

EFFECT OF FREE HAND EXERCISES ON CIRCULATORY SYSTEM AND RESPIRATORY SYSTEM

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ABSTRACT: The purpose of this study was to find out the effect of free hand exercises on circulatory system and respiratory system. For the purpose of this study total sixty (60) students were randomly selected who were studying in Bachelor of Physical Education and Master of Physical Education course from Department of Physical Education, Institute of Professional Studies, Gwalior, Madhya Pradesh, India. All the subjects were divided into two groups i.e. experimental group and control group and each group have thirty (30) students. Experimental group was received forty five (45) minutes of training per day except Sunday for duration of eight (08) weeks. The subjects' age was ranging between 20 to 25 years. Paired „t“ test was used and the level of significance was set at 0.05. All the statistical calculations were made through Statistical Package for Social Science (SPSS) version 16.0. The results of this study reveal that free hand exercises have no effect on circulatory system and respiratory system.

Keywords: Free hand exercise, circulatory system and respiratory system.

INTRODUCTION

The circulatory system means heart (cardium) and blood vessels (vascular) system, which is, the course taken by the blood through the arteries, capillaries and veins and back to the heart [1]. In humans the heart is made up of four chambers: the right and left auricles or atria and the right and left ventricles. The right side of the heart pumps oxygen-poor blood from the cells of the body back to the lungs for new oxygen and the left side of the heart receives blood rich in oxygen from the lungs that is pumped through the arteries to the different parts of the body [2]. It is estimated that a given portion of the blood completes its course of circulation in approximately thirty (30) seconds. Respiration is a physical process by which living organisms take in oxygen from the surrounding medium and emit carbon dioxide [3]. Oxygen is supplied to the tissues and their carbon dioxide is removed by the combined action of the cardiovascular and respiratory systems. Not only do these two systems have a close spatial relationship in the thoracic cavity, they also have such a close functional relationship that they are often pronounced effects on the heart and vice versa. Furthermore, the respiratory system works closely with the urinary system to regulate the body's acid-base balance. Changes in the blood pH, in turn, trigger autonomic adjustments of the heart rate and blood pressure [4]. Thus, the cardiovascular, respiratory and urinary systems have an especially close physiological relationship. Thus, respiration includes the movement of air into and out of the lungs, the exchange of gases between the air and the blood, the transport of gases in the blood and the exchange of gases between the blood and tissues [5].

METHODOLOGY

Selection of Subjects:

Total sixty (60) students were randomly selected for this study who was pursuing Bachelor of Physical Education and Master of Physical Education course from Department of Physical Education, Institute of Professional Studies, Gwalior, Madhya Pradesh, India.

Selection of Variables:

The following variables selected for this study as follows:

Circulatory System:

- Resting Heart Rate
- Systolic Blood Pressure
- Diastolic Blood Pressure

Respiratory System:

- Positive Breath Holding Capacity
- Vital Capacity

Criterion Measure:

The following tests were selected and their scores considered as criterion measures for this study:

- **Resting Heart Rate** was measured by manual method and score was in beats per minute.
- **Systolic Blood Pressure** was measured by sphygmomanometer and stethoscope and score was recorded in mm/Hg.
- **Diastolic Blood Pressure** was measured by sphygmomanometer and stethoscope and score was recorded in mm/Hg.
- **Positive Breath Holding Capacity** was measured by manual method and score was recorded in seconds.
- **Vital Capacity** was measured by dry spirometer and score was recorded in liters.

Research Design:

Pre-post random group design was selected for this study.

Statistical Technique:

To find out the effect of free hand exercise on selected circulatory system and respiratory system paired „t“ test was used and the level of significance was set at 0.05.

RESULTS OF THE STUDY

The analysis of data on selected variables that were resting heart rate, systolic blood pressure, diastolic blood pressure, positive breath holding capacity and vital capacity collected on sixty (60) students. Thirty (30) students from each group i.e. experimental group and control group from Department of Physical Education, Institute of Professional Studies, Madhya Pradesh, India. The data was analyzed by paired “t” test to investigate the effect of free hand exercise on circulatory and respiratory system.

Table No.01
Comparison of Pre-test and Post-test of Resting Heart Rate of Experimental Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	67.53	4.82	0.93	1.58
Post-test	66.60	3.14		

*Significant at 0.05 level tab „t“_{(0.05) (29)} = 2.045

Table no.01 indicates that there is insignificant difference between pre and post test of resting heart rate of experimental group as calculated „t“ value 1.58 is less than tabulated „t“ value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on resting heart rate of experimental group. Graphical representation of above table is made in figure no.01.

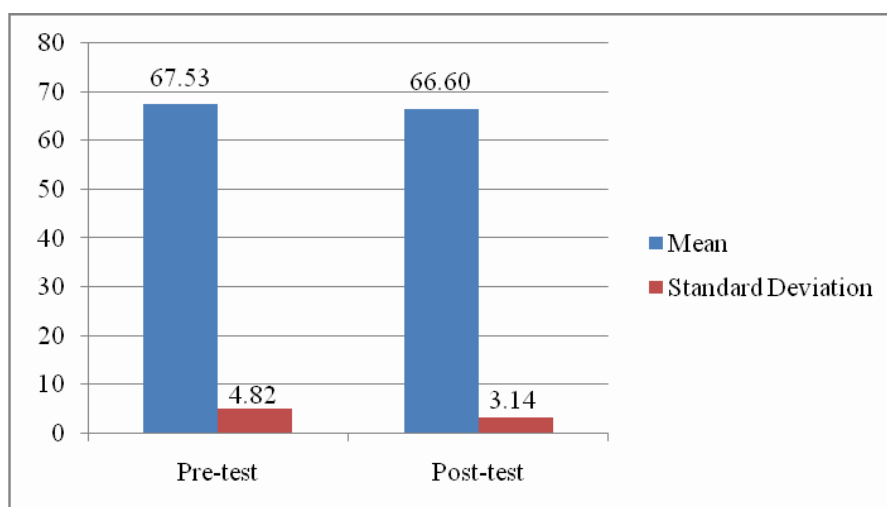


Figure No.01 Mean and Standard Deviation Values of Pre-test and Post-test of Resting Heart Rate of Experimental Group

Table No.02
Comparison of Pre-test and Post-test of Resting Heart Rate of Control Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	71.73	5.50	0.80	2.00
Post-test	70.93	5.98		

*Significant at 0.05 level tab „t“_{(0.05) (29)} = 2.045

Table no.02 indicates that there is insignificant difference between pre and post test of resting heart rate of control group as calculated „t“ value 2.00 is less than tabulated „t“ value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on resting heart rate of control group. Graphical representation of above table is made in figure no.02.

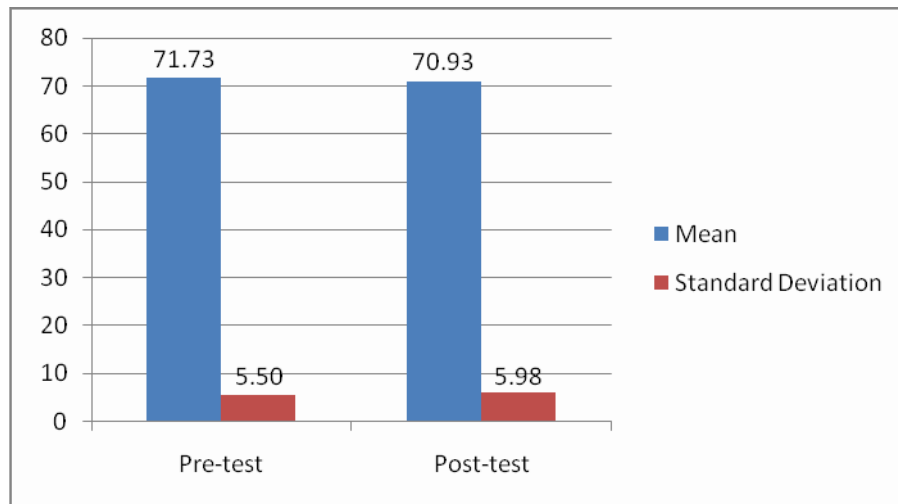


Figure No.02 Mean and Standard Deviation Values of Pre-test and Post-test of Resting Heart Rate of Control Group

Table No.03 Comparison of Pre-test and Post-test of Systolic Blood Pressure of Experimental Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	110.27	8.30	1.60	0.95
Post-test	108.67	7.53		

*Significant at 0.05 level tab „t“ $(0.05)_{(29)} = 2.045$

Table no.03 indicates that there is insignificant difference between pre and post test of systolic blood pressure of experimental group as calculated „t“ value 0.95 is less than tabulated „t“ value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on systolic blood pressure of experimental group. Graphical representation of above table is made in figure no.03.

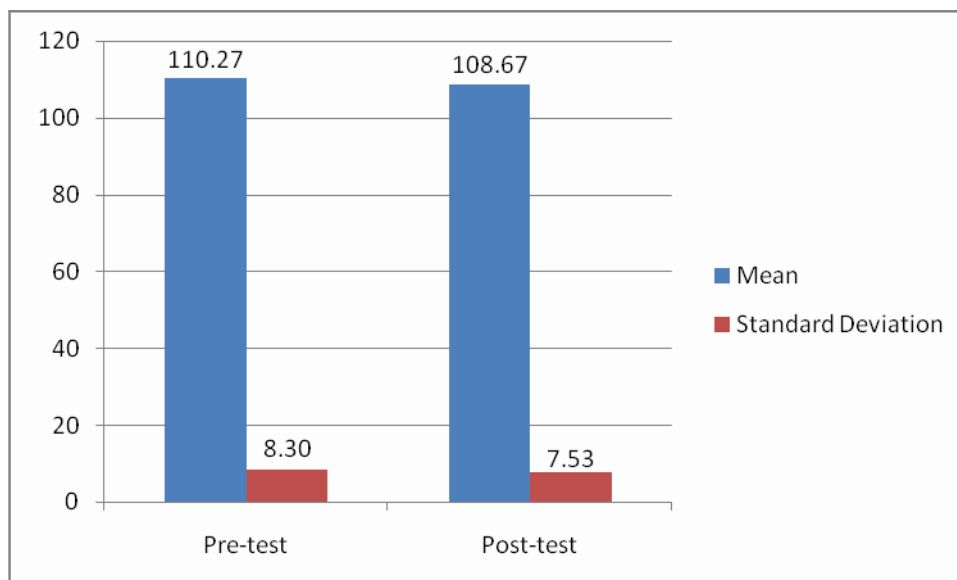


Figure No.03 Mean and Standard Deviation Values of Pre-test and Post-test of Systolic Blood Pressure of Experimental Group

Table No.04
Comparison of Pre-test and Post-test of Systolic Blood Pressure of Control Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	114.47	8.62	1.37	1.96
Post-test	113.10	7.84		

*Significant at 0.05 level tab „t“_{(0.05) (29)} = 2.045

Table no.04 indicates that there is insignificant difference between pre and post test of systolic blood pressure of control group as calculated „t“ value 1.96 is less than tabulated „t“ value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on systolic blood pressure of control group. Graphical representation of above table is made in figure no.04.

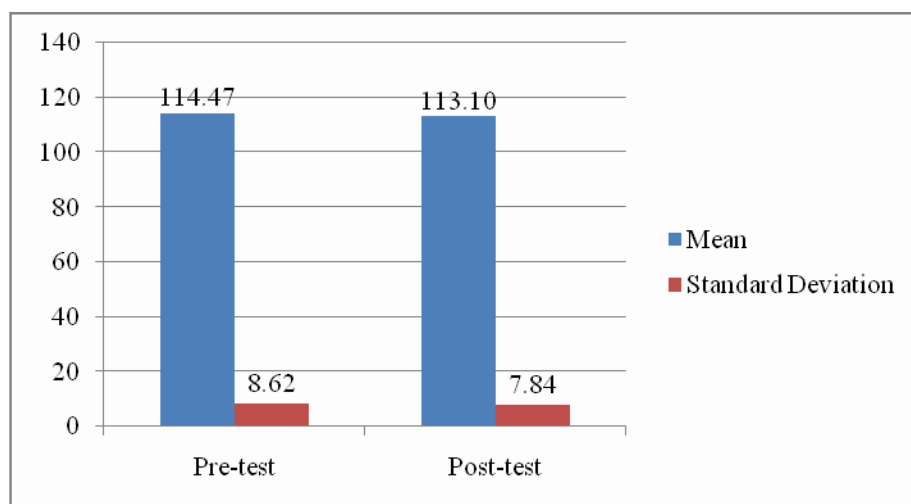


Figure No.04 Mean and Standard Deviation Values of Pre-test and Post-test of Systolic Blood Pressure of Control Group

Table No.05
Comparison of Pre-test and Post-test of Diastolic Blood Pressure of Experimental Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	79.96	6.99	1.46	1.56
Post-test	78.50	5.59		

*Significant at 0.05 level tab „t“_{(0.05) (29)} = 2.045

Table no.05 indicates that there is insignificant difference between pre and post test of diastolic blood pressure of experimental group as calculated „t“ value 1.56 is less than tabulated „t“ value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on diastolic blood pressure of experimental group. Graphical representation of above table is made in figure no.05.

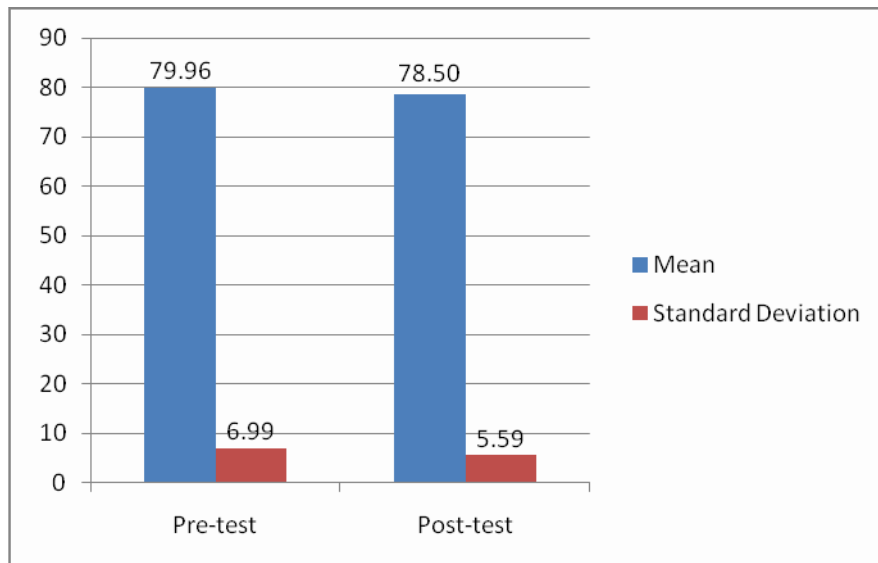


Figure No.05 Mean and Standard Deviation Values of Pre-test and Post-test of Diastolic Blood Pressure of Experimental Group

Table No.06 Comparison of Pre-test and Post-test of Diastolic Blood Pressure of Control Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	81.50	8.72	0.16	0.22
Post-test	81.33	7.64		

*Significant at 0.05 level tab „t“_{(0.05) (29)} = 2.045

Table no.06 indicates that there is insignificant difference between pre and post test of diastolic blood pressure of control group as calculated „t“ value 0.22 is less than tabulated „t“ value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on diastolic blood pressure of control group. Graphical representation of above table is made in figure no.06.

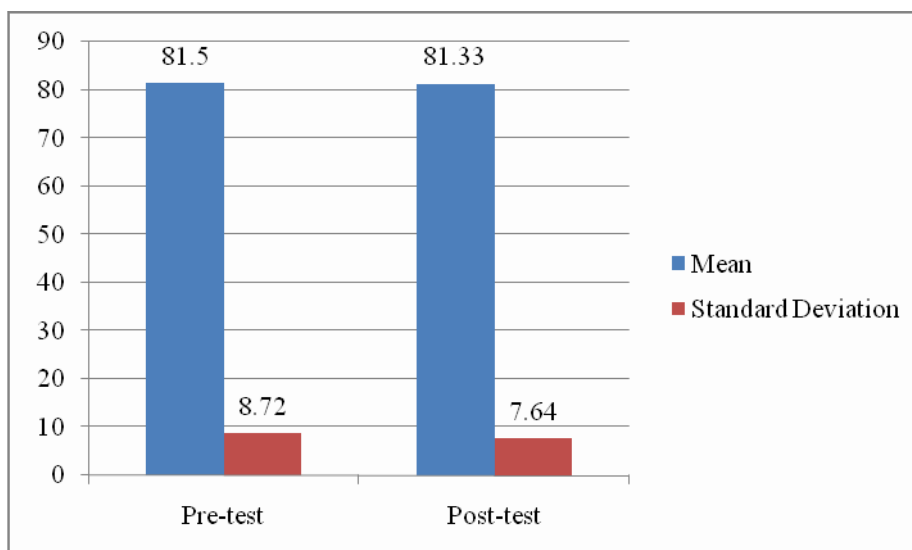


Figure No.06 Mean and Standard Deviation Values of Pre-test and Post-test of Diastolic Blood Pressure of Control Group

Table No.07
Comparison of Pre-test and Post-test of Positive Breath Holding Capacity of Experimental Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	37.28	14.19	0.14	0.07
Post-test	37.42	15.71		

*Significant at 0.05 level tab „t^{**} (0.05) (29) = 2.045

Table no.07 indicates that there is insignificant difference between pre and post test of positive breath holding capacity of experimental group as calculated „t^{**} value 0.07 is less than tabulated „t^{**} value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on positive breath holding capacity of experimental group. Graphical representation of above table is made in figure no.07.

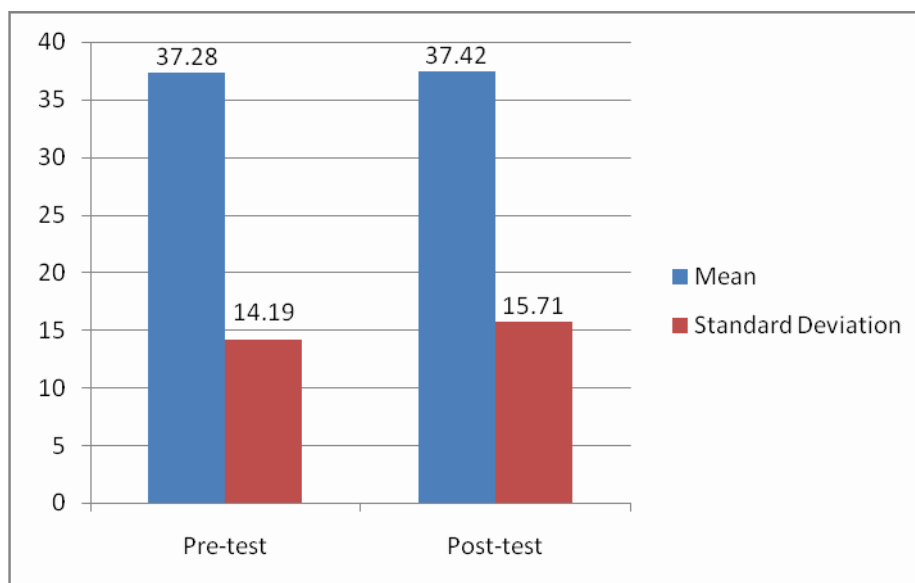


Figure No.07 Mean and Standard Deviation Values of Pre-test and Post-test of Positive Breath Holding of Experimental Group

Table No.08
Comparison of Pre-test and Post-test of Positive Breath Holding Capacity of Control Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	33.90	14.52	0.22	1.88
Post-test	34.12	14.59		

*Significant at 0.05 level tab „t^{**} (0.05) (29) = 2.045

Table no.08 indicates that there is insignificant difference between pre and post test of positive breath holding capacity of control group as calculated „t^{**} value 1.88 is less than tabulated „t^{**} value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on positive breath holding capacity of control group. Graphical representation of above table is made in figure no.08.

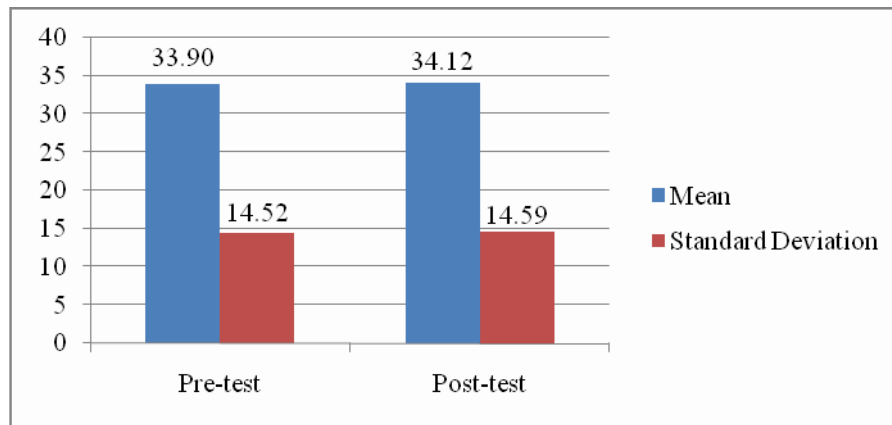


Figure No.08 Mean and Standard Deviation Values of Pre-test and Post-test of Positive Breath Holding of Control Group

Table No.09 Comparison of Pre-test and Post-test of Vital Capacity of Experimental Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	2.23	0.60	0.13	9.23*
Post-test	2.36	0.61		

*Significant at 0.05 level tab „t“_{(0.05) (29)} = 2.045

Table no.09 indicates that there is significant difference between pre and post test of vital capacity of experimental group as calculated „t“ value 9.23 is higher than tabulated „t“ value 2.045. Thus it clearly evident that eight (08) weeks of training programme had significant effect on vital capacity of experimental group. Graphical representation of above table is made in figure no.09.

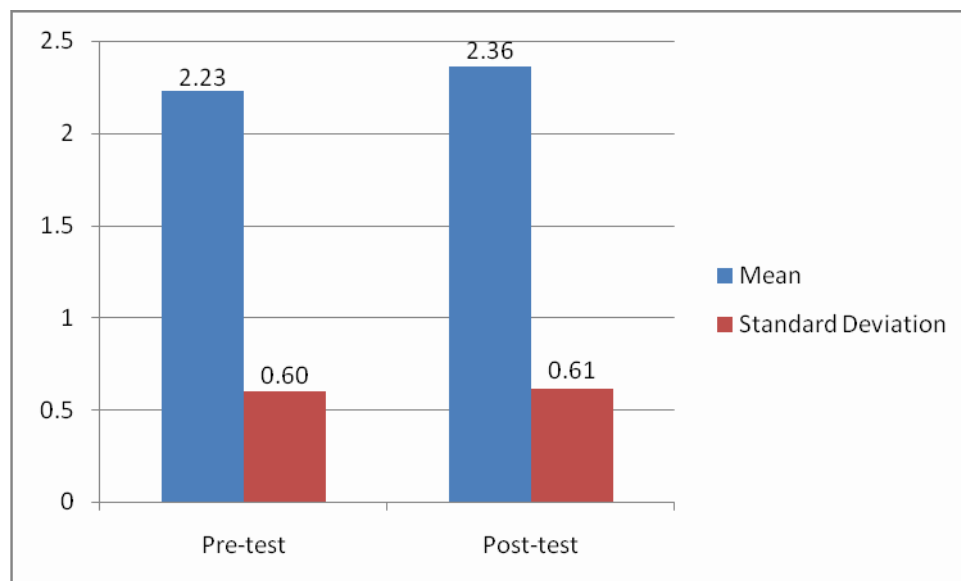


Figure No.09 Mean and Standard Deviation Values of Pre-test and Post-test of Vital Capacity of Experimental Group

Table No.10
Comparison of Pre-test and Post-test of Vital Capacity of Control Group

Test	Mean	Standard Deviation	Mean Difference	't' Ratio
Pre-test	1.96	0.62	0.02	1.04
Post-test	1.98	0.63		

*Significant at 0.05 level tab „t“_{(0.05) (29)} = 2.045

Table no.10 indicates that there is insignificant difference between pre and post test of vital capacity of control group as calculated „t“ value 1.04 is less than tabulated „t“ value 2.045. Thus it clearly evident that eight (08) weeks of training programme had no significant effect on vital capacity of control group. Graphical representation of above table is made in figure no.10.

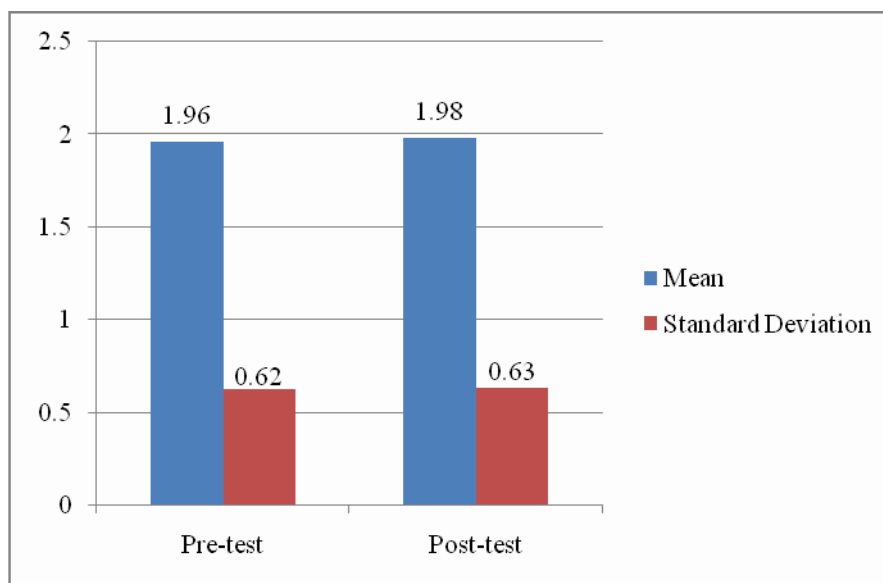


Figure No.09 Mean and Standard Deviation Values of Pre-test and Post-test of Vital Capacity of Control Group

DISCUSSION OF FINDINGS

The findings of the study show that there was significant difference found in respiratory system variable i.e. vital capacity of experimental group because due to duration of free hand exercise and intensity of free hand exercise. There was insignificant difference found in circulatory system variables i.e. resting heart rate, systolic blood pressure, diastolic blood pressure, vital capacity and positive breath holding capacity of experimental and control group because due to low intensity of free hand exercise involved in training programme.

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