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## Effect of circuit training programme on total leucocytes count and platelets count on pre-obese adolescents

**Neha Kumari and Dr. Sandeep Tiwari**

### Abstract

The present study was conducted to assess the effect of Circuit Training Programme on Total Leucocytes count and Platelets Count on Pre-Obese Adolescents. The objective of the study was to find out the effect of 30 minutes Circuit Training Programme on Total Leucocytes count and Platelets Count sedentary pre-obese adolescent for a total duration of 21 days. For the purpose of the study, thirty (n=30) subjects were selected. The age group of the subjects ranged from 12 years to 18 years. The subject selected were the students from Kendriya Vidyalaya, Shalimar Bagh New Delhi. The Statistical Technique employed for analysing the data were Mean, Standard Deviation and 't' test. The level of significance was set at 0.05 for interpreting the results. The result of the study indicates a significant difference in Total Leucocytes count between Experimental and Control group. Platelet Count was no significant difference found in the post data of experimental group and control group. However there was an increase in experimental group but it did not reach the significant level. Further, Experimental group had significantly higher average performance mean score as a result of 21 days of Circuit Training than the control group subjects who were not engaged in any training programme.

**Keywords:** Circuit training programme, total leucocytes count, platelets count

### Introduction

Diseases threatening human health are of the issues that have occupied the minds of researchers. A group of these diseases are cardiovascular ones that take the lives of about 12000000 people annually, according to the existing reports Hopper *et al.* (2001) [1]. One of the main risk factors of cardiovascular diseases is obesity, a medical condition in which body fats are unusually increased Wabitsch *et al.* (2001) [2]. In fact, obesity is an unusual phenomenon in children and there is no evidence that obesity in childhood also continues until adulthood and affects a long period of one's life. However, recent studies have demonstrated that dramatic changes have occurred in the health status of children and adolescents because of wrong nutrition and lifestyle Sarlio *et al.* (2001) [3] Wagner *et al.* (2005) [4]. For these reasons and as overweight is an index of inactivity, inactive children and adolescents should participate more in exercise. Almost in all the approaches presented, sport and exercise play an important role in the treatment of obesity Hare *et al.* (2000) [5].

In clinical practice, total leukocyte counts and subsets are widely used to confirm inflammatory process-related acute immune system disturbances that have been associated with the development of a number of conditions harmful to health. However, a complex interplay between manifold genetic and environmental factors determine interpersonal variability in leukocytes. A high interpersonal variation in white blood cell (WBC) counts has also been reported in physically active individuals. Mochizuki *et al.* (2012) [6].

Tayebi *et al.* (2010) [7] reported an increase in white blood cells (WBC) as a result of resistance exercise. Another study reported no change in WBC and an increase in PLT following 4 weeks of exercise Ghanbari *et al.* (2010) [8].

According to previous studies, firstly, inconsistency between the findings is evident and secondly, most previous studies have examined the effects of endurance exercises. Hence, as there was no available study about the effect of different ways of exercises on lipid profile, heart rate, and hematological parameters in obese male students.

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**Problem Statement**

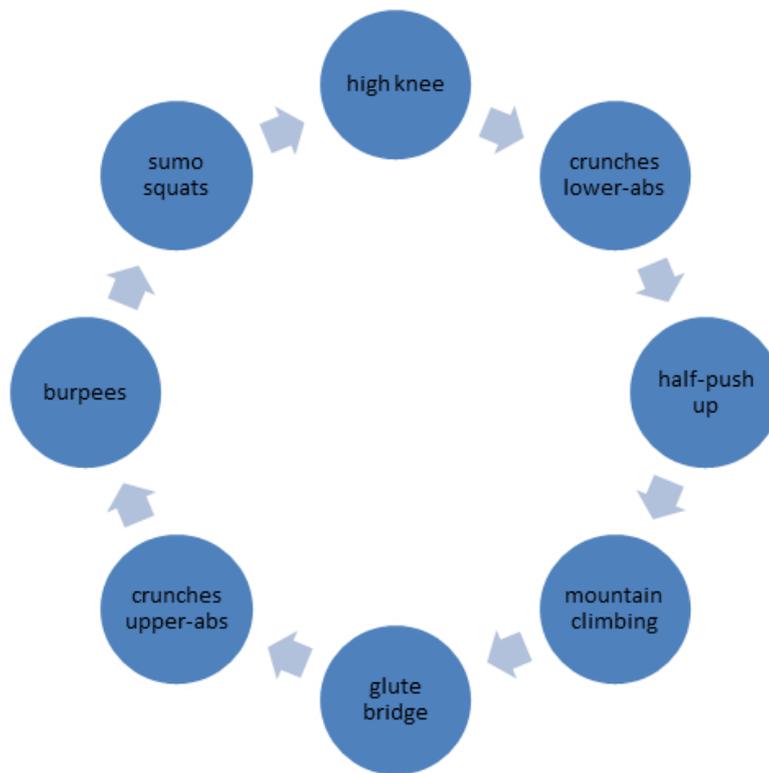
The purpose of the present investigation was to find the effect of Circuit Training Programme on Total Leucocytes count, Platelets Count on Pre-Obese Boys Adolescents with an objective to find out the effect of 30 minutes of Circuit Training Programme on Total Leucocytes count, Platelets Count.

**Methodology**

The study was formulated as an experimental design of 21 days of training to find out the effect of Circuit Training Programme on Total Leucocytes count, Platelets Count. Thirty (30) male subjects who were selected for the study was randomly assigned to two different groups namely Circuit Training as Experimental group & Control group (Not exposed to any training).Circuit Training group consisted of

15 subjects, and Control group consisted of 15 subjects. The age group of the subjects ranged from 12 years to 18 years. The data was collected prior to the start of training session (pre –training data), and after completion of 21 days of circuit training (post- training data) on Total Leucocytes count, Platelets Count variable. For measuring the Total Leucocytes count, Platelets Count of the subjects’ the research scholar was assessed with the help of Kalpvriksha lab (first floor, plot no.66, sector-12A Dwarka, Delhi, 110078) India. Blood Test was done in Laboratories.

Circuit training group was given 5 days a week for 3 weeks and 4<sup>th</sup> week having 6 days. The control group was not exposed to any training programme. Circuit Training unlisted eight exercise grouped used 8 different states which constituted one circuit. The eight states included following exercise:



**Findings**

To find out the effect of 21 days of circuit training on Total Leucocytes count, Platelets Count on pre-obese adolescents

the mean, standard deviation and the ‘t’ test were calculated which are presented in the following table .

**Table 1:** Descriptive Statistics & Paired ‘t’ Test of Bio-Chemical Variables of Experimental and Control Group.

| Variables              | Groups        | Mean | Std. Deviation | Std. Error Mean | t    | df | Sig.(2-tailed) |
|------------------------|---------------|------|----------------|-----------------|------|----|----------------|
| Total leucocytes count | Pre-Exp       | 7.44 | 0.903          | 0.233           | 1.00 | 14 | 0.334          |
|                        | Post-Exp      | 7.16 | 0.823          | 0.212           |      |    |                |
| Total leucocytes count | Pre- Control  | 8.13 | 2.040          | 0.615           | 1.77 | 10 | 0.106          |
|                        | Post- Control | 8.86 | 2.105          | 0.634           |      |    |                |

From table no.1, the results indicate that there was no significant difference in Total leucocytes count between pre and post of experimental group  $t(14) = 1.000, P = 0.334$ , which is greater than 0.05. That is the average score of pre experimental group ( $M=7.4433, SD=0.903$ ) was not statistically different from that of post experimental group ( $M=7.1667, SD=0.823$ ). Thus, it could be concluded that there was a no significant difference in Total leucocytes count between pre and post of experimental group. However, there was a decrease in the mean score of Total leucocytes count after 21 days of participation in circuit training programme.

From table no.1, the results indicate that there was no significant difference in Total Leucocytes count between pre and post data of control group  $t(10) = 1.777, P = 0.106$ , which is greater than 0.05. That is the average score of pre data of control group ( $M=8.131, SD=2.040$ ) was not statistically different from that of post data of control group ( $M=8.868, SD=2.105$ ). Thus, it could be concluded that there was a no significant difference in Total leucocytes count between pre and post of experimental group. However, there was increase in the mean score of Total leucocytes count after 21 days of participation in circuit training programme.

**Table 2:** Descriptive Statistics & Independent ‘t’ Test of Bio-Chemical Variables of Experimental and Control Group.

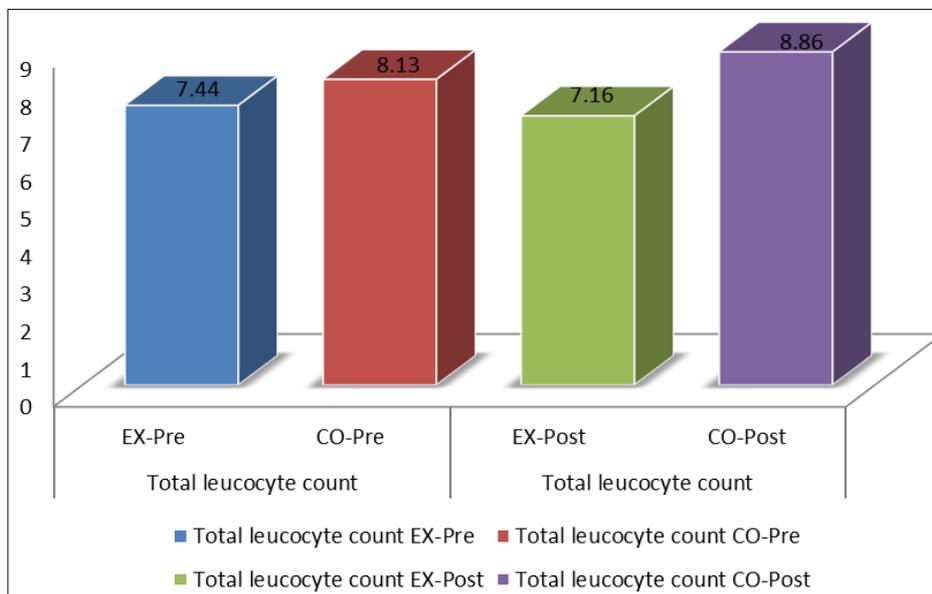
| Variables              | Groups       | Mean | Std. Deviation | Std. Error Mean | t     | df | Sig. (2-tailed) |
|------------------------|--------------|------|----------------|-----------------|-------|----|-----------------|
| Total leucocytes count | Pre-Exp      | 7.44 | 0.903          | 0.233           | 1.166 | 24 | 0.255           |
|                        | Pre- Control | 8.13 | 2.040          | 0.615           |       |    |                 |
| Total leucocytes count | Post-Exp     | 7.16 | 0.823          | 0.121           | 2.863 | 24 | 0.009           |
|                        | Post-Control | 8.86 | 2.105          | 0.634           |       |    |                 |

From table no.2 the results indicate that there was no significant difference in Total Leucocytes count between pre data of experimental group and pre data of control group  $t(14) = 1.166, P = 0.255$ , which is greater than 0.05. That is the average score of pre data of experimental group ( $M=7.44, SD=0.903$ ) was not statistically different from that of pre data of control group ( $M=8.13, SD=2.040$ ). Thus, it could be concluded that there was a no significant difference in Total Leucocytes count between pre data of experimental group and pre data of control group. Therefore, this indicates that both the groups were homogenous.

From table no.2 the results indicate that there was significant

difference in Total Leucocytes count between post data of experimental group and post data of control group  $t(14) = 2.863, P = 0.009$ , which is less than 0.05. That is the average score of post data of experimental group ( $M=7.16, SD=0.823$ ) was statistically different from that of post data of control group ( $M=8.86, SD=2.105$ ). Thus, it could be concluded that there was a significant difference in Total Leucocytes count between post data of experimental group and post data of control group.

The Mean scores from of pre-pre and post-post training Total Leucocytes count of Experimental and Control groups has been represented graphically in figure 1.



**Fig 1:** Graphical Representation of Mean Score from Table 1 & 2

**Table 3:** Descriptive Statistics & paired ‘t’ Test of Bio-Chemical Variables of Experimental and Control Group

| Variable              | Groups        | Mean | Std. Deviation | Std. Error Mean | t     | df | Sig. (2-tailed) |
|-----------------------|---------------|------|----------------|-----------------|-------|----|-----------------|
| Total Platelets count | Pre-Exp       | 2.71 | 78.039         | 20.149          | 0.618 | 14 | 0.547           |
|                       | Post-Exp      | 2.79 | 91.063         | 23.512          |       |    |                 |
| Total Platelets count | Pre- Control  | 2.44 | 97.59          | 29.42           | 1.687 | 10 | 0.122           |
|                       | Post- Control | 2.64 | 107.96         | 32.55           |       |    |                 |

From table no.3, the results indicate that there was no significant difference in Platelet count between pre and post data of experimental group  $t(14) = 0.618, P = 0.547$ , which is greater than 0.05. That is the average score of pre data of experimental group ( $M=271.26, SD=78.03$ ) was not statistically different from that of post data of experimental group ( $M=279.26, SD=91.06$ ). Thus, it could be concluded that there was a no significant difference in Platelet count between pre and post data of experimental group. However, there was an increase in the mean score of platelet count after 21 days of participation in circuit training programme.

From table no.3, the results indicate that there was no significant difference in Platelet count between pre and post data of control group  $t(14) = 1.687, P = 0.731$ , which is greater than 0.05. That is the average score of pre data of control group ( $M=51.89, SD=8.176$ ) was not statistically different from that of post data of control group ( $M=51.53, SD=8.97$ ). Thus, it could be concluded that there was a no significant difference in Platelet count between pre and post data of control group. However, there was decrease in the mean score of platelet count after 21 days of participation in circuit training programme.

**Table 4:** Descriptive Statistics & Independent 't' Test of Bio-Chemical Variables of Experimental and Control Group.

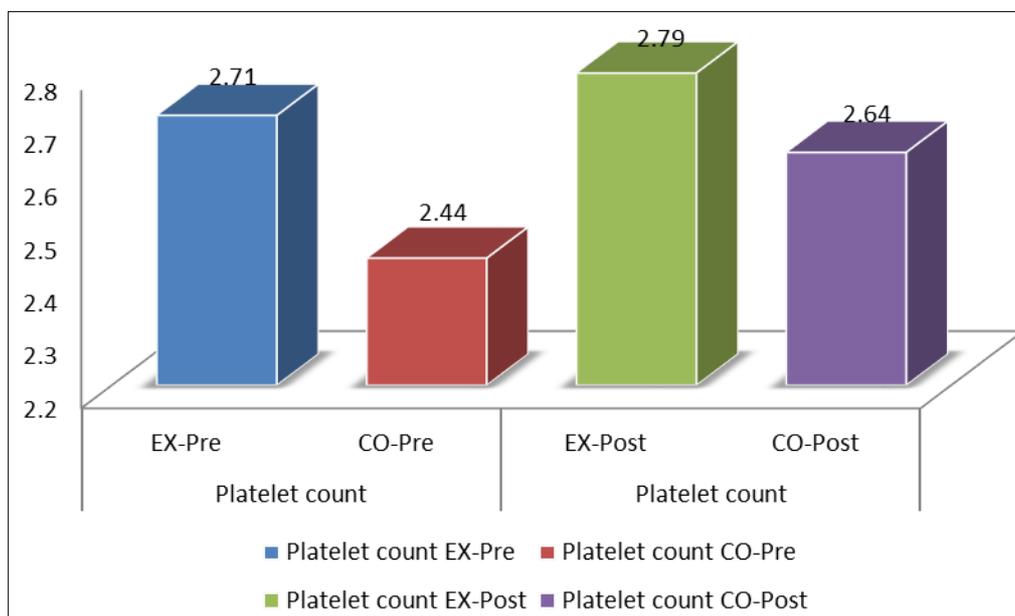
| Variables             | Groups            | Mean | Std. Deviation | Std. Error Mean | t     | df | Sig. (2-tailed) |
|-----------------------|-------------------|------|----------------|-----------------|-------|----|-----------------|
| Total Platelets count | Pre-Experimental  | 2.71 | 78.03          | 20.149          | 0.784 | 24 | 0.441           |
|                       | Pre- Control      | 2.44 | 97.59          | 29.424          |       |    |                 |
| Total Platelets count | Post-Experimental | 2.79 | 91.06          | 23.51           | 0.388 | 24 | 0.701           |
|                       | Post-Control      | 2.64 | 107.96         | 32.55           |       |    |                 |

From table no. 4 the results indicate that there was no significant difference in Platelet Count between pre data of experimental group and pre data of control group  $t(14) = 0.784$ ,  $P = 0.441$ , which is greater than 0.05. That is the average score of pre data of experimental group ( $M=2.71$ ,  $SD=78.03$ ) was not statistically different from that of pre data of control group ( $M=2.44$ ,  $SD=97.59$ ). Thus, it could be concluded that there was a no significant difference in Platelet Count between pre data of experimental group and pre data of control group. Therefore, this indicates that both the groups were homogenous.

From table no. 4 the results indicate that there was no

significant difference in Platelet Count between post data of experimental group and post data of control group  $t(14) = 0.388$ ,  $P = 0.701$ , which is greater than 0.05. That is the average score of post data of experimental group ( $M=2.79$ ,  $SD=91.06$ ) was not statistically different from that of post data of control group ( $M=2.64$ ,  $SD=107.96$ ). Thus, it could be concluded that there was a no significant difference in Platelet Count between post data of experimental group and post data of control group.

The Mean scores from of pre-pre and post-post training Platelet Count of Experimental and Control groups has been represented graphically in figure 2.

**Fig 2:** Graphical Representation of Mean Score from Table 3 & 4

Based on our inspection of the above figure, it is clear that the circuit training group had significantly average performance mean score as a result of 21 days circuit training than the control group.

### Discussion of findings

Analysis of the data revealed a significant difference in the 't' value between the circuit training group and control group in Bio-chemical variable of Total Leucocytes count. Further, these scores indicates that circuit training group had significantly decrease average performance score as a result of 21 days of circuit training programme than the control group subjects who were not engaged in any training programme. So the result shows that the circuit training has a positive influence on Total Leucocytes count. The result of the study revealed that after the completion of 21 days of circuit training program, Platelet Count was no significant difference found in the post data of experimental group and control group. However there was an increase in experimental group but it did not reach the significant level.

Further, if we look at the result of the present study it is clearly visible that the circuit training group scored decrease in Total Leucocytes count after engaging in a 21 days training

programme in comparison to their pre-recorded data. Exercise showed positive effects on Total Leucocytes count. However in Platelet Count no significant difference was found in the post data of experimental group and control group. But there was an increase in experimental group but it did not reach the significant level.

### Conclusions

The result obtained after the implementation of circuit training on the variable of Complete Blood count of experimental group, following conclusion are drawn:

1. The circuit training group had significantly decrease average performance mean score of Total Leucocyte count as a result of 21 days of circuit training than the control group subjects who were not engaged in any training programme. This further indicates that the average performance of circuit training group on Total Leucocyte count was significantly lesser than the control group.
2. The result of the study revealed that after the completion of 21 days of circuit training program, Platelet Count was not significantly different in the post data of experimental group and control group. However there was an increase

in experimental group but it did not reach the significant level.

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