td>0.55 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>W</td>
<td>234.33</td>
<td>87</td>
<td>2.69</td>
<td></td>
</tr>
<tr>
<td>Post-test means</td>
<td>10.23</td>
<td>10.57</td>
<td>10.40</td>
<td>B</td>
<td>1.67</td>
<td>2</td>
<td>0.84</td>
<td>0.34 NS</td>
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<td></td>
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<td>W</td>
<td>217.93</td>
<td>87</td>
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<tr>
<td>Post-test means</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>10.11</td>
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<td></td>
<td></td>
<td></td>
<td>0.06</td>
<td>0.04 NS</td>
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<td></td>
<td>W</td>
<td>146.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.71</td>
<td></td>
</tr>
</tbody>
</table>

B - Between Group Means
W - Within Group Means
Df - Degrees of freedom

NS - Not Significant
*
(Table Value for 0.05 Level = 3.11)
4.4.7 RESULTS OF BLOOD LACTIC ACID

An Examination of table VIII indicated that the Blood lactic acid scores of pretest means of control, Run & Walk and interval training groups were 10.07, 10.50, and 10.37 respectively. The Obtained F-ratio was 0.55 and the table F-ratio was 3.11. Hence as the pretest blood lactic acid concentration F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 87.

The post-test means of the control, Run & Walk, and interval training groups were 10.23, 10.57, and 10.40 respectively. The obtained F-ratio for the post-test was 0.34 and the table F-ratio was 3.11. Hence the post-test F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 87.

The adjusted post-test means of the control, Run & Walk and interval training groups were not calculated as the obtained F-ratio of adjusted post-test was 0.04 and the table F-ratio was 3.11. Hence the adjusted post-test F-ratio was insignificant at 0.05 level of confidence for the degrees of freedom 2 and 86.

The differences between varied adjusted final means were not significant as the final adjusted means were less than the table F-ratio.

Pre and post test mean difference of the control, Run & Walk and interval training groups on Blood Lactic acid concentration are given in figure No: 4
FIG. 4:
PRE AND POST TEST MEAN DIFFERENCES OF THE CONTROL, RUN & WALK AND INTERVAL TRAINING GROUPS ON BLOOD LACTIC ACID CONCENTRATION
(Scores in Millimeter)
4.4.8 DISCUSSION ON FINDINGS

The result of the study showed that experimental groups had no significant effects on Blood Lactic acid due to Run & Walk and interval training when compared with the mean difference of the control group.

Astrand (1970) has supported that when heavy exercise is prolonged for hours the work output during maximal effects decreases gradually. After the rest, a work load that normally could be tolerated for 6 minutes had to be terminated after about 4 minute due to exhaustion. The peak lactate level in the blood correspondingly decreased.

It is believed that the limiting factor must be sought at the cellular level in the exercising skeletal muscles, and could be anything from a change in the properties of the membranes of muscle fibers, and distributed ATP-ADP ‘machine’ etc to a depletion of the oxygen stores or a reduced capacity to neutralize the metabolites produced.

Well trained subjects can work for hours with an oxygen uptake around 70 to 80 percent of their maximum with little or no increase in blood lactate concentration.

Cruze vsm (1993) From physiological side it is important to determine those speeds and to train in Interval methods and forms with identical or varying speed intensities which will lead to a steady state Lactate or almost equal Balance between ATP breakdown and its
regeneration with low to medium blood lactate concentration and less PH decrease. This means that active pause between the runs will help accelerate the elimination of lactic acid by high oxygen transportation. By working at 30-50% vO₂ max, the Lactate values can be eliminated 2-3 times faster.

Cruze vsm (1993) Lactic acid in blood represents the results of all process which add Lactate to and remove from the circulation. Lactate is the end product of glycogen breakdown. Initially during a progressive exercise test the Lactate appearance and the disappearance are balance with an increase in work load a stage once reached when the appearance rate is faster than the rate of disappearance and lactate accumulates. During the training under threshold range there is the stimulation of oxidative metabolism with less Lactic acid formation.

Bangsbo (1994) Aerobic training causes changes in central factors such as the heart and blood volume, which results in a higher maximum oxygen uptake, peripheral adaptations also occur with this type of training. The training leads to a proliferation of capillaries and an elevation of the content of mitochondrial enzymes, as well as the activity of Lactate dehydrogenase 1-2 isozymes. Furthermore, the mitochondrial volume and the capacity of one of the shuttle systems for NADH are elevated. These changes cause marked alterations in muscle metabolism. The overall affects are an enhanced oxidation of lipids and sparing of glycogen, as
well as lowered Lactate production both at given and the same relative work rate.

Bangsbo (1994) The dissociation between changes in VO2 max and muscle adaptation by means of training and detraining fourteen players were tested before and after 5 week pre-season period. As a result of training VO2 max only slightly higher whereas the muscle oxidation enzymes and the number of capillaries per muscle fiber were increased by 10 and 15% respectively. In accordance with the Local adaptation, the blood lactate concentration during sub maximal running was significantly lower after the period of pre season training.

Ekblom (1986) claimed that peak values above 12 mmol\textsuperscript{-1} were frequently measured at higher levels of soccer play. Activity could not be sustained continuously under such conditions, which reflect the intermittent consequences of anaerobic metabolism during competition. Whilst most studies of blood lactate concentration have shown values of 4-6 mmol\textsuperscript{-1} during play, such measures are determined by the activity in the 5 minutes prior to obtaining the blood samples. Consequently, higher values are generally noted when observations are made at half time compared to the end of the match.

Klimt (1992) The physiological demands of German under 11 and under 12 Football matches were assessed that heart rate were in range 160-180 beats/ min, values comparable with elite adult players. Blood
lactate levels remained in 3-4 mmol\textsuperscript{L}\textsuperscript{-1} range and reflect the completion of high intensity efforts by children without major accumulation of lactate.

Eriksson (1974) exercise at the same relative sub maximal intensity elicits a lower blood lactate response in children than in adults and an age-related increase towards adult values during development. The true pattern of change in blood lactate responses to exercise with age and the mechanisms underlying the differences between children and adults are difficult to tease out from the available literature. Various terms have been applied to sub maximal measures of blood lactate during incremental exercise. In 11 to 15 Years old boys suggest that glycogenolysis and consequent ability to produce lactate is limited in children and adolescence compared with adults.

The result of the study supports the findings of Falk, Billat, V Nummcla, Gaesser, G.A. Hermann Nilsson J.E.
4.5 DISCUSSION ON HYPOTHESIS

1. Hypothesis number I stated that there would not be statistically significant improvement in the functions of Haemoglobin concentration due to selected packages of physical training.

The findings of the study showed that there was a significant improvement in the functions of Haemoglobin concentration due to the influence of selected packages of physical training.

Hence, the first hypothesis was rejected on the above said variable.

2. Hypothesis number II stated that there would not be statistically significant improvement in the functions of Mean Arterial Pressure due to selected packages of physical training.

The findings of the study showed that there was an insignificant improvement in the functions of Mean Arterial Pressure due to the influence of selected packages of physical training.

Hence, the second hypothesis was accepted on the above said variable.

3. Hypothesis number III stated that there would not be statistically significant improvement in the functions of Blood glucose due to selected packages of physical training.
The findings of the study showed that there was an insignificant improvement in the functions of Blood glucose due to the influence of selected packages of physical training.

Hence, the third hypothesis was accepted on the above said variable.

4. Hypothesis number IV stated that there would not be statistically significant improvement in the functions of Blood Lactic Acid Concentration due to selected packages of physical training.

The findings of the study showed that there was an insignificant improvement in the functions of Blood Lactic Acid Concentration due to the influence of selected packages of physical training.

Hence, the fourth hypothesis was accepted on the above said variable.