

COMPARATIVE EFFECT OF AEROBIC EXERCISES ON PHYSICAL FITNESS OF COLLEGE VOLLEYBALL PLAYERS

Sartaj Aziz Wani* Jai Shanker Yadav**

ABSTRACT

The purpose of the study was to find out the effect of aerobic exercises on physical fitness of various age group students of volley ball players. The subjects were selected from the Govt. Degree College Kulgam and Govt. Degree College Anantnag. The study consisted of total number of 40 subjects in age ranged from 18-21 & 22- 25 years. Subjects were selected randomly in Govt. Degree College Kulgam and Anantnag. These 40 subjects were divided into two equal groups 20-20. Again, they were further divided into two equal groups of 10-10. One was treated as Experimental and second was control in both groups. The Pre-test and Post-test were conducted on each group. The data for the study were collected by administering the physical fitness J.C.R. test. Results of the study concluded that the aerobic exercises showed the positive effect on the leg strength, power of arm and shoulder and agility of experimental Volleyball players in age between 18-21 years of age. Aerobic exercises also showed the positive effect on the leg strength and power of arm and shoulder of experimental Volleyball players in age between 22-25 years. Aerobic exercises did not have any positive effect on the agility of experimental Volleyball players in age between 22-25 years. Volleyball players of control group in the age between 18-21 and 22-25 did not improved their physical fitness factors i.e. leg strength, power of arm & shoulder and agility.

Keywords: Aerobic exercises, strength, agility, Power, physical fitness

* Student, Department of Physical Education, Dr. C.V.Raman University, Kota-Bilaspur (Chhattisgarh).

** Assistant Professor, Department of Physical Education, , Dr. C.V.Raman University, Kota-Bilaspur (Chhattisgarh).

INTRODUCTION

Many people participate in sports and games for fun, happiness, pleasure for health and fitness. Increased participation in sports has resulted in competition which has become an important element of modern life. Competition provides the means by which one can show one's worth by competing successfully. For top level performance, it is very important to spot, select and nurture a budding sportsman as it is recognized by all that athletes must possess some inherent qualities, which can be developed by means of systematized and scientific training.

The training is a process of preparing an individual for any event or an activity or job. Usually in sports we use the term sports training which denote the sense of preparing sportspersons for the highest level of performance. But now-a-days sports training is not just a term but it is very important subject that affects each and every individual who takes up physical activity or sports either for health and fitness or for competition at different level.

Hence sports training are the physical, technical, intellectual, psychological and moral preparation of an athlete or a player by means of physical exercises.¹

Movement is essential to life not only life processes such as blood circulation, respiration and muscles contraction require motion, but activities such as walking bending and grasping inherently involve movement consider how the human organism seeks, consciously or not, to move. Children provide perhaps the best evidence of the inherent nature of humans to move.

When a general sports, it is called skill. Proper movements with greater efficiency to finish are the pre-requisite of games and sports. Control over movements leads to better skill to best performance.⁴

Sports training needs not be confused with physical exercise, which is more validly used in conjunction with health and fitness. It does not however, mean that the athlete do not engage in a physical activity programme. As a matter of fact, training for competitions require much harder regimes of physical exercise to condition body than one does to achieve health objective. The training programme for athletes, in reality, is a comprehensive it includes psychological, physical conditioning, nutritional and managerial factors. In its broadest sense, sports training are the physical, technical, intellectual, psychological, physiological and moral preparation of an athlete by the means of physical exercise.

Usually in sports we use term sport training which denote the sense of preparing sports persons for the highest level of performance. But nowadays sports training are not just a term but is very important subject that affects each and every individual who takes up physical activity or sports either for health and fitness or for competition at different level.⁶. We can say that a sports training is the overall scientific and systematic channel of preparation of sports person for highest level a sport performance sports training also consists of all those learning influences and processes that are aimed at enhancing sports performance. Scientific truth is not copy of an image passively received, but the fruit of laborious and endless dialogue between thought and reality.

The scientific results in the field of physical education and sports are a bone of to the athletes, trainers and coaches. The physical educationists and sports scientists have been trying to develop new method of training and techniques to attain higher level of performance

in sports and games through critical thinking and scientific training. Now a day's games and sports are not limited to self satisfaction but it has got a wide range of importance. Therefore, physical fitness is a basic need and base of excellence in performance in addition to physical and motor fitness,

Aerobic exercises are physical exercise of relatively low intensity and long duration, which depends primarily on the aerobic energy system. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process. Many types of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time.

In selecting your aerobic exercises, consider the following: the type of activity, the duration of activity, the frequency, the intensity and the progression. Fitness experts, such as doctors in American College of Sports Medicine, have established recommendations for the quantity and quality of exercises required for the development and maintenance of both body composition and cardio vascular fitness for cardio vascular health. To this aid, aerobic exercises are preferred. Aerobic activities stimulate breathing by using large muscle groups in a continuous and rhythmical manner. Exercises such as jogging, running, walking, hiking, dancing and swimming are such activities.

The positive effects of regular aerobic exercise on health have been demonstrated in many studies. Nevertheless, the effects of physical activity on the different body systems differ depending on duration intensity, number of sessions, type of exercise and age. Most of these studies were performed with young subjects and in some cases, a geriatric population, but very few were performed esthetic studies are carried out with well- controlled groups with good situation. However, in real life situations, physicians see "normal" midlife people who exercise a few times per week, without professional supervision. It is of interest to know the effects of aerobic exercises are as positive in these cases as in the scientific studies.

Dynamic aerobic exercise is defined as rhythmic contractions of skeletal muscle, with an intensity that would not produce an accumulation of lactate in blood, and could be maintained at least 20 minutes. Aerobic metabolism increases in proportion to the mass of muscle involved and the intensity of exercise. Blood flow is more than tenfold, due to a decreased arterial resistance and opening or dilatation of the capillary beds of working muscle. Cardiac output and heart rate increase three to four times with increasing oxygen uptake, whereas stroke volumes increases only to a minor extent.

There are very few studies about the effects of aerobic training in midlife people. Cross sectional studies do not indicate the actual effect of time on those tested. Longitudinal studies show what actually happens with aerobic training but are scarce. In most of them, the effects are similar to those produced in younger population. Many of the studies carried out with middle-aged populations focus on the effects of aerobic training on the plasma lipids profile and its relationship with coronary heart disease. For example, in a study of 14 sedentary middle-age men who increased their activity over two years by running approximately 12 miles per week, there was a decrease in their body fat content from 21.6% to 18% and at the same time, an increase in their caloric intake by an average of 400 calories per day. During this time, their mean total cholesterol (T-C) concentration decreased while their HDL-cholesterol (HDL-C) concentration increased, both significantly. The mechanism underlying these changes in lipoproteins after aerobic training is the enhanced capacity of skeletal

muscle to use free fatty acids as fuel during exercise due to the changes in mitochondrial size and number, enzyme activity and capillary density. All these have the ability of the muscle to oxidize fat.⁷

Physical fitness is one of the objective of physical education as their objective is round by physical education alone. Further this objective is basic to their functioning of man in every walk of life. Let alone sports performance, physical fitness is acclaimed as one of the essential requirement of personality development. It is equally required for man and women of all spheres of life. Physical fitness is one's richest possession it can be earned through a daily routine of games, sports and physical exercise.⁹

REVIEW OF RELATED LITERATURE

A limited amount of Plyometric training could improve jumping performance in elite junior basketball players and this improvement could be partly related with an increase in F of hip extensors and RFD of knee extensors. However, neither of the two initial weights of the applied drop jumps proved to be more effective (Matavulu, et. al., 2001). Physical characteristics of the participants indicated no significant differences for age, height and weight. Significant differences was not found, similarly no significant differences were found, with trunk intention or the dynamic flexibility performance (BoBo et. al., 1999). Aerobic training evinced larger changes on the self-report measures of well-being and stress than the anaerobic trainers and both groups showed significant improvement when compared to controls (Norris, 1990). Deflection point in heart rate does not often occur, and, when it does, it does not coincide with AT, either in pre-training or post-training conditions (Kele, 2006). The improvement was observed in cardio-respiratory endurance, flexibility, muscular strength endurance and no improvement was seen in body fat % among the experimental group of middle-aged women after 12 weeks of aerobic training (Nair, et. al., 2010). The cardiorespiratory endurance of secondary school students can be effectively improved by administered a programme of interval training. To bring about significant improvement cardio respiratory endurance varied frequency of training that is twice, thrice and five days a week may be employed endurance workouts using interval training method, administered thrice and five days a week and more effective in developing cardio respiratory endurance as compared to workouts twice a week (Uppal, 1984). Differences were observed between the exercises and the control group for maximal O₂ consumption and body composition were accepted there was also difference between the two groups for the treadmill test during training (Auderey, 1985). Predicted Vo₂max with increased training was either maintained or reduce back to pre-training levels through detraining. Skin-fold thickness was significantly reduce following training and after detraining either stabilized or returned to pre training levels. Body weight, heart rate, blood pressure under went almost no change from training through the detraining period (Tenderman, 1985). Significant improvement were found in aerobic threshold resting heart rate, blood pressure in the standing position, percent of body fat and under water weighting and all strength measures except right leg strength. Difference was not observed in the means of Vo₂ max, percentage of maximum Vo₂ at anaerobic threshold, resting blood pressure, resting heart rate and right leg strength (Salih, 1985). A aerobic dance performed 30-45 min. 3 day a week, for 10 weeks significantly improves physical work capacity, cardiovascular function, but without dietary

control, does not alter body composition in sedentary middle aged women (Dowedy, et.al.,1985).

The main purpose of the study was to find out the effect of aerobic exercises on physical fitness of various age group students of volley ball players. It was also hypothesized that. There would be significant effect of aerobic exercises on physical fitness of various age group volley ball players.

METHODOLOGY

Selection of Subjects:

The subjects were selected from the Govt. Degree College Kulgam and Govt. Degree College Anantnag. The study consisted of total number of 40 subjects in age ranged from 18 to 25 years. Subjects were selected randomly in Govt. Degree College Kulgam and Anantnag. These 40 subjects were divided into two equal groups 20-20. Again, they were further divided into two equal groups of 10-10. One was treated as Experimental and second was control in both groups. The Pre-test and Post-test were conducted on each group.

Description of Tests:

The data for the study were collected by administrating the physical fitness J.C.R. test. The items of the test consist are described as below:

1. vertical jump

Purpose:- To measure the power of legs in jumping vertically.

Equipment:-A black board (Jump board or marking wall) chalk and measuring tape.

Procedure:-The subjects were asked to stand erect facing towards the board. His dominant hands fingertips were marked with chalk powder and were asked to raise the marked fingertips to a maximum height on the marked black board without lifting the heel so as to mark his maximum reach point then taking position on spot. The subject jumped up maximum and touches with the maximum height point by the chalked finger tips and makes the highest point of jump.

Scoring:-Subjects were allowed three trials the maximum distance among all the trials between the reaching height and jumping height provided the score of the test and the said score were recorded as the raw score of the subjects.

2. chin ups

Purpose:-To measure the Shoulder strength.

Equipment:-A horizontal metal bar, magnesium powder.

Procedure:-The bar was adjusted high enough so that the subject could hang with his arms and legs fully extended and his feet free off the floor. The subjects were asked to use overhand grasp. After assuming the hanging position, the subject raised his body by his arms until his chin could be placed over the bar and then lowered his body to a full, hang as in the starting position. The exercise was repeated as many times as possible only on trial was allowed. The swing of the body was not allowed during the execution of the movement. The raising of the knees and kicking of the legs were also not permitted.

Scoring:-The number of completed pull up to the nearest whole number was recorded and it was considered as the score of the subject.

3. shuttle run

Purpose:-To measure the Agility.

Equipment:-Marked Ground, two small wooden blocks, clapper/whistle, Stop watch etc.

Procedure:- The subject was asked to stand behind the starting line and two blocks were placed behind the finishing line. On the signal “Ready” and “Go”, the timer started the watch and the subject runs towards the blocks, picks up one block, runs back to the starting line, places the block behind the starting line, turns back and picks up the second block. As soon as the second block is placed on the ground the timer stopped the watch and recorded the time. Two trials were permitted.

Scoring:-The time of the better of the two trials was recorded to the nearest 10th of a second as the score of the test item.

Training Programme for both Experimental Group:

Day	Duration Exercises (Min.)	Name of Exercises	Training Means and Methods	Distance (km.)	Intensity
Monday	25	Basic Endurance	Continuous Running and Bicycling	2	Medium
	10	Relaxation	Walking and Jogging		
Tuesday	15	Strength Exercise	Neck, shoulder, hip, ankle rotation etc. rope skipping and aerobic dance.		Medium and fast
	10	Relaxation	Jogging and walking		Slow
Wednesday	15	Stretching Exercise	Triceps, Side wing, Hamstring, Quadriceps, Calf muscles, abdominal forward and backward lean. Spot jumping.		
	10	Relaxation	Easy Walking and jogging		
Thursday	05	Speed, Strength	General warming up, 100 m, 200 m run.		
	10	Relaxation	Limbering down, Easy jogging and walk	1	Medium
Friday	25	Agility	Continuous running with changing speed and aerobic dance.	½	Medium, Fast
	5	Relaxation	Limbering down, Easy jogging and walk		
Saturday	15	Strength Development	Running with changing direction.	1	Medium
		Supplementary Training	Training Exercise standing Broad jump three times each		
	5	Relaxation	Easy Walking and jogging		
Sunday		Rest			

Statistical Analysis:

The data collected qualitatively on three different test of strength, agility, and speed of control groups (N=10+10), and experimental groups (N=10+10) were analyzed by using the ‘t’ test. The level of significance was set at 0.05 level of confidence.

RESULTS

The data collected on 40 subjects before and after six week training program on strength, agility, speed was analyzed by comparing the means of pre and post test of control and experimental groups and was again statistically analyzed by applying-test to check the significant difference among selected items. Therefore, separate tables and graphs have been presented for each item as follows.

TABLE 1
LEG STRENGTH BETWEEN PRE AND POST-TEST OF CONTROL GROUP OF
THE AGE GROUP OF 18 TO 21 YEARS

Control Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	34.1	3.444	0.5	1.61	0.31
Post Test	34.6	3.777			

Insignificant at .05 level, $t_{.05}(18) = 2.10$

Table No. -1 reveals that there is no significant difference between means of pre and post test of control group, because mean of pre test is 34.1 is slightly less than mean of post test is 34.6, and their mean difference is 0.5. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 3.444 and Post test where S.D. = 3.777 and their Combine standard error = 1.61. There was no significant difference between pre and post test of control group because value of calculated 't' = 0.61 which is less than tabulated 't' = 2.10 at 0.05 level of confidence, which shows no improvement in control group because no training was given to the subjects of control group.

TABLE 2
LEG STRENGTH BETWEEN PRE AND POST TEST OF EXPERIMENTAL GROUP
OF THE AGE GROUP OF 18-21 YEARS.

Experimental Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre-test	37.2	1.84	9.8	1.571	6.238*
Post -test	47.0	4.618			

Significant at .05 level, $t_{.05}(18) = 2.10$

Table No. – 2 reveals that there is significant difference between means of pre and post test of experimental group, because mean of pre test is 37.2 is less than mean of post test which is 47.0, and their mean difference is 9.8. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 1.84 and Post test where S.D. = 4.618 and their Combine standard error = 1.571. there was significant difference between pre and post test of control group because value of calculated 't' = 6.238 which is greater than tabulated 't' = 2.10 at 0.05 level of confidence, which shows good improvement found in experimental group after six weeks aerobic training.

TABLE 3
ARM AND SHOULDER STRENGTH BETWEEN PRE AND POST TEST OF
CONTROL GROUP OF THE AGE GROUP OF 18-21 YEARS.

Control Group	Mean	S.D.	MD	σ DM	t-ratio
Pre. Test	8.8	1.135	0.20	0.49	0.41
Post Test	8.6	1.075			

Insignificant at .05 level, $t_{.05}(9) = 2.10$

Table No. - 3 reveals that there is no significant difference between means of pre and post test of control group, because mean of pre test is 8.8 which are slightly less than mean of post test 8.6, and their mean difference is 0.2. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 1.135 and Post test where S.D. = 1.074 and their Combine standard error = 0.492. There was significant difference between pre and post test of control group because value of calculated 't' = 0.406 which is less than tabulated 't' = 2.10 at 0.05 level of confidence, which shows no improvement in control group of the age group of 18-21 years.

TABLE 4
ARM AND SHOULDER STRENGTH BETWEEN PRE AND POST TEST OF
EXPERIMENTAL GROUP OF THE AGE GROUP OF 18-21 YEARS.

Experimental Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	9.3	1.152	2.1	0.579	3.62*
Post Test	11.4	1.429			

Significant at .05 level, $t_{.05}(18) = 2.10$

Table No. - 4 reveals that there is significant difference between means of pre and post test of experimental group, because mean of pre test is 9.3 is less than mean of post test which is 11.4, and their mean difference is 2.1. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 1.152 and Post test where S.D. = 1.429 and their Combine standard error = 0.579. There was a difference between pre and post test of control group because value of calculated 't' = 3.62 which is greater than tabulated 't' = 2.10 at 0.05 level of confidence, which shows little improvement in experimental group after six weeks aerobic training.

TABLE 5
AGILITY BETWEEN PRE AND POST TEST OF CONTROL GROUP OF THE AGE
GROUP OF 18-21 YEARS.

Control Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	13.12	1.33	0.249	0.534	0.469
Post Test	12.87	1.069			

Insignificant at .05 level, $t_{.05}(18) = 2.10$

Table No. - 5 reveals that there is no significant difference between means of pre and post test of control group, because mean of pre test is 13.12 is slightly greater than mean of post test is 12.87, and their mean difference is 0.249. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 1.33 and Post test where S.D. = 1.069 and their Combine standard error = 0.534. There was no significant difference between pre and post test of control group because value of calculated 't' = 0.469 which is less than tabulated 't' = 2.10 at 0.05 level of confidence, which shows no improvement in control group because no training was given to the subjects of control group.

TABLE 6
AGILITY BETWEEN PRE AND POST TEST OF EXPERIMENTAL GROUP OF
THE AGE GROUP OF 18-21 YEARS.

Experimental Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	13.25	1.258	1.370	0.435	3.15*
Post Test	11.88	0.55			

Significant at .05 level, $t_{.05}(18) = 2.10$

Table No. - 6 reveals that there is little difference between means of pre and post test of experimental group, because mean of pre test is 13.25 is greater than mean of post test is 11.88, and their mean difference is 1.370. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 1.258 and Post test where S.D. = 1.55 and their Combine standard error = 0.435. There was significant difference between pre and post test of control group because value of calculated 't' = 3.150 which is greater than tabulated 't' = 2.10 at 0.05 level of confidence, which satisfactory little improvement in experimental group.

TABLE 7
LEG STRENGTH BETWEEN PRE AND POST TEST OF CONTROL GROUP OF
THE AGE GROUP OF 22-25 YEARS.

Control Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	38.6	2.547	0	1.139	0
Post Test	38.6	2.547			

Table No. - 7 reveals that there is no significant difference between means of pre and post test of control group, because mean of pre test and post test are the same and their mean difference is 0. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 2.547 and Post test where S.D. = 2.547 and their Combine standard error = 1.39. There was no significant difference between pre and post test of control group because value of calculated 't' = 0 which is less than tabulated 't' = 2.10 at 0.05 level of confidence, which shows totally no improvement in control group because no training was given to the subjects of control group.

TABLE 8
LEG STRENGTH BETWEEN PRE AND POST TEST OF EXPERIMENTAL GROUP
OF THE AGE GROUP OF 22-25 YEARS.

Experimental Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	38.9	2.846	7.0	1.775	3.94*
Post Test	45.9	4.840			

Significant at .05 level, $t_{.05}(18) = 2.10$

Table No. - 8 reveals that there is significant difference between means of pre and post test of experimental group, because mean of pre test is 38.9 is less than mean of post test which is 45.9, and their mean difference is 7.0. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 2.846 and post test where S.D. = 4.840 and their combine standard error = 1.775. There was significant difference between pre and post test of control group because value of calculated 't' = 3.943 which is greater than tabulated 't' = 2.101 at 0.05 level of confidence.

TABLE 9
ARM AND SHOULDER STRENGTH BETWEEN PRE AND POST TEST OF
CONTROL GROUP OF THE AGE GROUP OF 22-25 YEARS.

Control Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	9.4	0.843	0.3	0.425	0.70
Post Test	9.7	1.05			

Insignificant at .05 level, $t_{.05}(18) = 2.10$

Table No. - 9 reveals that there is no significant difference between means of pre and post test of control group, because mean of pre test is 9.4 which are slightly less than mean of post test 9.7, and their mean difference is 0.3. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 0.843 and Post test where S.D. = 1.05 and their Combine standard error = 0.425. There was no significant difference between pre and post test of control group because value of calculated 't' = 0.70 which is less than tabulated 't' = 2.10 at 0.05 level of confidence, which shows no improvement in control group of the age group of 22-25 years.

TABLE 10
ARM AND SHOULDER STRENGTH BETWEEN PRE AND POST TEST OF
EXPERIMENTAL GROUP OF THE AGE GROUP OF 22-25 YEARS.

Experimental Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	9.3	0.948	1.6	0.639	2.50*
Post Test	10.9	1.79			

Significant at .05 level, $t_{.05}(18) = 2.10$

Table No. - 10 reveals that there is significant difference between means of pre and

post test of experimental group, because mean of pre test is 9.3 is less than mean of post test which is 10.9, and their mean difference is 1.6. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 0.948 and Post test where S.D. = 1.79 and their Combine standard error = 0.639. There was a difference between pre and post test of control group because value of calculated 't' = 2.503 which is greater than tabulated 't' = 2.10 at 0.05 level of confidence, which shows little improvement in experimental group after six weeks aerobic training.

TABLE 11
AGILITY BETWEEN PRE AND POST TEST OF CONTROL GROUP OF THE AGE GROUP OF 22-25 YEARS.

Control Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	12.03	1.209	0.05	0.521	0.095
Post Test	12.08	1.123			

Insignificant at .05 level, $t_{.05}(18) = 2.10$

Table No. - 11 reveals that there is no significant difference between means of pre and post test of control group, because mean of pre test is 12.03 is slightly greater than mean of post test is 12.08, and their mean difference is 0.05. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 1.209 and Post test where S.D. = 1.123 and their Combine standard error = 0.521. There was no significant difference between pre and post test of control group because value of calculated 't' = 0.095 which is less than tabulated 't' = 2.10 at 0.05 level of confidence, which shows no improvement in control group because no training was given to the subjects of control group.

TABLE 12
AGILITY BETWEEN PRE AND POST TEST OF EXPERIMENTAL GROUP OF THE AGE GROUP OF 22-25 YEARS.

Experimental Group	Mean	S.D.	M.D.	σ DM	t-ratio
Pre. Test	12.7	0.873	1.15	0.651	1.76
Post Test	11.6	1.866			

Insignificant at .05 level, $t_{.05}(09) = 2.26$

Table No. - 12 reveals that there is little difference between means of pre and post test of experimental group, because mean of pre test is 12.7 is slightly greater than mean of post test which is 11.6, and their mean difference is 1.15. To check the significant difference between pre and post test of control group the data was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 0.873 and Post test where S.D. = 1.866 and their Combine standard error = 0.651. There was

significant difference between pre and post test of experimental group because value of calculated ' t ' = 1.76 which is greater than tabulated ' t ' = 2.10 at 0.05 level of confidence, which shows little improvement in experimental group.

The obtained mean scores from JCR tests for experimental group and control groups belong to m Govt. Degree College Kulgam and Govt. Degree College Anantnag have been depicted figure 01 to 06.

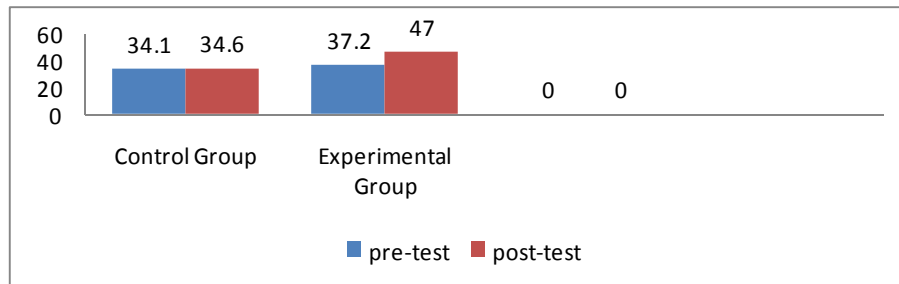


Figure.1: Mean Scores Between Pre and Post Test of Control and Experimental Group for Leg Strength

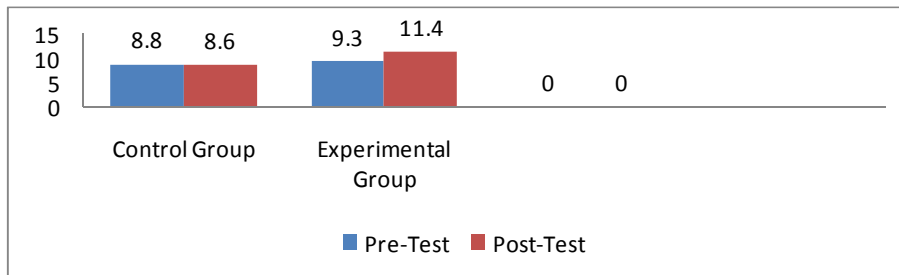


Figure.2: Mean Scores Between Pre and Post Test of Control and Experimental Group for Arm and shoulder Strength

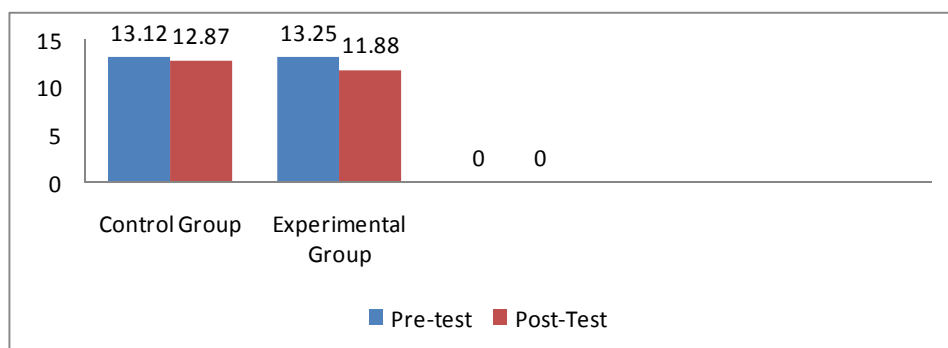


Figure. 3: Mean Scores Between Pre and Post Test of Control and Experimental Group for Agility Performance.

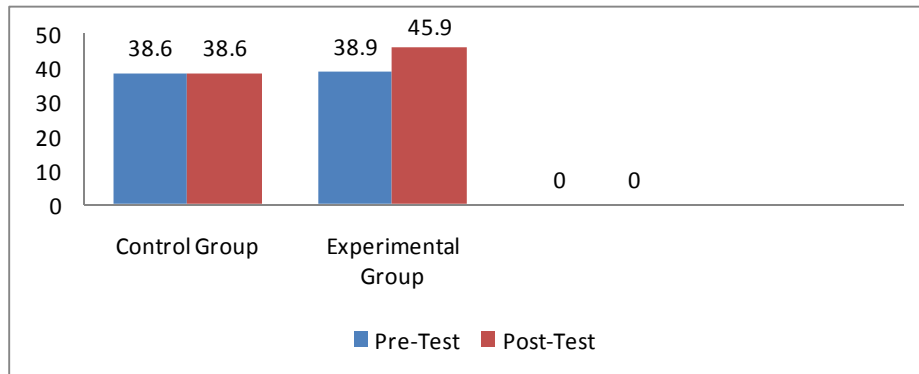


Figure. 4: Mean Scores Between Pre and Post Test of Control and Experimental Group for Strength Performance.

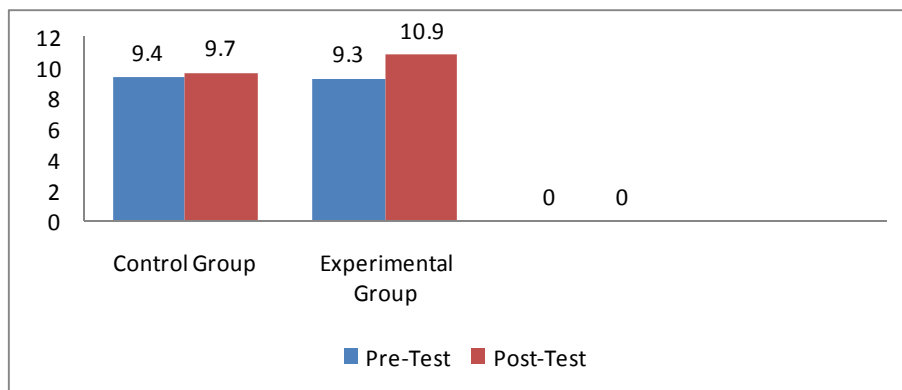


Figure.5: Mean Scores Between Pre and Post Test of Control and Experimental Group for Arm and shoulder Strength Performance.

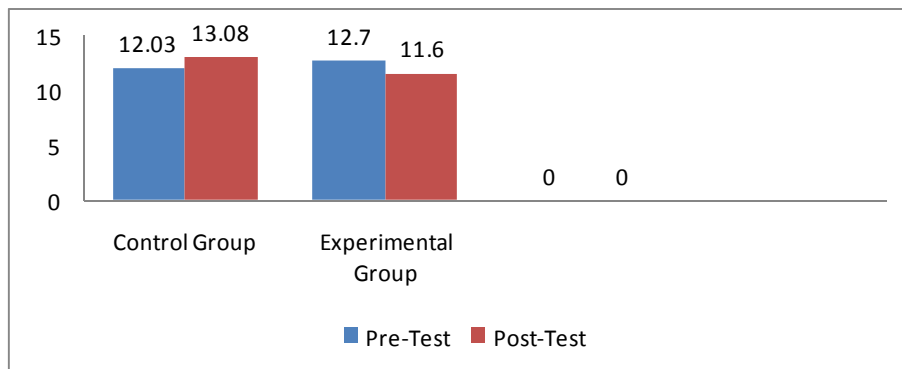


Figure.6: Mean Scores of Pre and Post Test of Control and Experimental Group for Agility Performance.

DISCUSSION

It has been observed from the analysis of data that there was significant difference between the same items among the groups after the administration of training programme. And there was great improvement in all the selected components of the body.

Leg Strength:-The results showed that there was good improvement within and among the groups.

Arm and Shoulder Strength:-The results showed that there was good improvement within and among the groups in arm and shoulder strength of experimental group.

Agility:-The agility showed significant improvement as the planned training program shows the significant effect. Hence aerobic training program of six weeks was adequate for agility.

Justification of Hypothesis: - It was hypothesized there would be significant effect of aerobic training on selected Physical Fitness components. And the effect of training showed the significant effect on leg strength, arm and shoulder strength and showed a significant effect on agility.

CONCLUSIONS

Within the limitations of the study and from statistical analysis the following conclusion was drawn.

1. Aerobic exercises showed the positive effect on the leg strength, power of arm and shoulder and agility of experimental Volleyball players in age between 18-21 years of age.
2. Aerobic exercises also showed the positive effect on the leg strength and power of arm and shoulder of experimental Volleyball players in age between 22-25 years.
3. Aerobic exercises did not have any positive effect on the agility of experimental Volleyball players in age between 22-25 years.
4. Volleyball players of control group in the age between 18-21 and 22-25 did not improved their physical fitness factors i.e. leg strength, power of arm & shoulder and agility.

APPLICATION IN SPORTS

The result of the study would be help the coaches, physical education teachers and athletes in planning the training programme to develop the strength and agility of players. This study would be helpful to reduce the undue fatigue and injuries of players. This study would be helpful to the students of physical education to understand the importance of Strength, Agility and Endurance etc. This study would be generate the interest in physical education teacher and coaches to improve the physical fitness level of players. The study would be help the coaches at the time of selection of players. The study would be help the coaches and physical education teachers to select suitable training programme. The effect of aerobic training would bring forward the merits and de-merits of each exercise. The findings would be helpful in introducing the new exercises in aerobic training programme.

FUTURE RESEARCH DIRECTIONS

The study may be repeated to other physical fitness components on the same subjects.. The same study may be constructed with longer duration of training programme.. The similar study may be repeated on the female subjects.. Coaches and physical education teachers are recommended to undertake this type of studies for selecting and planning the

training programme for the players.. The result of this study can be used to get better and advance outcome.. In this study only three components were taken, but this can be done on more or less components.. The similar study can be carried out on the total physical fitness.

REFERENCES

- Auderey, Miller.**“Effect of Endurance training on the cardiovascular system and body composition of sown syndrome adolescents and young adults”. Dissertation Abstracts International. 46: 6 (December, 1985) : 1554-A.
- Bobo, M. et. al.,** “The Effects Of Long Term Aerobic Dance On Agility And Flexibility”, Journal of Sports Medicine And Physical Fitness, 39 :3 (1999) : 108.
- De Geus, EJ., et. al.,** “Regular exercise and aerobic fitness in relation to psychological makeup and psychological stress reactivity”, Psychosom Med., 55: 4 (Jul.-Aug. 1993) :347-363.
- Gordan, Stephen L. et. al.,** Sports And Exercise In Midlife, (Rosemont : American Academy of Orthopedic Surgeons, North River Road, July 1992.
- Kele, Haluk.** “Effects of Aerobic Exercise Training on the Heart rate-Work rate Relationship and Estimation of Anaerobic Threshold in Obese Females”, Turk J Med Sci. 36 :3 (2006): 165-170.
- Klet, Gray A et. al.,** Encyclopedia Exercise And Physical Fitness . Guilford : The Dustitin Publication Group Inc., 5: 2 (May, 1998) :23-25.
- Kreighbaum, E. et. al.,** Biomechanics, (New York : Macmillan Publishing Company, 2nd Ed., 1981.
- Kansal, Devinder K.** A Text Book of Applied Measurement Evaluation and Sports Selection, (New Delhi : Sports and Spiritual Science publication, 2008
- Matavulu, D. et. al.,** “Effects of Plyometric Training On Jumping Performance In Junior Basketball Players”, Journal of Sports Medicine And Physical Fitness, 41: 2 (2001): 159.
- Nair, Usha S et. al.,** “Effect of aerobic exercise programme on health related physical fitness components of middle aged women”, Lakshmibai National College of Physical Education, Trivandrum, Kerela, India, Volume 44, Issue-1, British Journal Sports Med, 44 (2010) : 19
- Norris, R., et.al.,** “The Effects of Aerobic And Anaerobic Training On Fitness, Blood Pressure, And Psychological Stress And Well-Being”, School of Psychology, University of Birmingham. 34: 4, (1990) : 367-375.
- Salih, S. et. al.,** “Effect of Physical Conditioning Programmes on Selected Variables of College Age Women Gymnasts”, Dissertation Abstracts International, 45: 12, (June 1985) : 3578-A.
- Singh, Ajmer et. al.,** Essentials of Physical Education, (New Delhi : Kalyani Publishers, Third Edition. 2008.
- Tenderman, et. al.,** “Training and Detraining Effect on Skeletal Physiological Measures of Fitness In Adult Black Women”, Dissertation Abstract International, 46 :6 (December, 1985):1556-A.
- Uppal, A.K. et. al.,** “Comparative Effect of Different Frequencies of Endurance Training on Cardio Respiratory Endurance”, S. N. I. P. Es Journal, 30 :7 (January 1984) : 72-76.