CHAPTER – III

METHODOLOGY

In this chapter selection of subjects, selection of variables, experimental design, pilot study, criterion measures and selection of tests, reliability of data, reliability of instruments, reliability of questionnaire, subject reliability, orientation of the subjects, administration of test items, administration of training programs, collection of data, statistical techniques and its justification adopted for the analysis of data have been described.

3.1 SELECTION OF SUBJECTS

The purpose of the study was to find out the effect of aerobic training and circuit training on selected health related physical fitness, kinanthropometric and psychological variables among adolescent women kabaddi players.

To achieve the purpose of the present study, forty five adolescent women kabaddi players from Namakkal, Tamilnadu, India were selected as subjects at random and their ages ranged from 18 to 25 years. The subjects were divided into three equal groups of fifteen each. Group I acted as Experimental Group I (Aerobic training), Group II acted as Experimental Group II (Circuit training) Group III acted as Control Group. The requirement of the experiment procedures, testing as well as exercise schedule was explained to the subjects so as to get full co-operation of the effort required on their part and prior to the administration of the study.
3.2 SELECTION OF VARIABLES

The research scholar reviewed the available scientific literature pertaining to the problem from books, journals, magazines, websites and research papers which revealed the importance of aerobic training and circuit training. Taking into consideration of feasibility, criteria and availability of the instruments the following variables were selected for this study.

3.2.1 DEPENDENT VARIABLES

a. Health Related Physical Fitness Variables

- Muscular Strength
- Muscular Endurance
- Flexibility
- Cardio Respiratory Endurance
- Body Composition

b. Psychological Variables

- Cognitive Anxiety
- Somatic Anxiety
- Self Confidence

c. Kinanthropometric variables

- Hip Girth
- Calf Girth
3.2.2 INDEPENDENT VARIABLES

- Group I – Circuit Training Group
- Group II – Aerobic Training Group
- Group III – Control Group

3.3 EXPERIMENTAL DESIGN

The study was formulated as a true random group design, consisting of a pre-test and post-test. Forty five adolescent women kabaddi players from Namakkal, Tamilnadu, India was selected as subjects at random and their ages ranged from 18 to 25 years. The subjects (N=45) were randomly assigned to three equal groups of fifteen subjects each. Pre test was conducted for all the subjects on selected health related physical fitness, kinanthropometric and psychological variables. This initial test scores formed as pre test scores of the subjects. The groups were assigned as Experimental Group I, Experimental Group II and Control Group in an equivalent manner. Experimental Group I aerobic was exposed to circuit training, Experimental Group II was exposed to circuit training and Control Group was not exposed to any experimental training other than their regular daily activities. The duration of experimental period was 12 weeks. After the experimental treatment, all the forty five subjects were tested on their health related physical fitness, kinanthropometric and psychological variables. This final test scores formed as post test scores of the subjects. The pre test and post test scores were subjected to statistical analysis using Analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the ‘F’ ratio for adjusted test was found to be significant, Scheffe’s post hoc test was used. In all cases 0.05 level of significance was fixed to test hypotheses.
3.4 PILOT STUDY

A pilot study was conducted to assess the initial capacity of the subjects in order to fix the load. For this purpose ten subjects were selected randomly and underwent training packages under watchful eyes of the experts and the researcher. Based on the response of the subjects in the pilot study the training schedule were constructed, however the individual differences were considered while constructing the training programme. The basic principles of training (progression, over load and specificity) were also followed.

3.5 CRITERION MEASURES AND SELECTION OF TESTS

The present study was undertaken primarily to find out the effect of aerobic training and circuit training on selected health related physical fitness, kinanthropometric and psychological variables among adolescent kabaddi players.

The following tests were administered to measure the selected health related physical fitness, kinanthropometric and psychological variables. The tests were administered to the subjects before and after the training programme.
TABLE – I

TEST SELECTION

<table>
<thead>
<tr>
<th>S.No</th>
<th>Variables</th>
<th>Tests / Equipments</th>
<th>Units of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Muscular Strength</td>
<td>Flexed Arm Hang</td>
<td>Seconds</td>
</tr>
<tr>
<td>2</td>
<td>Muscular Endurance</td>
<td>Sit Ups</td>
<td>Numbers</td>
</tr>
<tr>
<td>3</td>
<td>Flexibility</td>
<td>Sit and Reach</td>
<td>Centimetres</td>
</tr>
<tr>
<td>4</td>
<td>Cardio Respiratory</td>
<td>Cooper’s 12 Min Run/</td>
<td>Metres</td>
</tr>
<tr>
<td></td>
<td>Endurance</td>
<td>Walk Test</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Body Composition</td>
<td>BMI</td>
<td>Kg/m²</td>
</tr>
<tr>
<td>6</td>
<td>Cognitive Anxiety</td>
<td>CSAI II</td>
<td>Scores</td>
</tr>
<tr>
<td>7</td>
<td>Somatic Anxiety</td>
<td></td>
<td>Scores</td>
</tr>
<tr>
<td>8</td>
<td>Self Confidence</td>
<td></td>
<td>Scores</td>
</tr>
<tr>
<td>9</td>
<td>Hip Girth</td>
<td>Anthropometric Tape</td>
<td>Centimetres</td>
</tr>
<tr>
<td>10</td>
<td>Calf Girth</td>
<td>Anthropometric Tape</td>
<td>Centimetres</td>
</tr>
</tbody>
</table>

3.6 RELIABILITY OF DATA

The reliability of data was established by using test-retest method. To achieve this purpose, ten subjects were randomly selected and the test was administered twice after a day’s gap. Care was taken to keep all testing conditions uniformly during testing and retesting. The scores recorded for the ten subjects during the test and retests were correlated using Intra Class Correlation for the different variables. The co-efficient of correlation is presented in Table – II.
### TABLE – II

RELIABILITY CO-EFFICIENT OF CORRELATION OF TEST-RETEST SCORES

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Variables</th>
<th>Co-efficient of Correlation ‘r’ (N=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Muscular Strength</td>
<td>0.90*</td>
</tr>
<tr>
<td>2</td>
<td>Muscular Endurance</td>
<td>0.92*</td>
</tr>
<tr>
<td>3</td>
<td>Flexibility</td>
<td>0.89*</td>
</tr>
<tr>
<td>4</td>
<td>Cardio Respiratory Endurance</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Body Composition</td>
<td>0.91*</td>
</tr>
<tr>
<td>6</td>
<td>Cognitive Anxiety</td>
<td>0.93*</td>
</tr>
<tr>
<td>7</td>
<td>Somatic Anxiety</td>
<td>0.94*</td>
</tr>
<tr>
<td>8</td>
<td>Self Confidence</td>
<td>0.89*</td>
</tr>
<tr>
<td>9</td>
<td>Hip Girth</td>
<td>0.96*</td>
</tr>
<tr>
<td>10</td>
<td>Calf Girth</td>
<td>0.90*</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level

3.7 RELIABILITY OF INSTRUMENT

The instrument such as sit and reach box, stop watch, anthropometric tape were reliable and accurate enough to carry out the test procedures successively.

3.8 RELIABILITY OF QUESTIONNAIRE

The questionnaire used in this study was Competitive State Anxiety Inventory-2 (CSAI-2) standardized by the authors concerned by statistically proving the validity, reliability and objectivity of the questionnaires.
3.9 TESTER’S RELIABILITY

To ensure the tester’s reliability of the tests the investigator had a number of practice sessions in the teaching procedure and well versed in the technique of conducting the test. Tester reliability of test was established by test-retest process. For this purpose ten subjects were selected at random on the chosen variables, which were recorded twice under identical conditions on different occasions by the different investigator.

3.10 SUBJECTS RELIABILITY

In order to get uniform results from the same subjects, they were used under similar conditions for the same test by the same tester. The test-retest method was used to find out the subjects reliability.

3.11 ORIENTATION TO THE SUBJECTS

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. All the subjects voluntarily came forward to co-operate in the testing procedures and the training to put in their best efforts in the interest of the scientific investigation and in order to enhance their own performance. The subjects were very enthusiastic and co-operative throughout the project.
3.12 ADMINISTRATION OF TEST ITEMS

3.12.1 Muscular Strength (Flexed-Arm Hang Test)

Purpose:
To measure muscular strength of the adolescence kabaddi players.

Equipment:
Stopwatch, Horizontal overhead bar at an adequate height, stool (optional).

Procedure:
Grasp the overhead bar. The grip for the President's Challenge allows using either an overhand grip (palms facing away from body) or underhand grip (palms facing toward body), while for Fitness Gram the overhand grip is required. Position the body with the armed flexed and the chin clearing the bar. The chest should be held close to bar with legs hanging straight. The subjects should be assisted to this position. The subject holds this position for as long as possible. Only one trial is required.

Scoring:
The total time in seconds is recorded - timing is stopped when student's chin touches or falls below the bar. The type of grip used should also be recorded with the results.

3.12.2 Muscular Endurance (Sit ups)

Purpose:
To measure the abdominal muscular endurance of the kabaddi players.

Equipment:
Mats, stop watch.
**Procedure:**

The subjects have lied flat on the back with knees have bent and have a feet on the floor with the heels no more than one foot from the buttocks. The knees angle have to should be no less than $90^\circ$ degrees. The fingers have interlocked and have placed behind the neck with the elbows touching the floor. The feet have held securely by a partner. The subjects have curled up to a sitting position and touch the chest to, the knees.

**Scoring:**

The score is the maximum number of sit ups completed in 60 seconds.

### 3.12.3 Flexibility (Sit and Reach Test)

**Purpose:**

To measure the flexibility of the kabaddi players.

**Equipments:**

Sit and reach apparatus, score sheet.

**Procedure:**

The sit and reach apparatus should have the 25cm mark equivalent to the point where the feet touch the box. The subject, has sit barefoot with the legs fully extended with the soles of the feet have placed flat against the horizontal cross board of the apparatus, with the inner edge of the sole have placed 2cm from the scale, keeping the knees have fully extended, arms evenly stretched and palms down. The subjects has bent and reached forward (without jerking) pushing the sliding marker along the scale.
with the fingertips as far forward as possible. The position of maximum flexion must be held for approximately two seconds. The test has repeated twice.

**Scoring:**

Record the maximum distance reached to the nearest 0.5cm.

### 3.12.4 Cardio Respiratory Endurance (Cooper’s 12 Min Run/Walk)

**Purpose:**

The purpose of this test was to assess the cardio respiratory endurance of the kabaddi players.

**Equipments:**

The test was administered in 400 meters track. A stop watch, whistle, score sheets and pencils were used to administer the test.

**Procedure:**

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 fifth 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 covered by each subject in twelve minutes were recorded to the nearest tenth meter. The distance covered by the subjects was used as a measure of cardio-respiratory endurance.

3.12.5 Body Composition (Scales and Stadiometer)

**Purpose:**

To measure the body composition of the kabaddi players.

**Equipments:**

Scales and stadiometer as for weight and height.

**Procedure:**

BMI is calculated from body mass (Weight in kg) and height in meter. $\text{BMI} = \frac{\text{Weight in kg}}{(\text{Height in meter})^2}$. The higher the score usually indicating higher levels of body fat.

**Scoring:**

Use the table below to determine the BMI rating.

<table>
<thead>
<tr>
<th>Body Mass Index</th>
<th>Weight Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18.5</td>
<td>Under weight</td>
</tr>
<tr>
<td>18.5-24.9</td>
<td>Normal</td>
</tr>
<tr>
<td>25.0-29.9</td>
<td>Overweight</td>
</tr>
<tr>
<td>30.0 and above</td>
<td>Obese</td>
</tr>
</tbody>
</table>
3.13 PSYCHOLOGICAL VARIABLES

3.13.1 COMPETITIVE SPORT ANXIETY INVENTORY – 2

Purpose:

To measure the hip girth of the kabaddi players.

Administration:

Competitive state anxiety was assessed by using the competitive state anxiety Inventory-2 (CSAI-2, martens et al. 1990) which is a self report, psychometric state anxiety inventory consisting of 27 items. The CSAI – 2 normally takes less than five minutes to complete and was administered ten minutes before competition and practice session. Before allowing subjects to begin completes the CSAI – 2, instruction was explained, and researchers ensured that all instruction was completely understood. State anxiety was measured by the competition state anxiety Inventory – 2. (CSAI – 2) Matters et al 1990). The CSAI – 2 asses ‘two components of state anxiety, cognitive worry and somatic anxiety and related constricts self-confidence. The CSAI -2 contains 9 items that reference each sub – scale. Thus, each sub-scale has range from 9 to 36. Higher scores on cognitive and somatic anxiety indicate higher level of anxiety whereas higher scores on self - confidence sub - scale correspond to higher level 02 self – confidence (Martens et al 1990 and Mckay et al. 1997).

Description of CSAI-2:

The CSAI was revised to develop a sport –specific inventory that measured the cognitive and somatic components of A-state. The CSAI –2 was originally constructed to include subscales to measure not only cognitive state anxiety and somatic anxiety
but also fear of physical harm and generalized anxiety. The development of the CSAI-2 as a sport-specific measure of multidimensional A-state followed a systematic Psychometric process. The CSAI-2 is an A-state inventory designed to measure existing state of cognitive state anxiety, somatic state anxiety, and state of self confidence in competitive situations. The CSAI-2 was constructed primarily as research tool. It was administered three hour before competition. When administering the CSAI-2, it was recommended that the title on the form given to the subjects to be Illinois self-evaluation questionnaire. This technique helps to reduce the bias to the inventory. In addition antisocial instructions given by author of CSAI-2 was committed to memory and orally communicated with conviction to the respondents. Before allowing subjects to begin completing the CSAI-2 it was made sure that whether the instructions are completely understood and particularly that responses should be based on how the respondent feels at the moment.

<table>
<thead>
<tr>
<th>Sub Scales</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Anxiety</td>
<td>1, 4, 7, 10, 13, 16, 19, 22, 25</td>
</tr>
<tr>
<td>Somatic Anxiety</td>
<td>2, 5, 8, 11, 14*, 17, 20, 23, 26</td>
</tr>
<tr>
<td>Self Confidence</td>
<td>3, 6, 9, 12, 15, 18, 21, 24, 27</td>
</tr>
</tbody>
</table>

**Scoring:**

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Some what</th>
<th>Moderately</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

* The test item 14 reversed
3.14 KINANTHROPOMETRIC VARIABLES

3.14.1 Hip Girth

**Purpose:**

To measure the hip girth of the kabaddi players.

**Equipment Required:**

Anthropometric tape.

**Procedure:**

The subject assumed a relaxed standing position with the arms folded across the thorax. The subject’s feet should be together and the glottal muscles relaxed. The girth was taken at the level of the greatest posterior protuberance of the buttocks which usually corresponds interiorly to about the level of the syphilis pubis. The anthropometric passed the tape around the hips from the side. The stub of the tape and the housing were then both held in the right hand while the anthropometrics uses the left hand to adjust the level of the tape at the back to the adjudged level of the greatest posterior protuberance of the buttocks. The anthropometric resumed control of the stub with the left hand, and using the cross-hand technique, positions the tape in front and the sides so that the tape was held in a horizontal plane at the target level. The tape was then readjusted as necessary to ensure it had not slipped and did not excessively indent the skin.

**Scoring:**

Maximum circumference of the hip girth was recorded as a score in centimeters.
3.14.2 Calf Girth

Purpose:

To measure the calf girth of the kabaddi players.

Equipment Required:

Anthropometric tape.

Procedure:

The subject assumed a relaxed standing position with the arms hanging by the sides. The subject’s feet should be separated with the weight evenly distributed. The maximum girth of the calf at the marked Medial calf skin fold site. The subject stood in an elevated position. The elevated position will make it easier for the measure to align the eyes with the tape. The kinanthropometric passed the tape around the calf and then slides the tape to the correct plane. The stub of the tape and the housing were both held in the right hand while the kinanthropometric uses the left hand to adjust the level of the tape to the marked level. The kinanthropometric resumed control of the stub with the left hand and using the cross-hand technique positions the tape so that it was held in a plane perpendicular to the axis of the leg. The tape was then readjusted as necessary to ensure it had not slipped and did not excessively indent the skin.

Scoring:

Maximum circumference of the calf girth was recorded as a score in centimeters.
3.15 TRAINING PROGRAMME

During the training period the experimental groups underwent their respective training programme in addition to their daily regular activities as per the schedule. Experimental groups namely aerobic training, circuit training underwent their respective experimental training on three alternate days per week for twelve weeks. The experimental training programmes were designed based on the resources collected from books, periodicals, e-materials and discussions with the experts. The duration of experimental training were planned for 90 minutes. The subjects reported for experimental training between 7.00 am and 8.30 am. All the subjects involved in this study were carefully monitored throughout the training programme and attained 90% of attendance.

### TABLE - III

**GENERAL STRUCTURE OF TRAINING PROGRAMS**

<table>
<thead>
<tr>
<th>GROUPS WITH TRAINING PARTICULARS</th>
<th>TRAINING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>Aerobic Training Group</td>
</tr>
<tr>
<td>Group II</td>
<td>Circuit Training Group</td>
</tr>
<tr>
<td>Group III</td>
<td>Control Group</td>
</tr>
<tr>
<td>Training Duration</td>
<td>Ninety Minutes</td>
</tr>
<tr>
<td>Training Session Per Week</td>
<td>Three Days</td>
</tr>
<tr>
<td>Total Length of Training</td>
<td>Twelve Weeks</td>
</tr>
<tr>
<td>Training Load Progression</td>
<td>Every Four Weeks</td>
</tr>
</tbody>
</table>
### TABLE – IV

**AEROBIC TRAINING PROGRAMME**

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Aerobic Training</th>
<th>Intensity</th>
<th>Repetition</th>
<th>Set</th>
<th>Frequency/Week</th>
<th>Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>Over the Top</td>
<td>40 to 60%</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>L Step</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Basic Straddle Step</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Side to Side</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Knee Up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Touch Out</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td>5-8</td>
<td>Knee Kick</td>
<td>50 to 70%</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Leg Curl</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Double Step Side</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Step Touch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Kick Forward</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>A Step</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td>9-12</td>
<td>Bench Step</td>
<td>60 to 80%</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>V Step</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Grapevine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Side Lunging</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Turn Step</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td></td>
<td>Back Lunging</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Sec</td>
</tr>
<tr>
<td>Weeks</td>
<td>Training</td>
<td>Duration</td>
<td>Warm Up &amp; Warm Down</td>
<td>Intensity</td>
<td>Repetition</td>
<td>Rest</td>
</tr>
<tr>
<td>-------</td>
<td>----------</td>
<td>----------</td>
<td>---------------------</td>
<td>-----------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td>1-2</td>
<td>Squat Jump</td>
<td>50 Mins</td>
<td>10 Mins</td>
<td>40 to 60%</td>
<td>8</td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Ricochets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Burpee jump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>On the spot running</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Push ups with clap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Front box jump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td>3-4</td>
<td>Squat Jump</td>
<td>50 Mins</td>
<td>10 Mins</td>
<td>50 to 70%</td>
<td>10</td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Ricochets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Burpee jump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>On the spot running</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Push ups with clap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Front box jump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td>5-6</td>
<td>Squat Jump</td>
<td>50 Mins</td>
<td>10 Mins</td>
<td>60 to 80%</td>
<td>12</td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Ricochets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Burpee jump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>On the spot running</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Push ups with clap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
<tr>
<td></td>
<td>Front box jump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 Seconds</td>
</tr>
</tbody>
</table>
3.16 AEROBIC TRAINING

3.16.1 Over the Top

Turn the body side. Feet close. Right leg up apart down. Left leg up down close together. Right foot apart over down. Do with alternate legs.

3.16.2 L Step

Right leg knee up toe forward and down diagonally. Repeat with alternate legs.

3.16.3 Basic Straddle Step

Right foot up apart on the right side and down. Left knee up straddle down on the spot and move a right foot right side apart. Repeat with alternate leg.

3.16.4 Side to Side

Right leg a part hands forward left leg tap down Sideward hands down. Repeat with other leg.

3.16.5 Knee Up

Right knee up stretch sideward and down. Repeat with alternate knee.

3.16.6 Touch Out

Right leg stretch apart land on toe and heel. Do with alternate leg.

3.16.7 Knee Kick

Right knee up kick down. Same action with alternate leg on both sides.
3.16.8 Leg Curl

Right leg apart and curl left leg. Do with alternate side.

3.16.9 Double Step Side

Right leg apart and hands up. Left leg tap down hands pull down clap. Repeat the same with right leg once again. Same action with alternate leg on both sides.

3.16.10 Step Touch

Right leg diagonally forward on right side left leg close together to the right leg. Stretch the left leg apart left side. Right leg close to the left. Repeat on the other side with alternate leg.

3.16.11 Kick Forward

Right knee up kick forward down. Repeat with other leg on other side.

3.16.12 A Step

Right leg move forward diagonally down. Left leg move forward close together forward close together. Right leg move right backward diagonally down. bring back left leg close together. Repeat with the alternate leg on the other side.

3.16.13 Bench Step

Step up to a bench with your right foot, and then up with your left foot. Step down with your right foot, then down with your left foot. Repeat this 4-count (up, up, down, down) stepping at an even rhythm about 25 times per minute.
3.16.14 V Step

Right leg up right forward diagonally down. Left leg up forward diagonally down. Repeat with alternate legs.

3.16.15 Grapevine

Right leg apart. Left leg tap down behind right leg. Move right leg apart. Bring left leg close and parallel to the right leg.

3.16.16 Side Lunging

Right leg stretch sideward and lunge. Repeat with alternate leg.

3.16.17 Turn Step

Right foot up down. Left foot up down together. Right foot up turn right bring behind left foot. Left foot up turn right bring behind left foot. Left foot up down feet together. Repeat with alternate legs.

3.16.18 Back Lunging

Right leg push back land on toe lunge. Repeat on the other side.

3.17 CIRCUIT TRAINING

3.17.1 Squat Jump

Stand with feet shoulder-width apart, trunk flexed forward slightly with back straight in a neutral position. Arms should be in the “ready” position with elbows flexed at approximately 90°. Lower body where thighs are parallel to ground and immediately explode upwards vertically and drive arms up. Do not hold a squat position before
jumping up – keep the time between dipping down and jumping up to a minimum. Land on both feet. Rest for 1-2 seconds and repeat. Prior to takeoff extend the ankles to their maximum range (full plantar flexion) to ensure proper mechanics.

3.17.2 Ricochets

Mark out a small box shape on the floor (about 2 feet square) with paint or chalk. Keeping your feet together, start at one corner of the box and perform small jumps from corner to corner in a random manner. For this exercise the emphasis should be on speed and rate of leg movement rather than height. Each ground contact is 1 repetition.

3.17.3 Burpee Jump

To perform a burpee jump-up, stand up straight with your arms by your sides and your feet at shoulder width. Squat down and place your palms face down on the floor in front of you. Kick your legs behind you so you are in a push-up position. Do one push-up, then pull your legs back under you into the squat position, keeping your palms face down on the floor. Stand and then jump in the air, bringing your arms over your head to reach for the ceiling. When you land, you will finish the first burpee-jump-up.

3.17.4 On the Spot Running

Jogging on the spot with hand swing.
3.17.5 Push Ups with Clap

Lower body to floor and immediately push body up as fast as possible. As the hands leave ground, rapidly clap hands together and place back to original position, catching body before it falls. Repeat.

3.17.6 Front Box Jump

Stand in front of the box with feet directly under the hips and hands by your side. Lower yourself into the jumping position by bending at the knees and hips. Keep your head up and back straight. Explosively jump from the crouched position whilst swinging the arms. Land softly on the centre of the platform absorbing the impact with your legs. Stand tall. Return to starting position by either jumping backwards off the box, or by stepping down and repeat the movement.

3.18 COLLECTION OF DATA

The variables used in the present study were assessed from all the subjects before they have to treat with the respective treatments. It was assumed as pre-test. After completion of treatment they were tested again as it was in the pre test on all variables and assumed as post test.
Figure –I

Research Flow Chart

SUBJECTS
Forty five Kabaddi players

DESIGN
Randomized Group Design

PRE-TEST

Health Related Physical Variables
1. Muscular Strength
2. Muscular Endurance
3. Flexibility
4. Cardiorespiratory Endurance
5. Body Composition

Psychological Variables
1. Cognitive Anxiety
2. Somatic Anxiety
3. Self Confidence

Kinanthropometric Variables
1. Hip Girth
2. Calf Girth

Group I
Experimental Group I
Aerobic Training
(12 weeks)

Group II
Experimental Group
Circuit Training
(12 weeks)

Group III
Control Group

POST-TEST

Statistical Analysis ('t' test & ANCOVA)
3.18 STATISTICAL TECHNIQUES AND ITS JUSTIFICATION

The following statistical techniques were adopted to treat the collected data in connection with established hypotheses and objectives of this study. To find out the difference between pre and post test of each groups, paired’ test was used. Analysis of covariance (ANCOVA) was computed because the subjects were selected random, but the groups were not equated in relation to the factors to be examined. Hence the difference between means of the three groups in the pre-test had to be taken into account during the analysis of the post-test differences between the means. This was achieved by the application of the analysis of covariance, where the final means were adjusted for differences in the initial means, and the adjusted means were tested for significance. Whenever the adjusted post-test means were found significant, the Scheffe’s post-hoc test was administer to find out the paired means difference. To test the obtained results on variables, level of significance 0.05 was chosen and considered as sufficient for the study.