CHAPTER III

METHODOLOGY

In this chapter selection of subjects, selection of variables, experimental design, reliability of data, training schedule, training program, collection of data and statistical technique have explained.

3.1. SELECTION OF SUBJECTS

For the present investigation BMI Weight Status Categories forty-five (45) college men obese students were selected by BMI Weight Status Categories from Dr..M.G.R University, Maduravoyil, Chennai. Totally Twelve weeks of training was given of Aerobic rhythmic exercise and Weight training to the subjects. The subjects were assigned to two Groups namely experimental group I, experimental group II, and Control group. Each group consists of 15 subjects. Aerobic rhythmic exercise and Weight training were given to Experimental Group I and Experimental Group II respectively, no training was provided to Control group as listed below.

Experimental Group 'I' - (Aerobic rhythmic exercise Training)

Experimental Group 'II' - (Weight Training)

Control Group - No training

3.1.1. Subjects Orientation

The investigator held a meeting with the subjects prior to the administration of tests. The purpose, the significance of this study, and the requirements of the testing procedure were explained to them in detail, so that there was no ambiguity in their minds, regarding the efforts required of them. At the commencement of the training programme, the subjects were assembled and were given a thorough orientation on the requirements and objectives of the research.

3.2. SELECTION OF VARIABLES

The investigator reviewed the available scientific literature pertaining to the study from books, journals, periodicals, magazines, research papers, and available sources Tamilnadu Physical Education and Sports University, M.G.R University, Maduravoyil, Chennai libraries, and also with help of experts.

3.2.1. Selection of the Dependent Variables

Physiological variables

a. Resting Pulse Rate

b. VO_2 Max

c. Mean Arterial Blood Pressure.

Hematological variables

1. Hemoglobin count

2. Red Blood Cells (RBC)

3. White Blood Cells (WBC)

Kin anthropometric Variables

1. Fat mass

2. Lean Body Mass

3.2.2. Selection of the Independent Variables

a. Experimental Group I -Aerobic rhythmic exercise Training

b. Experimental Group II – Weight Training

c. Group 'III' - (Control group, No training was provided).

3.3. PILOT STUDY

The Pilot Study was conducted with five players from each group (college men obese students) and their difficulties were noted and rectified. The calculated intra-class correlation of the pilot there was a significant improvement in health related physiological, hematological, and kin anthropometric variables. This enabled the investigator to adopt a suitable training schedule for the study.

3.4. CRITERION MEASURES

Physiological variables

a. **Resting Pulse Rate** - Citizen Make digital B.P monitor.

b. **VO_2 Max** - was assessed using Cooper's Test.

c. **Mean Arterial Blood Pressure** - P mean = Diastolic pressure + 1/3 pulse Pressure.

Hematological Variables

a. Hemoglobin count - Blood Samples (Standard Laboratory)

b. Red Blood Cells - Blood Samples (Standard Laboratory)

c. White Blood Cells - Blood Samples (Standard Laboratory)

Kin anthropometric Variables

a. **Fat mass -** Omron body fat monitor and weighing machine (Fat mass (kg) = percentage fat X body weight (kg)

b. **Lean Body Mass -** weighing machine and fat mass (Lean Body Mass (kg) = body weight (kg) – Fat Mass (kg)

3.5. RELIABILITY OF DATA

Test and Retest methods was followed in the order to establish the reliability of the data by using 45 subjects. All the variables selected in the present study were tested twice for the subjects by same person under similar conditions then the reliability was established by using intraclass correlation coefficient of test and test scores.

3.5.1. RELIABILITY OF THE TESTS

Tester's competency was evaluated with the reliability of the tests. Reliability of the test was established by test-retest method whereby the consistencies of results were obtained by intra-class correlation. The repeated measurement of individuals on the same test was to determine reliability, as it was univariate not a bivariate situation. It is the distribution of a single variable. It makes sense, then to use a univariate statistic like Intra-class correlation co-efficient.

3.5.2. RELIABILITY OF INSTRUMENT

All the equipment which were used in the study all that equipment had been obtained from slandered firms which cater to need of various research laboratories in India and abroad and their calibrations were accepted as enough for the purpose of the study.

3.5.3. SUBJECT'S RELIABILITY

The Intra-class correlation coefficient of test-retest values also determined that subject reliability was adequate as the same tester used the same subjects under similar conditions. Motivation techniques were not used. In order to get uniform results from the subjects, they were oriented about the study prior to the conduct of the test. The test-retest methods were used to find out the subject's reliability.

3.5.4. INSTRUMENT RELIABILITY

The investigator learnt the procedure and methods to handle and operate the instruments to administer the tests. The services of qualified assistance were used while taking the measurements.

All the equipment which were used in the study had been obtained from standard firms which catered to the need of various research laboratories in India and abroad. All instruments were available in Mukesh Diagnostic Center, Chennai, and their calibrations were accepted as enough for the study.

3.5.5. TESTER'S RELIABILITY

The repeated measurement of individuals on the same test is done to determine reliability, is either a univariate or a bivariate situation. It is the distribution of a single variable like an Intra Class correlation co-efficient Baumgarrter and Jocker (2004). The Intra Class correlation coefficient obtained for test-retest are presented in Table - I

TABLE - I

INTRA CLASS CORRELATION CO-EFFICIENT OF TEST – RETEST

Test	Instruments	r
Resting Pulse Rate	Digital Monitor (citizen equipment)	**0.92***
VO_2 Max	was assessed using Cooper's Test	**0.96***
Mean Arterial Blood Pressure	P mean = Diastolic pressure + 1/3 pulse pressure Digital Monitor (citizen equipment).	**0.97***
Hemoglobin	Blood Samples (Standard Laboratory)	**0.93***
Red Blood Corpuscles	Blood Samples (Standard Laboratory)	**0.95***
White Blood Corpuscles	Blood Samples (Standard Laboratory)	**0.91***
Fat Mass	Omron body fat monitor and weighing machine	**0.97***
Lean Body Mass	weighing machine and fat mass	**0.96***

* Significant at o.o1 level

3.6. EXPERIMENTAL DESIGN

The study was formulated as a truly random group design, consisting of a pre-test and post-test. The forty-five subjects were randomly assigned to three equal groups of fifteen college men obese students each. The groups were assigned as aerobic rhythmic exercises group, weight training group, and control group respectively. The Pre-test was conducted for all the forty-five subjects on selected physiological, hematological, and kin anthropometric variables the college men obese students.

Aerobic rhythmic exercises were given to the Experimental Group - I for five days a week for twelve weeks, Weight training was given to Experimental Group - II for five days in a week for twelve weeks in a week for 45 - 60 minutes, and control group was left on their own.

The Post test was conducted on the dependent variables after twelve weeks of Aerobic rhythmic exercises (Experimental Group - I) Weight training (Experimental Group - II).

TABLE - I

TRAINING PROGRAMME FOR EXPERIMENTAL GROUPS

GROUPS	**PROGRAMMES**
Experimental Group - I	Aerobic rhythmic exercise Training
Experimental Group - II	Weight Training
Control Group	No training

3.6.1. Experimental Group - I (Aerobic rhythmic exercise Training)

Aerobic exercise (also known as cardio) is a physical exercise of low to high intensity that depends primarily on the aerobic energy-generating process. Generally, light-to-moderate intensity activities that are sufficiently supported by aerobic metabolism can be performed for extended periods. Doing aerobics regularly can decisively improve heart rate, body condition, and state of mind. Aerobic exercise gets the heart working to pump blood through the heart more quickly and with more force than normal. As blood is pumped faster, it must be oxygenated more quickly, which quickens respiration. Aerobic exercise strengthens the heart and boosts healthy cholesterol levels. Over 20 years of research has shown that aerobic exercise is one of the best exercises. Aerobics conditions heart and lung, helps to use oxygen more efficiently and helps control weight, and reduces stress. Aerobics helps relax tense muscles, and regular aerobics activity increases the body's production of endorphins (a natural sedative) and catecholamine (chemical substances that help stabilize moods).

The major benefits of aerobic exercises are a stronger and more efficiently operating heart and lungs more energy physical flexibility, conditioned muscles, proper use of fats, and effective burning of calories The increased oxygen flow gained through aerobics re-energizes by giving more energy and a ‘re-awakening ‘of senses.

TABLE – II

AEROBIC RHYTHMIC EXERCISE TRAINING PROGRAMME

(FLOOR)

Weeks	Floor Aerobics	Duration	Intensity	Counts	Sets	Rest Between the sets
1-4	Side to Side	15-20 Mins	40 to 60%	20-24	2	30 – 60 sec
	Grapevine					
	Double Side to Side					
	Cross Over Step					
	Knee Curl					
	Front Kick					
5-8	Touch Out	20-25 Mins	50 to 70%	24-28	3	60- 90 sec
	Side Kick					
	Knee and Arm Lift					
	Jump on the Spot					
	Cross Over Step					
	Knee Curl					
9-12	Grapevine	25-30 Mins	60 to 80%	28-32	4	90 – 120 sec
	Double Side to Side					
	Cross Over Step					
	Jump on the Spot					
	Knee Curl					
	Front Kick					

FLOOR AEROBICS

Floor aerobics is a form of aerobic power distinguished from other types of aerobic exercise performed on the plain floor. The floor must be safe without any protrude and safe in manner. Floor aerobics are done with a count. Floor aerobics was developed in a manner to avoid doing exercise in an open place. Day by day the women took the advantageous that is to be performed.

TABLE – III

AEROBIC RHYTHMIC EXERCISE TRAINING PROGRAMME (STEP)

Weeks	Step Aerobics	Duration	Intensity	Counts	Sets	Rest Between the sets
1-4	Leg Curl Toe Tap L Step Turn Step Slice Back Lunging	15-20 Mins	40 to 60%	20-24	2	30 – 60 sec
5-8	V Step Bench Step Step Touch Straddle Down Slice Back Lunging	20-25 Mins	50 to 70%	24-28	3	60- 90 sec
9-12	A Step Kick Forward Step Touch Knee Up Bouble Step Side Toe Tap	25-30 Mins	60 to 80%	28-32	4	90 – 120 sec

STEP AEROBICS

Step aerobics is a form of aerobic power distinguished from other types of aerobic exercise by its use of an elevated platform (the step). The height can be tailored to individual needs by inserting risers under the step. Step aerobics classes are offered at many gyms and fitness centers that have a group exercise program. Step aerobics was innovated by Gin Miller around 1989. After a knee injury, Gin consulted with an orthopedic doctor, who recommended she strengthen the muscles supporting the knee by stepping up and down on a milk crate and from this, she developed the step regimen.

3.6.2. EXPERIMENTAL GROUP - II (WEIGHT TRAINING)

Weight Training programme differs in the land, a number of repetition, sets, rest interval and is based on the individuals physical fitness. Some individual train for bulk, and others for definitions. Some train for strength and others for speed. In the case of basketball, strength is needed in the form of speed. This is known as power and can be defined as force ties distance or the rate at which work is done. In other words, explosive type movements are desirable in a weight programme for basketball players. Though major muscle groups of the body are involved in college men obese students since the hips and legs are responsible for jumping and running, they get first priority. Muscle groups involved include the quadriceps, hamstrings, gastroncnemius, and those associated with the hips such as gluteus and adductor muscles. The smaller muscles of the upper body which are used are the deltoids, triceps, biceps forearm, and pectoral’s groups.

Weight training for basketball should be as specific to the sports as possible. Each exercise movement should correlate highly with the movements involved in the sports. Since Basketball is a very quick and powerful game, the exercises chosen were powerful. At the same time, the training programme should be well rounded and geared towards total body strengthening. Keeping this in mind the above concepts the following weight training exercise were given to the weight training group.

TABLE - IV

TWELVE WEEKS WEIGHT TRAINING PROGRAMME

WITH TARGET PERCENT 1 RM

Weekly Schedule	Muscle	Duration	Set	Repetition	Target 91 Rep.) % of Maximum
1 to 3	A. Major Muscle Groups Exercises 1, 2, 3, 4, 10	60 mins	3	8 to 10	60 - 70
	B. Exercises 5, 6, 7, 8, 9		1	6 to 7	30 - 35
4 to 6	A. Major Muscle Groups Exercises 1, 2, 3, 4, 10	60 mins	4	8 to 10	70 - 75
	B. Exercises 5, 6, 7, 8, 9		2	7 to 8	35 - 40
7 to 9	A. Major Muscle Groups Exercises 1, 2, 3, 4, 10	60 mins	5	8 to 10	75 - 80
	B. Exercises 5, 6, 7, 8, 9		3	8 to 9	40 - 45
10 to 12	A. Major Muscle Groups Exercises 1, 2, 3, 4, 10	60 min	5	10	80 - 85
	B. Exercises 5, 6, 7, 8, 9		4	10	45 -50

3.7. TEST ADMINISTRATION

The administration of the test and the method of collecting data are explained at this time.

3.7.1.PHYSIOLOGICAL VARIABLES

3.7.1.1. RESTING PULSE RATE

Purpose

The purpose of this test is to measure the resting pulse rate at rest.

Equipment

Citizens make digital portable blood Pressure monitors.

Procedure

The pulse rate of all the subjects was recorded in a sitting position, in the evening between 4 and 5 p.m. Before taking pulse rate the subjects were asked to relax for about 30minutes.

Then the subjects were instructed to sit in a back supported chair and maintain in a slight incline position and placed their left hand on the table. Next, the researcher was collected Heart Rate or pulse rate by using a Digital Heart Rate measuring machine which was placed in the chest level on a table. In this way, the researcher has measured the heart rate of the subject.

Scoring

The resting pulse rate is indicated in the digital monitor.

3.7.1.2. MEAN ARTERIAL BLOOD PRESSURE

Objective

The purpose of the test was to measure the systolic and diastolic blood pressure.

Equipment

A dial type of sphygmomanometer and stethoscope a chart and a table were used for recording the blood pressure.

Administration

The blood pressure for all the subjects was checked in the morning. The subjects were given adequate time to relax in a chair in a comfortable position so that the normal pressure was restored. While taxing the blood pressure the subject's right arm was completely made bare to make certain that the clothes did not compress the blood vessels. The instrument was kept at the level of the heart on the table. The blood pressure measurement was taken with the subject in a sitting position the forearm being kept straight in a relaxed position on the table. The pressure cuff was wrapped around the arm evenly the lower edge being placed approximately one inch above the anticubical space. Care was taken that the stethoscope was not in contact with the cuff. The cuff was inflated until the artery was fully pressed so that no heartbeat could be learned.

When the heartbeat was not audible air was released by opening the air valve of the rubber tube and the systolic stroke the heart sent to spurt into the artery and at

the peak of the systolic stroke, the first heartbeat becomes audible at which instant the read in millimeter of measuring (mmHg) was recorded with the gradual release of air, the heartbeat become muffled and then disappeared. This indicated blood pressure at the diastolic stage and the reading was noted in mm Hg.

Like the same blood pressure was recorded after the Brisk Walking exercise was over.

Mean arterial pressure

Mean arterial pressure also measured by using the formula.

P mean = Diastolic pressure + 1/3 pulse pressure.

Pulse pressure is the difference between systolic pressure and diastolic pressure. (Mathew, 1988)

3.7.1.3. VO_2 MAX

To ascertain VO_2 Max of the subjects, Cooper's formulae were used, and accordingly Cooper's 12 Minutes run / Walk Test was administered

Purpose

To measure the VO_2 max (cardio respiratory endurance)

Equipment

Whistle, stopwatch, 400 meters track.

Description

Cooper's twelve-minute run/walk test was administered with the help of qualified testers. For this test, 400 meters track was prepared with marking at every tenth meter. The investigator and the testers served as the lap scorers. The subjects were asked to stand on the starting arc drawn at the finish line of the 400 meters track and they were given instructions to cover as much distance as possible by running/walking. They were instructed to continue the run / walk till the final whistle. The race was started with a whistle and at the end of the twelfth minute again the whistle was blown. The number of minutes left was announced to the subjects every minute. At the twelfth minute a long whistle was blown and the subjects stopped instantly and stood on that spot. The lap scorers must rush to the spot and take the reading in nearest tenth meter.

Scoring

The distance in meters covered in 12 minutes. The VO2 max in ml/min/kg was calculated based on the formulae suggested by Cooper (1960) was:

$$\mathrm{VO_2\ max} = \frac{d_{12} - 505}{45}$$

Where d_{12} is the distance (in meters) covered in 12 minutes.

3.7.2. HEMATOLOGICAL VARIABLES

3.7.2.1 HEMOGLOBIN

Purpose

To find out the total hemoglobin count.

Equipments

Syringe, Test tubes, Microscope

Method used

Cyana methoglobin method.

Procedure

Take clean and dry pencilin bottle to add 5ml of Hemoglobin solution, add 20 micro liter of fresh blood mix well, and wait for 5 minutes take the reading calorio meter for 540 nanometer (green filter).

Normal **:** 12.00 to 16.00 gms

3.7.2.2.RBC TEST

Purpose

To find out the total RBC counts.

Equipments

Syringe, Test tubes, Microscope

Procedure

Take the RBC micro pipette draw 0.5 ml of fresh blood and again draw 101 marking hayms fluid shake the pipette mix for bead wait for 5 minutes charge the counting chamber count the cells for centre square (25small square)

3.7.2.3.WBC TEST

Purpose

To find out the total WBC counts.

Equipments

Syringe, Test tubes, Microscope

Procedure

Total WBC cells are increased in the blood is called leukemia; there are different types of leukemia.

- Chronic myeloid leukemia
- Myeloid leukemia

Take clean and dry pencilin bottle add 0.38 ml of truks fluid, add 20 micro liter of fresh blood mix well take the counting chamber put the coverslip change one drop of solution. Count the cells for 10* (low power objective microscope) count four corner square * 50.

Example **:** 208 * 50.

Normal **:** 3.50 to 5.50 million cells/cumm

3.7.3.KIN ANTHROPOMETRIC VARIABLES

3.7.3.1. FAT MASS

Purpose:

To assess the subjects fat mass.

Procedure:

Subject's percentage of fat and body weight was measured by using Omron body fat monitor and weighing machine respectively. Fat-free mass was calculated by the following formula.

Scoring:

Fat mass (kg) = percentage fat X body weight (kg)

3.7.3.2. LEAN BODY MASS

Purpose:

To assess the subjects fat mass.

Procedure:

Subject's body weight was measured by using a weighing machine and fat mass was measured by using the formula fat mass (kg) = percentage fat X body weight (kg). Lean body mass was calculated by the following formula.

Scoring:

Lean Body Mass (kg) = body weight (kg) – Fat Mass (kg)

3.8. STATISTICAL TECHNIQUE

The data obtained were analyzed by Analysis of Covariance (ANCOVA) to assess the significant difference among the groups between the pre-test and post-test on physiological, hematological, and kin anthropometric variables to find out the effects of aerobic rhythmic exercise and weight training on selected physiological, hematological and kin anthropometric variables among college men obese students. The normality of the data collected was tested through F test (ANCOVA). The data and the regression were plotted and found to be in the standing straight line and thus tested for normality of data and found the data are normal. The adjusted post test mean differences among the experimental groups were tested and if the adjusted post test result was significant the Scheffe's post hoc test was used to determine the significance of the paired means differences.

The investigator has analyzed scientific results obtained by application of various methodologies discussed above and the results are analyzed and presented in form of detailed discussion graphs and various tables in the next chapter.