3. The students were asked to be in wide straddle position with their toes turned out. They were asked to bring the right arm over the head, by bending the upper body to the side (stretched towards the right side), and move the left arm across the body (to the side) followed by a gentle bounce. They repeated the movement to the left side and had gentle bounce (8 counts). The students extended both the arms out to the side and bent the upper torso forward so that it was parallel to the floor. They kept the back flat and the knees were locked and had a gentle bounce (8 counts). Then they came back up to a standing position, with the hands on the hips and arch backward. They moved the head back and had a bounce gently (8 counts). Then they started the entire movement again from the top and performed 4 counts, then repeated everything again for 2 counts, and again for 1 count (completed 4 sets).
4. The students were asked to move the head down, up (8 counts- after this, count is given in parentheses). They moved their head side to side (8), turned the head right and left (8), circled the head to the right (4); then to the left (4), then they repeated the head circles right and left, and moved right shoulder up, down (8), followed by left shoulder moved up, down (8), then they moved both the shoulders up, down (8). This was followed by moving the right shoulder forward and backward (8), then moved the left shoulder forward and back (8), then moved both the shoulders forward and back (8). Then they performed forward arm circles with both the arms extended to the side (8). Then they were asked to perform backward arm circles (8). They performed waist twist right and left with both arms extended to the side (8). Then they bent forward and touched the right toe with left hand and left toe with right hand (by swinging their arms and turning at the waist) (8).

5. They were asked to jog forward (8), and to jog backward (8), then they repeated the jogging twice and jumped with the feet together (8).Then they jumped with feet apart (8) repeated the jump with feet together (8), and were asked to perform the jumping jacks (8) twice.

Conditioning Bout (15-20 Minutes)

The conditioning bout is the aerobic part of the workout, which should be performed continuously for the entire time period.

It can be performed at a low, moderate or high intensity level. The step patterns include jogging, running, skipping, hopping, jumping and kicking steps.

Step Right; Tap Left Toe on Floor

1. The students were asked to be in standing position with feet together. Then they were moved to the right, side-step right, tapped the left toe on floor (8 counts). (It was performed four times).
2. Then they performed the side-step left, tapped right toe on floor (8, 4*)

Jump; Clap Hands on Jump

1. The students were asked to perform side-step to the right, and to jump (clap hands on the jump)(8,4*)
2. Then they were asked to do the side-step to the left, and then jumped and clap hands(8,4*)

Jog In Place

1. The students jogged in the place (8,4*)

2. They were asked to jog forward four steps, starting with right foot and then jog backwards four step, starting with left foot(8)

Skip, Touching the Knee with Both Hands

1. The students were asked to skip (step hop, alternating feet, bringing the knee up high and hitting the knee with both hands) (8,2*)

Kick leg and clap hands under leg (right and left)

1. They were asked to hop on right, then kick the left leg high, and to clap hands under leg (8, 2*)

2. The students repeated the same movement on the left foot. They performed alternate kicks (8, 2*).

Crisscross jump: a) arms out b) arms crossed

1. The students were asked to perform crisscross jumps: swing both arms up and out to the side as their straddle jump and cross arms in front of body as their feet cross in front and back (8,2*).

Jump twist: a) right b) left

1. The students were asked to perform jump-twists: with arms over the head, jump in place, turning the feet from side to side by turning their arms in the opposite direction (8,2*)

Charleston heel hit

1.They performed the Charleston heel hit; jumped on both feet, then kicked the right foot up in back and touched with the right hand (8,2*)

2. They were asked to jog in place, and kick the feet high in the back, and punch with the arms right and left.

Cool-down (5-10 minutes)

1. For cool down purpose, they were asked to walk slowly one or two minutes (the students counted the pulse rate immediately after the conditioning bout)
2. They placed the feet in a straddle position and kept them flat on the floor, bent the knees and lowered the body down on 4 counts and up on 4 counts. They moved the hands from the side of the body up over the head as they bent their knees and down again to the side as they straightened their legs. (Repeated four times)
3. Then they were asked to sit on the floor with legs in a straddle position. They kept both the hands on the head with elbows out and bended to the right side as far as they can, then repeated to the left side (4*)
4. They put the soles of the feet together and held the ankles and bent forward. They tried to take their heads to their feet slowly on 4 counts. They held this position, breathing in and out for 4 counts and by straightening their back on 4 counts (4*)
5. They were asked to lie on their back, flex both knees up to the chest, extend the legs out and lower them to the floor on 4 counts(4*)
6. They remained on the back with both arms over the head. Then they lifted the back and brought the arms up over the head, forward and reached for their toes (4 counts .4*)
7. They were asked to lie on the back. They breathed deeply and relaxed for a few minutes (imagined themselves in their favourite vacation spot)

3.15 BASIC TRAINING PRINCIPLES AND PROCEDURES (ACSM)

3.15.1 Intensity

Exercise intensity dictates the specific physiological and metabolic changes in the body during exercise training. Exercise prescription depends on the subjects programme goals: age, capabilities, preferences, and fitness level and stress, the cardiopulmonary and musculoskeletal system.

3.15.2 Duration

Duration and intensity of exercises are inversely related, the higher the intensity, the shorter the duration of the exercise. Exercise duration depends not only on the intensity of exercise but also on the subject's health status, initial fitness level, functional capability, and programme goals. For improved health benefits, the American College of Sports Medicine (ACSM) and the American Heart Association (Nelson et al. 2007) recommend that every individual accumulate, 150 min / wk or more of moderate – intensity aerobic exercise.

3.15.3 Frequency

Frequency typically refers to the total number of weekly exercise sessions. Research shows that exercising 5 days a week is sufficient to improve various components of physical fitness. However, frequency is related to the duration and intensity of exercise and varies depending on the subject's programme goals and preferences. Sedentary subjects with poor initial fitness levels may exercise more than once a day. When improved health is the primary goal of the exercise programme. ACSM and the American Heart Association (AHA) recommend either 3 days/wk of vigorous – intensity exercise or 5 days / wk of moderate – intensity exercise.

3.15.4 Progression of Exercise

Throughout the exercise programme, physiological and metabolic changes enable the individual to perform more work. For continued improvement, the cardiopulmonary and musculoskeletal systems must be progressively overloaded through periodic increase in the frequency intensity, and duration of the exercise.

3.15.5 Pilot Study

A Pilot study was conducted to assess the initial capacity of the subjects to fix the load and to design the training programme. 10 subjects were selected at random and they were divided into 2 groups of 5 subjects each. Group 1 aerobic dancing (AD) group 2 yogic practices (YP) for 5 sessions. The initial load of the subjects was fixed and the training programme for selected training was designed separately based on the performance in the pilot study. While constructing the training programme, the basic principles of sports training were followed.

3.16 Training Approaches of the Present Study

The subjects were involved with their respective training programme for five days per week for a period of twelve weeks under the personal supervision of the research scholar. At the end of twelve weeks, the post – test was taken on selected criterion variables. The optimum cardio respiratory zone is found between the 70 and 85 percent training intensities. However, individuals that have been physically inactive or are in the poor or fair cardio respiratory fitness categories should use 60 % intensity during the first few weeks of the exercise programme (Heyward 2002).The subjects training heart rate were measured through the maximal heat method invented by karvonen formula, i.e., (MHR-AGE). The intensity was fixed 55 %, 60% and 65%, for first, second and third four weeks respectively. In yogic practices the study was confined to asanas, pranayama, and mudras only.

3.16.1 Training Programme

Every training session lasted for 60 minutes. The training programme was scheduled in the morning between 6.30 am and 7.30 am. The control group was not

exposed to any specific training. The subjects underwent their respective programmes under strict supervision prior to and during every session. Subjects underwent a 10 minutes 'warm up' and 10 minutes 'cool-down' exercises that included jogging and stretching. The details about the training programme were given below.

3.16.1.1 Exercise Prescription - Experimental Group-I aerobic dancing for 1 to 4 weeks

The selected aerobic steps were performed by the subjects for 1-4 weeks. Each step was performed continuously one by one without break for the duration of 1 min. In these weeks, the subjects performed totally 3 sets, each set consisting of 8 minutes. In between each set, 5 minutes of recovery time was allowed.

Aerobic Dancing	Duration of each step	No of Sets	Recovery In between sets
Step Right; Tap Left Toe On Floor	1 Min	3	5 min
Jump; Clap Hands On Jump	1 Min	3	
Jog In Place	1 Min	3	
Skip, Touching The Knee With Both Hands	1 Min	3	
Kick Leg And Clap Hands Under Leg (Right And Left)	1 Min	3	
Crisscross Jump: A) Arms Out B) Arms Crossed	1 Min	3	
Jump Twist: A) Right B) Left	1 Min	3	
Charleston Heel Hit	1 Min	3	

3.16.1.2 Exercise Prescription - Experimental Group-I aerobic dancing for 5 to 8 weeks

The selected aerobic steps were performed by the subjects for 5-8 weeks. Each step was performed continuously one by one without break for the duration of 2 minutes. In these weeks, the subjects performed totally 2 sets, each set consisting of 16 minutes. In between each set, 5 minutes of recovery time was allowed.

Aerobic Dancing	Duration of each step	No of Sets	Recovery In between sets
Step Right; Tap Left Toe On Floor	2 Min	2	5 min
Jump; Clap Hands On Jump	2 Min	2	
Jog In Place	2 Min	2	
Skip, Touching The Knee With Both Hands	2 Min	2	
Kick Leg And Clap Hands Under Leg (Right And Left)	2 Min	2	
Crisscross Jump: A) Arms Out B) Arms Crossed	2 Min	2	
Jump Twist: A) Right B) Left	2 Min	2	
Charleston Heel Hit	2 Min	2	

3.16.1.3 Exercise Prescription - Experimental Group-I aerobic dancing for 9 to 12 weeks

The selected aerobic steps were performed by the subjects for 9-12 weeks. Each step was performed continuously one by one without break for the duration of 3 minutes. In these weeks, the subjects performed totally 1 set of 24 minutes.

Aerobic Dancing	Duration of each step	No of Sets	Recovery In between sets
Step Right; Tap Left Toe On Floor	3 Min	1	5 min
Jump; Clap Hands On Jump	3 Min	1	
Jog In Place	3 Min	1	
Skip, Touching The Knee With Both Hands	3 Min	1	
Kick Leg And Clap Hands Under Leg (Right And Left)	3 Min	1	
Crisscross Jump: A) Arms Out B) Arms Crossed	3 Min	1	
Jump Twist: A) Right B) Left	3 Min	1	
Charleston Heel Hit	3 Min	1	

3.16.1.4 Exercise Prescription - Experimental Group-II yogic practices (asana, pranayama and mudras) for 1 to 4 weeks

The selected asanas were performed by the subjects for 1-4 weeks. The final posture was maintained up to 30 sec in each asana. Totally three sets were given in each asana and the recovery in between the set was 3 min. After Asana Practice 2 min rest period was allowed before the pranayama. The simple pranayama was selected and performed by the subjects for 1 min of 2 sets. The recovery period in between the pranayama was 1 min. After Pranayama Practice 2 min rest period was allowed before mudras and they performed mudra for 3 min continuously with 1 set.

Activities	Duration	Sets	Recovery In between set
Suryanamaskar (12 steps)	3 min	2	2 min
Asanas			
Bhujangasana	30 Sec	3	3 min
Patchimothasana	30 Sec		
Dhanurasana	30 Sec		
Halasana	30 Sec		
Gomukhasana	30 Sec		
Ardhamatsyendrasana	30 Sec		
Ushtrasana	30 Sec		
Garudasana	30 Sec		
Virabadharasana	30 Sec		
Natarajasana	30 Sec		
			2 min
Pranayama			
Bhastrika	1 min	2	1 min
			2 min
Mudra			
Chin or Gyan	3 min	1	-

3.16.1.5 Exercise prescription - Experimental group-II yogic practices (asana, pranayama and mudras) for 5 to 8 weeks

The selected asanas were performed by the subjects for 5-8 weeks. The final posture was maintained up to 45 sec in each asanas. Totally two sets were given in each asana and the recovery in between the set was 3 min. After Asana Practice 2 min rest period was allowed before the pranayama. The simple pranayama was selected and performed by the subjects for 1 min of 2 sets. The recovery period in between the pranayama was 1 min. After Pranayama Practice 2 min rest period was allowed before mudras and they performed mudra for 3 min continuously with 1 set.

Activities	Duration	Sets	Recovery In between set
Suryanamaskar (12 steps)	3 min	2	2 min
Asanas			
Bhujangasana	45 Sec	2	3 min
Patchimothasana	45 Sec		
Dhanurasana	45 Sec		
Halasana	45 Sec		
Gomukhasana	45 Sec		
Ardhamatsyendrasana	45 Sec		
Ushtrasana	45 Sec		
Garudasana	45 Sec		
Virabadharasana	45 Sec		
Natarajasana	45 Sec		
			2 min
Pranayama			
Bhastrika	1 min	2	1 min
			2 min
Mudra			
Chin or Gyan	3 min	1	-

3.16.1.6 Exercise prescription - Experimental group-II yogic practices (asana, pranayama and mudras) for 9 to 12 weeks

The selected asanas were performed by the subjects for 9-12 weeks. The final posture was maintained up to 60 sec in each asana. Totally one set was given in each asana and the recovery in between the set were 3 min. After Asana Practice 2 min rest period was allowed before the pranayama. The simple pranayama was selected and performed by the subjects for 1 min of 2 sets. The recovery period in between the pranayama was 1 min. After Pranayama Practice 2 min rest period was allowed before mudras and they performed mudra for 3 min continuously with 1 set.

Activities	Duration	Sets	Recovery In between set / Asana
Suryanamaskar (12 steps)	5 min	2	2 min
Asanas			
Bhujangasana	60 Sec	1	1 min
Patchimothasana	60 Sec		
Dhanurasana	60 Sec		
Halasana	60 Sec		
Gomukhasana	60 Sec		
Ardhamatsyendrasana	60 Sec		
Ushtrasana	60 Sec		
Garudasana	60 Sec		
Virabadharasana	60 Sec		
Natarajasana	60 Sec		
			2 min
Pranayama			
Bhastrika	1 min	2	1 min
			2 min
Mudra			
Chin or Gyan	3 min	1	---

3.17 STATISTICAL ANALYSIS

The pre and post - test random group design was used as an experimental design in which sixty women college students were selected as subjects. The selected subjects were divided into three groups of twenty subjects each. Ancova was used to find out significant adjusted post - test mean difference of three groups with respect to each parameter and Scheffe's post hoc test was used to find out pair-wise comparisons between groups with respect to each parameter.

CHAPTER – IV
ANALYSIS AND INTERPRETATION OF DATA

4.1 INTRODUCTION

The statistical analysis of data collected pertaining to experimental study on the effects of two methods of training namely aerobic dancing and yogic practices on selected health related fitness psychological and bio-chemical variables among women college students is presented in this chapter.

The selected subjects were initially tested on criterion variables used in this study and this is considered as the pre-test. After assessing the pre-test, the subjects in the experimental groups 1 and 2 were treated with their respective treatments for five days a week and for a duration of twelve weeks.

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

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

The influence of Aerobic Dancing and Yogic Practice on selected Health related fitness Psychological and Bio-chemical variables of women college students were analyzed separately for each variable and presented in table I - table IX.

4.2 Comparison of flexibility in the experimental groups and control group

The data on scores of Flexibility were collected from the experimental groups and control group. The pre – test, post – test, and adjusted post – test mean and standard deviation along with respective ANCOVA table are given in table I.

TABLE I

ANALYSIS OF CO VARIANCE OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON FLEXIBILITY

(Scores in centimetres)

Test	G-1 (AD)	G-2 (YP)	G-3 (CG)	Source of Variance	Sum of Square	Df	Mean Square	Obtained 'F" Ratio
Pre Test								
Mean	31.75	30.90	31.0	Between	8.63	2	4.32	0.69
SD	2.34	2.53	2.45	Within	357.55	57	6.27	
Post Test								
Mean	37.35	39.75	31.15	Between	774.96	2	393.87	76.37*
SD	2.13	2.00	2.37	Within	282.85	57	4.96	
Adjusted Post Test								
Mean	36.95	39.75	31.31	Between	774.96	2	387.48	276.12*
				Within	78.58	56	1.40	

* Significant at 0.05 level. (The table values required for significance at 0.05 level of confidence for 2 and 57 and 2 and 56 are 3.16.

4.2.1 RESULTS ON FLEXIBILITY

Pre - Test: The mean and standard deviation of the pretest flexibility scores of G1, G2, and G3 are 31.75 ± 2.34, 30.90 ± 2.53, 31.0 ± 2.45, respectively. The obtained pre test F value of 0.69 was lesser than the required table F value of 3.16. Hence the pre test means value of flexibility shows insignificant at 0.05 level of confidence for the degrees of freedom 2 and 57.

Post - Test: The mean and standard deviation of the post- test flexibility scores of G1, G2, and G3 are 37.35 ± 2.13, 39.75 ± 2.00, 31.15 ± 2.37, respectively. The obtained post test F value of 76.37 was greater than the required table F value of 3.16. Hence the post- test means value of flexibility shows significant at 0.05 level of confidence for the degrees of freedom 2 and 57. Thus the results obtained proved that the interventions namely Aerobic Dancing and Yogic Practice on flexibility produced significantly different improvements among the experimental groups.

Adjusted Post - Test: The mean value of adjusted post - test flexibility scores of G1, G2, and G3 are 36.95, 39.75 and 31.31, respectively. The obtained post - test F value of 276.12 was greater than the required table F value of 3.16. Hence the adjusted post - test mean value of flexibility shows significant at 0.05 level of confidence for the degrees of freedom 2 and 56. Thus the results obtained proved that the interventions namely Aerobic Dancing and Yogic Practice on flexibility produced significantly different improvements among the experimental groups.

In order to find out which training programme is to be used in the present study for the significance of adjusted means was tested by Scheffe's post hoc test. The results of the same are presented in the table I (A)

TABLE I (A)

SCHEFFE'S POST HOC VALUES OF PAIRED MEAN DIFFERENCES ON FLEXIBILITY

(Scores in centimetres)

G-1 (AD)	G-2 (YP)	G-3 (CG)	Mean Differences	Confidence Interval Value
36.95	39.75		2.80*	1.10
36.95		31.31	5.63*	1.10
	39.75	31.31	8.44*	1.10

* Significant at 0.05 level.

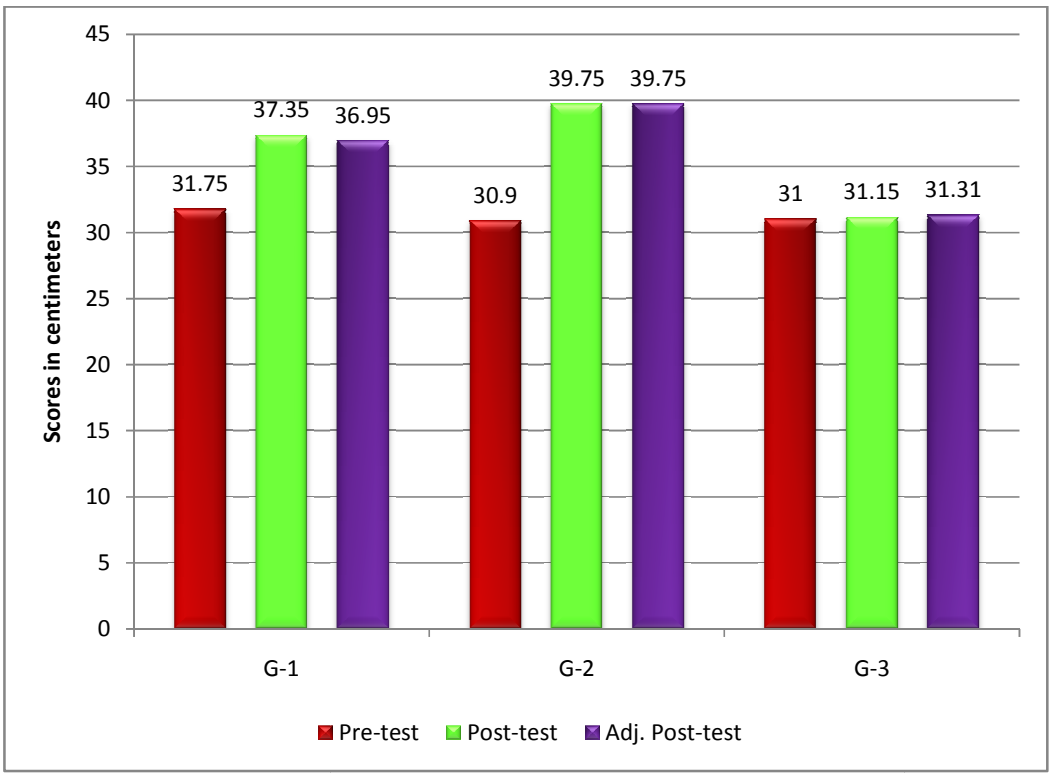
From Table I (A), Scheffe's test shows the significant difference of paired adjusted post test means of Aerobic Dancing group, Yogic Practices group and Control group on flexibility. The obtained mean differences between Aerobic Dancing group and Yogic practice group, Aerobic Dancing and Control group, Yogic Practices group and Control group were 2.80, 5.63 and 8.44 respectively. The required confidence interval value was 1.10.

Since the obtained mean difference between experimental group and control group were greater than the confidential interval value on flexibility, it was concluded that aerobic dancing group and yoga practice group improve the flexibility better than the control group. Further it was concluded that the yoga practice group improved flexibility better than aerobic dancing group.

FIGURE -1

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON FLEXIBILITY

(Scores in centimetres)



G1 - Aerobic Dancing

G2 - Yogic Practices

G 3 - Control Group

4.2.2 Discussion of Findings on Flexibility

Flexibility is an important, yet often neglected, component of health-related fitness. Adequate levels of flexibility are needed for maintenance of functional independence and performance of activities of daily living such as bending to pick up a newspaper or getting out of the backseat of a car. Over the years, flexibility tests have been included in most health-related fitness test batteries, since it has been thought that lack of flexibility is associated with musculoskeletal injuries and low back pain. However, compared to research on other physical fitness components, there are not many studies substantiating the importance of flexibility to health-related fitness. A few evidences suggests that females generally are more flexible than males at all ages (Alter 1996; Payne et al. 2000). The greater flexibility of women is usually attributed to gender differences in pelvic structure and hormones that may affect connective tissue laxity (Alter 1996). However, the effect of gender on ROM appears to be joint and motion specific. Females tend to have more hip flexion and spinal lateral flexion than males of the same age. On the other hand, males have greater ROM in hip extension and spinal flexion and extension in the thoracolumbar region (Norkin and White 1995).

After analysing the results, the researcher has found that there were significant differences among the experimental and control group and there was a significant improvement on the experimental groups on flexibility. The selected training group has significantly improved the flexibility from the base line to post training. The aerobic dancing group pre (31.75 $\pm$ 2.34) to post (37.35 $\pm$ 2.13) and yogic practice group from pre (30.90 $\pm$ 2.53) to post (39.75 $\pm$ 2.00) have significantly improved in pre to post in the two experimental groups with no change in control group.

The present study demonstrates an increase in flexibility of 0.05%, and 0.08% for aerobic dancing and yogic practice respectively. However the yogic practice produced greater improvement than the other groups. The result of this study indicates that flexibility performance increased significantly over the twelve weeks training period for Aerobic dancing and yogic practice groups; However, the difference among the two experimental groups were significant. The Yogic practice group produces higherimprovement than the aerobic dancing and control group. The Aerobic dancing group shows less improvement on flexibility. The control group did not produce any significant improvement on flexibility.

Chen TL, Maohc, Laich, Licy, Kuoch, (2009) conducted a study on the effect of yoga exercise intervention on health related physical fitness in school-age asthmatic children. For this they selected 31 voluntary children (exercise group 16; control group 15) aged between 7 to 12 years. Those children were purposively sampled from one public elementary school in Taipei Country. The yoga exercise programme was practiced by the exercise group three times per week for a consecutive seven week period. The variables which were selected by them were muscular strength and flexibility. These variables served as criterion variables for they been assessed with the help of standardized test items i.e., pushups for muscular strength and sit and reach test. The data was collected before and after training period. A total of 31 subjects (exercise group 16; control group 14) completed follow-up. The GEE analysis showed that yoga exercise indeed improved muscular strength and flexibility after yoga practice.

The above mentioned study lends support to the results of the present study.

4.3 Comparison of Cardio Respiratory Endurance in the Experimental Groups and Control Group

The data on scores of cardio respiratory endurance were collected from the experimental group and control group. The pre test, post test, and adjusted post test mean and standard deviation along with respective ANCOVA table are given in table II.

TABLE II

ANALYSIS OF CO VARIANCE OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON CARDIO RESPIRATORY ENDURANCE

(Scores in meters)

Test	G-1 (AD)	G-2 (YP)	G-3 (CG)	Source of Variance	Sum of Square	Df	Mean Square	Obtained 'F" Ratio
Pre Test								
Mean	1850	1846	1863.5	Between	3363.33	2	1681.67	0.48
SD	59.58	39.17	69.45	Within	198135.00	57	3476.05	
Post Test								
Mean	1914	1874.5	1864.5	Between	27403.33	2	13701.67	4.80*
SD	43.06	38.79	69.10	Within	162670	57	2853.86	
Adjusted Post Test								
Mean	1916.74	1874.5	1855.56	Between	37542.48	2	18771.24	72.53*
				Within	14492.70	56	258.80	

* Significant at 0.05 level. (The table values required for significance at 0.05 level of confidence for 2 and 57 and 2 and 56 are 3.16).

4.3.1 Results on cardio respiratory endurance

Pre - Test: The mean and standard deviation of the pretest cardio respiratory endurance scores of G1, G2, and G3 are 1850.00 ± 59.58, 1846.00 ± 39.17, 1863.50 ± 69.45, respectively. The obtained pre test F value of 0.48 was less than the required table F value of 3.16. Hence the pre test means value of cardio respiratory endurance show insignificant at 0.05 level of confidence for the degrees of freedom 2 and 57.

Post - Test: The mean and standard deviation of the post- test cardio respiratory endurance scores of G1, G2, and G3 are 1914.00 ± 43.06, 1874.50 ± 38.79, 1864.50 ± 69.10, respectively. The obtained post test F value of 4.80 was greater than the required table F value of 3.16. Hence the post- test means value of cardio respiratory endurance show significant at 0.05 level of confidence for the degrees of freedom 2 and 57. Thus, the results obtained proved that the interventions namely Aerobic Dancing and Yogic Practice on cardio respiratory endurance produced significant difference among the experimental groups.

Adjusted Post - Test: The mean of the adjusted post - test cardio respiratory endurance scores of G1, G2, and G3 are 1916.74, 1874.50 and 1855.56, respectively. The obtained post - test F value of 72.53 was greater than the required table F value of 3.16. Hence the adjusted post - test means value of cardio respiratory endurance show significant at 0.05 level of confidence for the degrees of freedom 2 and 56. Thus, the results obtained proved that the interventions namely Aerobic Dancing and Yogic Practice on cardio respiratory endurance produced significantly different improvements among the experimental groups.

In order to find out which training programme used in the present study was the source for the significance of adjusted means was tested by Scheffe's post hoc test. The results of the same are presented in the table II (A)

TABLE II (A)

SCHEFFE'S POST HOC VALUES OF PAIRED MEAN DIFFERENCES ON CARDIO RESPIRATORY ENDURANCE

(Scores in meters)

G-1 (AD)	G-2 (YP)	G-3 (CG)	Mean Differences	Confidence Interval Value
1916.74	1874.50		42.24*	14.90
1916.74		1855.56	61.17*	14.90
	1874.50	1855.56	18.94*	14.90

* Significant at 0.05 level.

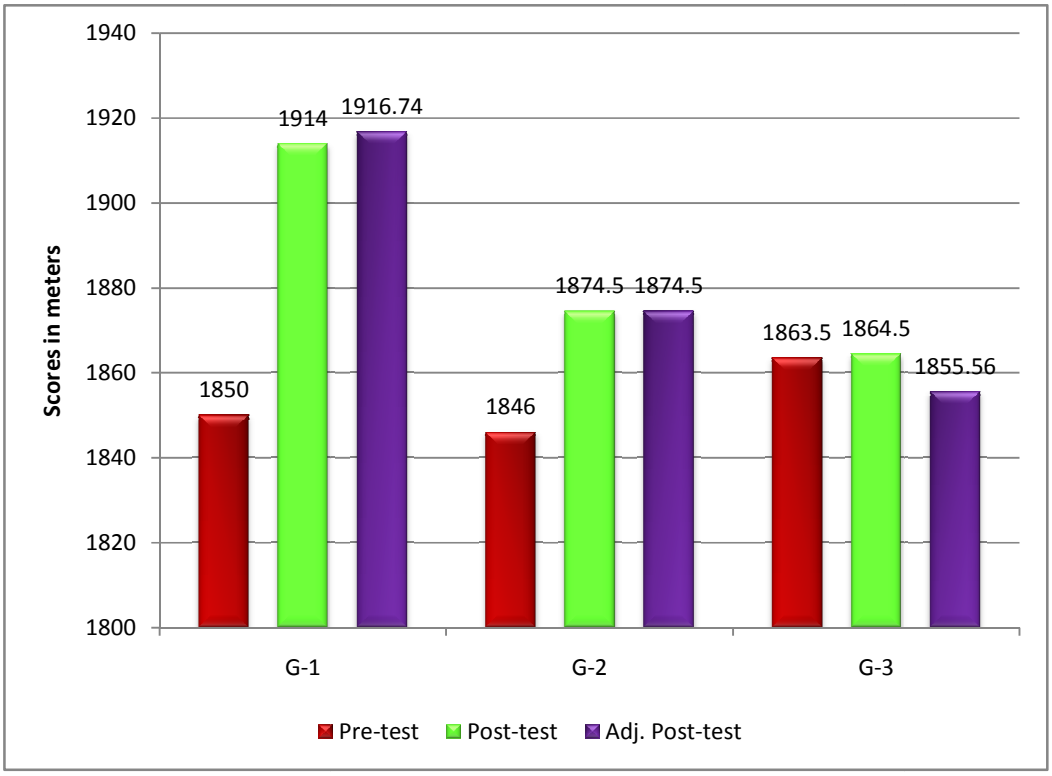
Table II (A) shows the significant difference of paired adjusted post test means of Aerobic Dancing group, Yogic Practices group and Control group on cardio respiratory endurance. The obtained mean differences between Aerobic Dancing group and Yogic Practice group, Aerobic Dancing group and Control group, Yogic Practices group and Control group were 42.24, 61.17 and 18.94 respectively. The required confidence interval value was 14.90.

Since the obtained mean difference between experimental group and control group were greater than the confidential interval value on cardio respiratory endurance, it was concluded that aerobic dancing group and yoga practice group improve the cardio respiratory endurance better than the control group. Further it was concluded that the aerobic dancing group improved cardio respiratory endurance better than yogic practices group.

FIGURE -2

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON CARDIO RESPIRATORY ENDURANCE

(Scores in meters)



G1 - Aerobic Dancing

G2 - Yogic Practices

G 3 - Control Group

4.3.2 DISCUSSION OF FINDINGS ON CARDIO RESPIRATORY ENDURANCE

Cardio-respiratory function is based on the joint effort produced by the circulatory and respiratory systems. The more efficient the cardio-respiratory function; the longer will be a person able to sustain work. It is regarded as the most important of all the basic components of health and performance related to sports activities because of the benefits which are derived from improved cardio-respiratory function such as the potential it has for preventing circulatory and respiratory diseases, improving work capacity and providing greater distance from fatigue. If this function is properly developed it can render a major contribution to the performance oriented sports. One of the most important components of physical fitness is cardio respiratory endurance. Cardio respiratory endurance is the ability to perform dynamic exercise involving large muscle groups at moderate-to-high intensity for prolonged periods (American College of Sports Medicine (ACSM) 2010). Every physical fitness evaluation should include an assessment of cardio respiratory function during rest time and doing exercises.

After analysing the results, the researcher found that there were significant differences among the experimental and control group and there was a significant improvement on the experimental groups on cardio respiratory endurance. The selected training group has significantly improved the cardio respiratory endurance from the base line to post training. The aerobic dancing group pre (1850 $\pm$ 59.58) to post (1914 $\pm$ 43.06) and yogic practice group from pre (1846 $\pm$ 39.17) to post (1874.50 $\pm$ 38.79) have significantly improved pre to post in the two experimental groups with no change in control group. The present study demonstrates an increase in cardio respiratory endurance of 0.64%, and 0.28% for aerobic dancing and yogic practice respectively. However the

aerobic dance training produced greater improvement than the other groups. The result of this study indicates that cardio respiratory endurance increased significantly over the twelve weeks training period for Aerobic dancing and Yogic practice groups; However, the difference among the two experimental groups were significant. The Aerobic dancing group significantly increased cardio respiratory endurance performance over twelve weeks training than the Yogic practice group and control group. The Yogic practice group produces less improvement on cardio respiratory endurance. The control group did not produce any significant improvement on cardio respiratory endurance.

Toy (2008) conducted a study on the effect of aerobic dance training on physiological variables among middle aged women. Twenty subjects were selected to experimental group (N: 10) and control group (N: 10) for this study. The experimental group underwent twelve weeks of aerobic dance training. After twelve weeks of aerobic dance training, there was a significant improvement on cardio respiratory fitness. This study highlights that systematic aerobic dance training helps to increase the physical and cardio respiratory fitness among middle aged women.

Hopkins(1990) determines the effect of low impact aerobic dance on sedentary elderly women (N=53), and functions fitness were measured by items from the proposed American Alliance Health, Physical Education Recreation and Dance (AAHPERD) fitness test for older adults. After 12 weeks of low impact aerobic dance, the group improved significantly on all functional fitness components except motor control, coordination, including cardio respiratory, strength /endurance.

The above mentioned studies lend support to the results of the present study.

4.4 Comparison of Muscular Strength Endurance in the Experimental Groups and Control Group

The data on scores of muscular strength endurance were collected from the experimental group and control group. The pre test, post test, and adjusted post test mean and standard deviation along with respective ANCOVA table are given in table III.

TABLE III

ANALYSIS OF CO VARIANCE OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON MUSCULAR STRENGTH ENDURANCE

(Scores in numbers)

Test	G-1 (AD)	G-2 (YP)	G-3 (CG)	Source of Variance	Sum of Square	Df	Mean Square	Obtained 'F" Ratio
Pre Test								
Mean	12.35	13.10	12.55	Between	6.03	2	3.02	0.83
SD	1.85	1.79	1.94	Within	207.30	57	3.64	
Post Test								
Mean	14.00	16.35	12.60	Between	143.63	2	71.82	19.37*
SD	1.95	1.59	2.06	Within	211.35	57	3.71	
Adjusted Post Test								
Mean	14.29	16.35	12.71	Between	774.96	2	387.48	77.05
				Within	78.58	56	1.40	

* Significant at 0.05 level. (The table values required for significance at 0.05 level of confidence for 2 and 57 and 2 and 56 are 3.16.)

4.4.1 Results on Muscular Strength Endurance

Pre - Test: The mean and standard deviation of the pretest muscular strength endurance scores of G1, G2 and G3 are 12.35± 1.85, 13.10± 1.79, 12.55 ± 1.94 respectively. The obtained pre test F value of 0.83 was less than the required table F value of 3.16. Hence the pre test means value of muscular strength endurance show insignificant at 0.05 level of confidence for the degrees of freedom 2 and 57.

Post - Test: The mean and standard deviation of the post - test muscular strength endurance scores of G1, G2, and G3 are 14.00± 1.95, 16.35± 1.59, 12.60± 2.06 respectively.. The obtained post test F value of 19.37 was greater than the required table F value of 3.16. Hence the post- test means value of muscular strength endurance show significant at 0.05 level of confidence for the degrees of freedom 2 and 57. Thus, the results obtained proved that the interventions namely Aerobic Dancing and Yogic Practice on muscular strength endurance produced significantly different improvements among the experimental groups.

Adjusted Post - Test: The mean of the adjusted post - test muscular strength endurance scores of G1, G2, and G3 are 14.29, 16.35 and 12.71, respectively. The obtained post – test F value of 77.05 was greater than the required table F value of 3.16. Hence, the post - test means value of muscular strength endurance show significant at 0.05 level of confidence for the degrees of freedom 2 and 56. Thus, the results obtained proved that the interventions namely Aerobic Dancing and Yogic Practice on muscular strength endurance produced significantly different improvements among the experimental groups.

In order to find out which training programme used in the present study was the source for the significance of adjusted means was tested by Scheffe's post hoc test. The results of the same are presented in the table III (A)

TABLE III (A)

SCHEFFE'S POST HOC VALUES OF PAIRED MEAN DIFFERENCES ON MUSCULAR STRENGTH ENDURANCE

(Scores in numbers)

G-1 (AD)	G-2 (YP)	G-3 (CG)	Mean Differences	Confidence Interval Value
14.29	16.35		2.06*	0.76
14.29		12.71	1.58*	0.76
	16.35	12.71	3.64*	0.76

* Significant at 0.05 level.

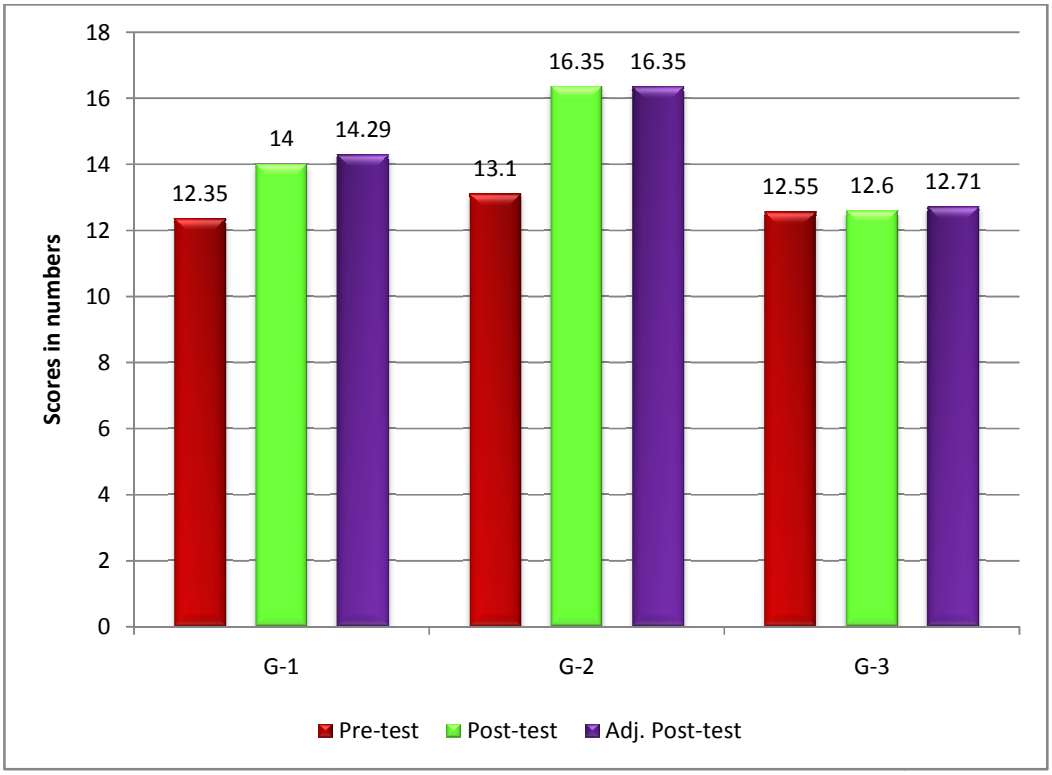
Table III (A) shows the significant difference of paired adjusted post test means of Aerobic Dancing group, Yogic Practices group and Control group on Muscular Strength Endurance. The obtained mean differences between Aerobic Dancing group and Yogic Practice group, Aerobic Dancing group and Control group, Yogic Practices group and Control group were 2.06, 1.58 and 3.64 respectively. The required confidence interval value was 0.76.

Since the obtained mean difference between experimental group and control group were greater than the confidential interval value on muscular strength endurance, it was concluded that aerobic dancing group and yoga practice group improve the muscular strength endurance better than the control group. Further, it was concluded that the yoga practice group improved muscular strength endurance better than aerobic dancing group.

FIGURE – 3

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON MUSCULAR STRENGTH ENDURANCE

(Scores in numbers)



G1 - Aerobic Dancing

G2 - Yogic Practices

G 3 - Control Group

4.4.2 Discussion of Findings on Muscular Strength Endurance

Muscular Endurance is the ability of the muscles to exert force over an extended period of time. Maintenance of minimum levels of trunk and hip strength/endurance are important to prevent and alleviate low back pain and tension. Muscular strength endurance is important in almost all sports activities. The functioning capacity of vital organs such as those of respiratory, circulatory and digestive systems depend upon the condition of voluntary muscles.

After analysing the results, the researcher found that there were significant differences among the experimental and control group and there was a significant improvement on the experimental groups on muscular strength endurance.

The selected training group has significantly improved the muscular strength endurance from the base line to post training. The aerobic dancing group pre (12.35 $\pm$ 1.85) to post (14.00 $\pm$ 1.95) and yogic practice group from pre (13.10 $\pm$ 1.79) to post (16.35 $\pm$ 1.59) have significantly improved pre to post in the two experimental groups with no change in control group.

The present study demonstrates an increase in the muscular strength endurance of 0.01%, and 0.03% for aerobic dancing and yogic practice respectively. However, the yogic practices produced greater improvement than the other groups.

The result of this study indicates that muscular strength endurance performance increased significantly over the twelve weeks training period for Aerobic dancing and yogic practice groups; However, the difference among the two experimental groups were significant.

The Yogic practice group produces greater improvement than the aerobic dancing group and control group. The Aerobic dancing group shows less improvement on muscular strength endurance. The control group did not produce any significant improvement on muscular strength endurance.

Bharatha priya and Gopinath (2011) conducted a study on the effect of yogic practices on abdominal strength among school boys. Forty subjects were divided into two groups namely the control and the experimental group. The experimental group underwent selected asanas and pranayama for five days per week for twelve weeks. The findings of abdominal strength show a significant improvement due to the twelve weeks yogic practice when compared to the control group.

Chai-Lin Li , Tseng and Jen Lee (2006) conducted a study on the effects of aerobic exercise intervention with goals of improving health-related physical fitness among selected adults. Fifty four subjects were selected as subjects. The subjects in exercise group participated in a 12-weeks aerobic exercise programme, while control group did not undergo any training programme rather than their routine work. The abdominal muscle strength was measured by using sit ups. The results of pre-test and post-test were compared by using Analysis of variance with repeated measures of health-related physical fitness which showed that the subjects in the exercise group had significantly more improvement in abdominal muscle strength than the subjects in the control group.

The above mentioned studies lend support to the results of the present study.