Chapter - III

METHODOLOGY
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METHODOLOGY

INTRODUCTION

In this chapter, the selection of subjects, tester reliability, instrument reliability, orientation of the subject, research design, criterion measures, administration of test, construction of training schedule and statistical techniques adopted for the analysis of data have been described.

3.1. SELECTION OF SUBJECTS

To achieve the purpose of this study 60 cricket players from various Engineering Colleges in Trichy district, were randomly selected as subjects. Their age ranged between 17–21 years. Care was taken in looking into their medical fitness state before they were to put in the training process.

3.2. SELECTION OF CRITERION MEASURES

By going through the literature and after consulting with the experts in the field of yoga, physical education and sports the investigator had chosen the variables which are specific to cricket players which in turn play a major role in the overall
fitness and performance. The following are the variables and testing tools applied to assess the subjects.

<table>
<thead>
<tr>
<th>Psychological Variables (PSV)</th>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. State Anxiety</td>
<td>-</td>
</tr>
<tr>
<td>2. Trait Anxiety</td>
<td>-</td>
</tr>
<tr>
<td>Manual of State trait Inventory</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Psychological Variables (PLV)</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Systolic Pressure</td>
<td>Sphygmomanometer, Stethoscope</td>
</tr>
<tr>
<td>2. Dyastalic Pressure</td>
<td>Stethoscope</td>
</tr>
<tr>
<td>3. Pulse rate</td>
<td>Stethoscope</td>
</tr>
<tr>
<td>4. Respiratory rate</td>
<td>Stop watch</td>
</tr>
<tr>
<td>5. Breath Holding Time</td>
<td>Digital Timer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor Ability Components (MAC)</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Speed</td>
<td>50 mts. run</td>
</tr>
<tr>
<td>2. Agility</td>
<td>Shuttle run</td>
</tr>
<tr>
<td>3. Cardio Respiratory Endurance</td>
<td>Cooper's 12 min run / walk test</td>
</tr>
</tbody>
</table>

### 3.3. EXPERIMENTAL DESIGN

To achieve the purpose of the present study, 60 cricket players from various engineering colleges in Trichy district of
Tamil Nadu were selected as subjects. They were between the age group of 17 - 21 years. The selected subjects were divided into 3 equal groups namely, yoga training group (Group-I), physical exercise group (Group-II), and control group (Group-III), each group consisting of 20 subjects.

3.4. RELIABILITY OF DATA

The reliability of data was ensured by establishing the tester reliability, subject reliability and instrument reliability.

3.5. TESTER RELIABILITY

To ensure that the investigator was well versed in the technique of conducting the test, the investigator had a number of practice sessions in the teaching procedure. All the measurements were taken by the investigator with the assistance of persons from yoga, physical education and medical field. Tester competency and reliability of test were established by test, retest process. A very high correlation was obtained, the tester competency in taking measurement and test reliability were accepted.
3.6. SUBJECT RELIABILITY

The below test, retest co-efficient of correlation was also established in which subject reliability was highly significant.

3.7. INSTRUMENT RELIABILITY

The reliability of the test items used in the present study to test the criterion measurement is as follows.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Test Items</th>
<th>Co-efficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>State Anxiety</td>
<td>0.89</td>
</tr>
<tr>
<td>2.</td>
<td>Trait Anxiety</td>
<td>0.91</td>
</tr>
<tr>
<td>3.</td>
<td>Systolic Pressure</td>
<td>0.89</td>
</tr>
<tr>
<td>4.</td>
<td>Diastolic Pressure</td>
<td>0.86</td>
</tr>
<tr>
<td>5.</td>
<td>Pulse rate</td>
<td>0.89</td>
</tr>
<tr>
<td>6.</td>
<td>Respiratory rate</td>
<td>0.90</td>
</tr>
<tr>
<td>7.</td>
<td>Breath Holding Time</td>
<td>0.78</td>
</tr>
<tr>
<td>8.</td>
<td>Speed</td>
<td>0.89</td>
</tr>
<tr>
<td>9.</td>
<td>Agility</td>
<td>0.90</td>
</tr>
<tr>
<td>10.</td>
<td>Cardio Respiratory Endurance</td>
<td>0.86</td>
</tr>
</tbody>
</table>
THE RESEARCHER DURING ORIENTATION
3.8. ORIENTATION OF THE SUBJECTS

Prior to the administration of tests the investigator held a meeting with the subjects. 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 know their own performance. The subjects were very enthusiastic and co-operative throughout the study.

3.9. ADMINISTRATION OF TESTS

Before the conduct of the tests, the researcher demonstrated each test to the subjects. A model performance by few persons other than the active participants has also been done to make them already understand the test procedures. The test items and the procedure for administration used in the present study are explained below.
3.10. PSYCHOLOGICAL VARIABLES
Assessment of Anxiety Psychological Variables

Description of Spielberger and his associate state and trait anxiety inventory.

The standard psychological tool constructed by Spielberger and his associates (1970) were used to measure anxiety of the subjects. The test consists of 40 statements (20 – state anxiety and 20-trait anxiety). It includes both positive negative statements. It is a liker method and each statement consists of 4 responses. The respondent made a tick mark on any one of the responses that fit to them best.

METHOD OF SCORING

This inventory was scored with the help of scoring key and which is given below. A separate scoring method was followed for positive and negative statements were added and it was treated as individual score. The total score constitute the anxiety score. The range of score is 20 to 80 scoring key.

STATE ANXIETY

For items 2, 5, 8, 10, 11, 15, 16, 19, 20 subjects responses, almost never, sometimes, often and almost always
are to be given 4, 3, 2 and 1 scores respectively. For the rest of the items scoring is to be done in the opposite way.

**TRAIT ANXIETY**

For items 1, 6, 7, 10, 13, 16 and responses, almost never, sometimes, often and almost always are to be given 4, 3, 2 and 1 scores respectively. For the rest scoring is to be done in the opposite way.

**3.11. PHYSIOLOGICAL VARIABLES**

**Blood Pressure**

**Purpose:** To Assess the Systolic Pressure (SP) and Diastolic Pressure (DP).

**Equipment:** Sphygmomanometer, Stethoscope.

**Procedure:** The subjects were asked to sit comfortably on the chair with the left arm slightly flexed and the whole forearm supported at the heart level on the table. The subjects were asked to have weight of the body on the forearm and the fingers were relaxed. The center of the rubber compressor bag was squarely, placed over the brachial artery, and placed to wrap the silk cuff after the manner of the bandage tuck the ends in neatly, avoiding any tucks in wrapping. The systolic and diastolic
points were determined from the different sounds made by blood in the artery as the artery is subjected to various degrees of compression. The sounds were heard by means of stethoscope applied just below the armband at the bifurcation of the brachial artery.

**SCORING**

Systolic Pressure (SP), pressure was applied by means of the pressure ball, and with the left hand palpating the pulse, the pressure was continued for about a further 10 mm, above the point of pulse disappearance. The stethoscope was applied to the brachial artery and releasing the pressure in the rubber compressor bag slowly and evenly by means of slight movement of the release by means of slight movement of the release screw of the control value, listen intently for heart sound. The first sound is usually clear and easy to distinguish; the first regular beat being heard should be read as the point of systolic pressure.

**DIASTOLIC PRESSURE (DP)**

Continue to release the pressure and the tone and volume of the sound change and finally disappear in a faint murmur.
The last sound just before disappearance is the point to read the diastolic pressure. The true diastolic pressure is that point where the 'Snapping' changes to final murmur.

**PULSE RATE**

**Instruments**

No instrument is required, only the investigator’s right index, middle and ring fingers are used. Since stethoscope was used.

**Precautions**

The investigator should count the pulse for one full minute. After gathering experience investigator should count the pulse in a correct manner.

**Procedure**

The subject was asked to sit comfortably on the chair. The stethoscope was placed over the radial artery of the subjects left forearm and counted the pulse for one minute.

**RESPIRATORY RATE**

**Purpose**

To access respiratory rate required.
TEST ADMINISTRATION
Materials

Cotton, Stopwatch.

Procedure

The subject was asked to sit comfortably on the floor without tension. A small piece of cotton was fixed near the nose. Asked the subject to breathe normally and comfortably, counted the breathing (both inspiration and expiration) for one minute. During expiration the cotton would be moved.

Scoring

The total number of breathing cycle per minute was respiratory rate.

BREATH HOLDING TIME

Purpose

To find out the maximum ability of the subject to hold his breath.

Equipments

A stopwatch.
SUBJECTS DURING TESTS
**Procedures**

The subject was asked to stand at ease and inhale deeply after which he held his breath as long as possible. The index finger of the subject served as an indicator for the investigator to know the start and end of recording time. To prevent exhalation or inhalation through the mouth during the recording time the subject was asked to couple his lips tightly. Two trials were permitted for each subject with a gap of five minutes and the better time was recorded.

**Scoring**

The time of holding the breath till the subject lets the air out was recorded to the nearest one tenth of a second using a stopwatch (Astrand and Ročahl, 1977).

**3.12. MOTOR ABILITY COMPONENTS**

**SPEED**

Test : 50 meters run

Purpose : To measure the speed

**Equipments**

Stopwatch, whistle, score sheet, pen and lime powder.
Procedure

The subjects take their position behind the starting line. The starter used the command "Ready" and blew the whistle. The latter was accompanied by a downward sweep of the starter’s arm as a signal to the timer. On hearing the whistle sound, the subjects started running as fast as possible up to the finishing line.

Scoring

The score is the elapsed time to the largest one tenth of a second between the starting and the instant the subject crosses the finish line (Clarke and Clarke, 1987).

AGILITY

Test : Shuttle run

Purpose : To measure agility

Equipments

Two lines parallel to each other are placed on the floor 30 feet apart. Since the student must over run both of these lines, it is necessary to have several feet more of floor space at either end. Two blocks of wood and a stopwatch are needed.
Procedures

The student stands at one of the lines with the 2 bocks at the other line. On the signal to start, the student runs to the blocks, takes one, and returns to the starting line, and places the block behind that line. He then returns to the second block, which is carried across the starting line on the way back. Two trials are necessary to return the blocks after each race.

Scoring

The score is the elapsed time recorded in seconds and tenths of seconds for the better of 2 trials (Harold M. Barrow and McGee, 1979).

CARDIO RESPIRATORY ENDURANCE

Test : Cooper’s 12 minutes Run / Walk

Purpose : To assess the Cardio-Respiratory Endurance

Equipments

Stop Watch, Whistle, Score Sheet, Pen, Track and Lime Powder.

Procedure

The test was administered in a 200 meter track with markings at every 5 meters. The investigator and the testers
served as the lap scorers. The subjects were asked to stand behind the starting line drawn at the finish of the 200 mts track. They were instructed to cover as much distance as possible by running / walking, in case of running throughout the 12 minutes was not possible. They were instructed to continue 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 5th, 10th and 11th minutes were announced to them. At the final whistle after 12 minutes, they stopped instantly and stood on the spot.

**Scoring**

The distance covered by each subjects in twelve minutes was recorded to the nearest fifth meter (Clarke and Clarke, 1987).

**3.13. ADMINISTRATION OF TRAINING PROGRAMME**

To achieve the purpose of the present study, two training programs namely Yogic training and Physical exercise Training were designed scientifically. The scientifically designed programmes were given to the subjects of respective groups such as Yogic Training (Group-I), Physical Exercise Training
(Group-II). The subjects of the control group were not given any special training schedule. The detailed procedures of these two training programmes are dealt in detail.

### 3.14. TRAINING PLAN

<table>
<thead>
<tr>
<th>Duration of the training</th>
<th>12 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of days per week</td>
<td>6 days</td>
</tr>
<tr>
<td>Duration of a session</td>
<td>90 minutes</td>
</tr>
</tbody>
</table>

The training period consisted of twelve weeks, two session a day. The respective trainings were carried out from Monday to Saturday and Sunday was allotted for rest.

The components of yogic practices and physical exercises was applied in rotation on various sessions of the training period depending upon the session load. However care was taken that all the components of the training packages were put to practice before the training duration was completed.

The capsule of training package of yoga and physical exercises were scientifically designed with the help of yoga experts, sports coaches and physical education persons.
DURING YOGA PRACTICE
### 3.15. YOGA PRACTICE SCHEDULE WITH TIME SPLIT

**Table – 3.2**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>YOGIC PRACTICE</th>
<th>NAME</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>ASANAS</td>
<td>1. Padmasana</td>
<td>60-Minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Vajrasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Paschimottanasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Matsyasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Ardha Matsyendrasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Bhujangasana</td>
<td></td>
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<td></td>
<td></td>
<td>7. Sarvangasana</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>8. Shalabhasana</td>
<td></td>
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<td></td>
<td></td>
<td>9. Pavanmuktasana</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>10. Dhanurasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. Halasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. Chakrasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13. Virabhadrasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14. Utthita Parsvakonasana</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>15. Utkatasana</td>
<td></td>
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<td></td>
<td></td>
<td>16. Vrksasana</td>
<td></td>
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<td></td>
<td></td>
<td>17. Tadasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18. Garudasana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>19. Shavasana</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>PRANAYAMA</td>
<td>1. Nadi Suddhi</td>
<td>15-Minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Nadi Sothana</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Ujjayi</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Bhramari</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Sitali</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Sitakari</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>MEDITATION</td>
<td>Any one meditation technique (Mantra / Object / Breathing / Yoga Nidra)</td>
<td>15-Minutes</td>
</tr>
</tbody>
</table>
3.16. PHYSICAL EXERCISE SCHEDULE WITH TIME SPLIT

Table – 3.3

<table>
<thead>
<tr>
<th>PHASE – I</th>
<th>WARM UP AND STRETCHING</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>15 Minutes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHASE – II</th>
<th>EXERCISE TRAINING LOAD</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>40 Minutes</td>
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</table>

<table>
<thead>
<tr>
<th>PHASE – III</th>
<th>DISTRIBUTED REST BETWEEN TRAINING LOAD</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10 Minutes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHASE – IV</th>
<th>REPETATION OF THE LOAD</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>15 Minutes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHASE – V</th>
<th>WARM DOWN AND STRETCHING</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10 Minutes</td>
</tr>
</tbody>
</table>

3.17. LIST OF YOGA PRACTICE

ASANA

- Padmasana
- Vajrasana
- Paschimottanasana
- Matsyasana
- Ardha Matsyendrasana
- Bhujangasana
- Sarvangasana
- Shalabhasana
- Pavanmuktasana
- Dhanurasana
- Halasana
- Chakrasana
- Virabhadrasana
- Utthita Parsvakonasana
- Utkatasana
- Vrksasana
- Tadasana
- Garudasana
- Shavasana

**PRANAYAMA**

- Nadi Suddhi
- Nadi Sothana
- Ujjayi
- Bhramari
- Sitali
- Sitakari

**MEDITATION**

Any one meditation technique (Mantra / Object / Breathing / Yoga Nidra).
3.18. LIST OF PHYSICAL EXERCISES

GENERAL

Exercises starting from standing position

Neck Exercises

- Head bending forward (neck flexion).
- Head bending backward (neck extension).
- Head bending sideward (left and right).
- Neck rotation (to the left and right) or neck roll.
- Neck circle (clockwise and anticlockwise).

Shoulder Exercises

- Arms raised forward upward (single arm, double arm).
- Arms raised sideward (single arm, double arm).
- a. Arms rotation outward (palms facing upward).
- b. Arm rotation inward (palms facing downward).
- Arm circle-single arm, double arm (clockwise and anticlockwise).
- Shoulder lift.
- Shoulder shrug.
**Wrist Exercises**

- Wrist bending forward (flexion).
- Wrist bending backward (extension).
- Wrist bending at the sides (left and right).
- Wrist circle (clockwise and anticlockwise).

**Trunk Exercises**

Position: Feet apart, hands on hips.

- Trunk bending forward (flexion).
- Trunk bending backward (extension).
- Trunk bending sideward (left and right).
- Trunk rotation or trunk twist (to the left and right), with variations in position of arms:
  - Arms at the sides, at shoulder level.
  - Hands clasped behind the neck.
  - Arms folded and placed on lower back.
  - Fingers on the shoulders with elbow flexion.
- Trunk circle (clockwise and anticlockwise).
- Alternate toe touch.
Hip Exercises

In Standing Position

➢ Knee touching the chest (hip flexion).
➢ Leg turned outward.
➢ Leg turned inward.
➢ Leg raised sideward.
➢ Leg circle (clockwise and anticlockwise).

Knee Exercises

Half squat, full squat.

Ankle Exercises

➢ Toe pointing downward (Plantar flexion).
➢ Toe pointing upward (Dorsiflexion).
➢ Ankle circle – clockwise and anticlockwise.
➢ Heel raise.
➢ Walking on the heels.

Exercises Starting from the Sitting Position

➢ Single leg lift / raise.
➢ Double leg lift / raise.
➢ Single leg crossovers.
➢ Hip hoist.
- Hip hoist and leg kick.
- Single leg circle.
- Double leg circle.
- Head to knee touch.
- Alternate toe touch.
- Head to floor touch.
- Elbow to opposite knee touch.
- Trunk twist.
- Forward and backward seat walk.
- Sitting tucks.
- Bicycle.
- Bend knees, and touch side.
- Side bends, arms overhead.
- Sliding hand backward as far as possible.
- Both hands to one side, and touch nose to color.
- Holding a V-sit.
- One leg straight, other bent, toe touch.
- Off back to touch toes to floor overhead.
- Toes to nose.
- Hurdler sit, arch back and then stretch.
**Exercises Starting from the Prone Lying Position**

- Seat hands in push – up position.
- Chest raised, arms extended.
- Single and double backward leg raise / lift.
- Single leg crossovers, toes to touch floor.
- Rock and roll, arch back, hands behind.
- Push ups.
- Cradle bend knees and grasp both ankles.
- Bring one knee forward to touch chin.
- Resting on elbows, lift chest.
- Raise opposite arm and leg.

**Exercises from the Side Lying Position**

- Single leg lift.
- Leg swing forwards and backwards.
- Double leg lift.
- Single leg circles.
- Bend knee, bring forward to chest, and return.
- Arm stretched overhead, raise arm and leg to touch.

**Exercises from the all four Position**

- Single backward leg raise.
- Single leg circling.
• Raise opposite arm and leg.
• Knee push – ups – fingers facing inward.
• Lean forward and arch back.
• Raise knee, sideward straighten leg.
• Cat and Camel.
• Donkey kick.

**SPECIFIC**

- Wind sprint
- Striding
- Acceleration drills
- Sprint drills
- Falling acceleration
- Quick starts
- High knee action
- Side Shuttle
- T-drill
- Zig – Zag drill
- Four corner drill
- Quick feet
- L-drill
- Hopping
- Hop step up
- Standing Long Jump
- Split Jump
- Squat Jump
- Jumping Jacks
- Leg thrust
- Jogging and Jumping
- Skipping
- Split Jump
- Step up Jump (8’ to 10’)
- Faartleks
- Accelerated Running
- Continuous Running
- Tempo runs
- Explosive running
- Endurance running
- Speed Endurance
PADMASANA

Padmasana (the lotus pose)

- Sit with the legs extended forward.
- Fold one leg and place its foot on the top of the opposite thigh.
- The sole of the foot must be upward and the heel should touch the pelvic bone.
- Fold the other leg and place its foot on top of the other thigh (Swami Sathyananda Saraswati, 1993).

VAJRASANA

Vajrasana (the thunderbolt pose)

- Stand on the Knees with the feet stretched backward and big toes crossed.
- The Knees should be together, heels apart.
- Lower the buttocks onto the insides of the feet, the heels at the sides of the hips.
- Place the hands on the knees, palms downward (Swami Sathyananda Saraswati, 1993).
**PASCHIMOTTANASANA**

**Paschimottanasana (the back stretching pose)**

- Sit on the floor with the legs straight in front of the body, the lower arms on the thighs.
- Relax the whole body, especially the back muscles. Slowly bend the body forward.
- Try to grasp the big toes with the fingers and the thumbs. If this is impossible then hold the heels, the ankles or the legs as near to the feet as possible.

Again, consciously relax the back and leg muscles. Keeping the legs straight and without utilizing the back muscles, only using the arms, pull the trunk a little lower toward the legs. This should be a process without any sudden movement or excessive strain anywhere in the body. If possible, without strain, touch the knees with the forehead.

Remain in the final pose for a comfortable length of time, trying to further relax the whole body, and then slowly return to the starting position *(Swami Sathyananda Saraswati, 1993)*.
MATSYASANA

Matsyasana (the fish pose)

Sit in padmasana. Bend backward, supporting the body with the arms and elbows, until the crown of the head touches the ground. Hold the big toes and rest the elbows on the floor.

Arch the back as much as possible. Remain in the final pose up to 5 minutes. Do not strain (Swami Sathyananda Saraswati, 1993).

ARDHA MATSYENDRASANA

Ardha Matsyendrasana (the half spinal twist pose)

- Sit with the legs straight in front of the body.
- Place the right foot flat on the floor outside the left knee.
- Bend the left leg to the right and place the left heel against the right buttock.
• Place the left arm outside the right leg and with the left hand hold the right foot or ankle. The right knee should be as near as possible to the left armpit.

• Turn the body to the right, placing the right arm behind the back.

• Twist the back and then the neck as far as possible without strain.

• Remain in the final pose for a short time and then slowly return to the starting position.

• Change the legs and repeat to the other side (Swami Sathyananda Saraswati, 1993).

HALASANA

Halasana (the plough pose)

• Lie flat on the back with the arms straight and beside the body, palms facing downward.

• Keeping the legs straight, slowly raise them to the vertical position above the body. Only use the stomach muscles to raise the legs. Do not use the arms. Simultaneously bend the trunk upward, hips first.
• Slowly lower the legs over the head and touch the floor with the toes of both feet. Keep the legs straight, bend the arms and place the hands on the back as in sarvangasana. Relax the body.

• Remain in the final pose for a comfortable period of time. Then either return to the starting position or perform the following additions to the basic pose:

1. Walk the feet away from the head until the body is completely stretched and a tight chin lock occurs.

2. Walk the feet towards the head until the back is fully tensed. Keep the legs straight and directly above the head. Grasp the feet with the fingers.

Maintain these poses for a comfortable length of time, and then return to the final pose of basic halasana (Swami Sathyananda Saraswati, 1993).
BHUJANGASANA

Bhujangasana (the cobra pose)

Lie on the stomach with the legs straight and the feet extended. Place the palms flat on the floor under the shoulders. Rest the forehead on the ground and relax the body. Slowly raise the head and the shoulders off the ground, bending the head as far back as it will go. Try to raise the shoulders without using the arms, only utilizing the back muscles. Now bring the arms into action and slowly bend the back as much as possible without strain until the arms are straight. Keep the navel as near to the ground as possible. Hold as long as comfortable.

Practice up to 5 times.

Breath

Inhale while raising the body from the ground. Breathe normally in the final pose. If the final pose is held for a short time, retain the breath inside (Swami Sathyananda Saraswati, 1993).
Dhanurasana (the bow pose)

Lie flat on the stomach and inhale fully. Bend the knees and hold the ankles with the hands. Tense the leg muscles and arch the back. Simultaneously raise the head, chest and thighs as high as possible. Keep the arms straight.

Hold forth as long as is comfortable. Practice up to 5 times (Swami Sathyananda Saraswati, 1993).

Shalabhasana (the locust pose)

Lie on the stomach with the hands under the thighs, palms facing downward. Stretch the legs and tense the arms. Raise the legs and abdomen as high as possible without bending the legs. Practice up to 5 times.
Breath

Inhale deeply in the lying-down position. Retain the breath inside while raising the legs and abdomen. Exhale while returning to the starting position (Swami Sathyananda Saraswati, 1993).

SARVANGASANA

Sarvangasana (the shoulder stand pose)

Lie flat on the back with the feet together, the arms by the sides and palms flat on the ground. Using the arms as levers raise the legs and back to a vertical position. Bend the elbows and use the arms as props to steady the back by presenting it with the palms.

The trunk and legs should extend straight up, forming a right angle with the neck, the chest pressing against the chin (Swami Sathyananda Saraswati, 1993).
PAWAN MUKTASANA

Pawan Muktasana (Wind Releasing Posture)

Lie down on the back. Keeping legs together, hug tightly the drawn up knees against the chest so that the palms are placed on elbows. Raise your head and touch the chin with the knees. Keep the breath normal and toes stretching outside.

Place the head on the ground when the neck gets tired. Cervical patients should perform it without lifting the head from the ground (Y.P. Yadav and Rachna, 1998).

CHAKRASANA

Chakrasana (the wheel pose)

Lie on the back with knees bent and the heels touching the buttocks. The feet should be about one foot apart. Place the palms on the ground beside the temples, with fingers pointing towards the shoulders.
Slowly raise the trunk. Let the head rotate slightly and allow the crown to support the weight of the upper body. The legs will form right angles at the knees. Straighten the arms and legs, life the head off the ground and raise the body so that it is fully arched. You can straighten the knees almost completely by moving the trunk upward.

Slowly lower yourself back to the ground and then the supine position (Swami Sathyananda Saraswati, 1993).

**UTTHITA PARSVAKONASANA**

*Utthita Parsvakonasana (Extended side stretch)*

In Sanskrit, utthita means “stretch”, parsva indicates “side” or “flank”, while kona translated as “angle”. In this asana, both sides of your body are stretched intensely, from the toes of one foot to the fingertips of the opposite hand. Remember to keep your body absolutely steady when practising this asana.

**Step 1:** Stand in Tadasana inhale, and jump your feet about 1.2m (4ft) apart. At the same time, raise both your arms out to
the sides, to shoulder-level. Your palms should face the floor. Stretch your arms from the back of the elbows. Ensure that your feet are in line with each other toe pointing forward. Push down on the outer edges of your feet. Press the little toe of each foot down to the floor.

**Step 2:** Exhale slowly and simultaneously rotate your right leg and foot $90^\circ$ to the right. At the same time, turn the left foot slightly to the right stretch your left leg and tighten it at the knee. Ensure that your weight falls on the heel, not the toes of your right foot. Adjust the distance between your legs, if necessary. Make sure your feet remain in line with each other.

**Step 3:** Bend your right knee until your thigh and calf form a right angle and your right thigh is parallel to the floor. Take one or two breaths.

**Step 4:** Exhale, and place your right palm on the floor beside your right foot. Ensure your right armpit touches the outside of your right knee. Stretch your left arm out over your left ear. Turn your head and look up. Hold the pose for 20 – 30 seconds *(B.K.S. Iyengar, 2001).*
VIRABHADRASANA

Virabhadrasana (Warrior Posture)

Stand with feet about 4-5 ft. apart; stretch the arms over the head. Keep the arms parallel, palms facing each other. Turn the right leg and foot 45° in and the left foot 90° out. At the same time turn the hips and trunk to the left. Bend the left leg to a right angle at the knees and stretch the whole body up, look up.

Move the shoulder blades in and open the chest. Stretch up and stay for 15-20 seconds with normal breathing. Then turn to the center, rest the arms and line up the feet. Repeat it with the other side (Y.P. Yadav and Rachna, 1998).

UTKATASANA

Utkatasana (Fierce Posture)

Stand erect with feet together, stretch the arms overhead with palms together and upper arms touching the ears, bend the knees and sit as in a chair.
Use the hands to pull the trunk up strongly. Keep breathing normal, hold the position for about 15 seconds and then come up (Y.P. Yadav and Rachna, 1998).

**VRKSASANA**

**Vrksasana (Tree Pose)**

**Step 1:** Stand in Tadasana (no.1). Without disturbing the left leg, bend the right leg to the side. Catch the ankle and place the foot at the top of the inner left thigh. Take it as high as possible. Press the right knee back, in line with the right hip.

**Step 2:** Inhale and take the arms over the head with the palms facing each other. Straighten the elbows and stretch the arms and trunk up. Stand firmly on the left foot so that you do not overbalance. Stretch the leg up.

**Step 3:** Right: Join the palms, without bending the elbows. Stay for 20-30 seconds. Exhale, then bring the arms and the leg down. Repeat on the other side (Mira Mehta, 1994).
**TADASANA**

*Tadasana (the palm tree pose)*

Stand erect with the feet 4 to 6 inches apart. Raise the arms overhead with the palms facing upward, fingers interlocked and look up at the hands. Lift the heels and feel as though you are being drawn upwards.

Completely stretch the body. Slowly return the heels to the ground *(Swami Satyananda Saraswati, 1993)*.

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**GARUDASANA**

*Garudasana (the eagle pose)*

Assume a standing position. Raise the right leg and twist it around the left leg. The right thigh should eventually lie in front of the left thigh and the right foot should rest on the calf of the left leg.

Now fold the arms and twist the right arm around the left arm until the palms can be placed together to resemble an eagle’s beak. Bend the left leg and lower
the body until the right toe touches the floor. Practise for as long as possible without strain.

**Concentration**

On a visible point and on balance *(Swami Satyananda Saraswati, 1993)*.

**SHAVASANA**

*Shavasana (The corpse pose)*

- Lie flat on the back with the arms beside and in line with the body, palms facing upward.
- Move the feet slightly apart to a comfortable position and close the eyes.
- Relax the whole body. Do not move any part even if discomfort occurs.
- Let the breath become rhythmic and natural.
- Become aware of the inhalation and exhalation.
- Count the number of respirations: I in, I out, and so on.
• Continue to count for a few minutes. If the mind starts to wander bring it back to the counting. If you can keep the mind on the breath for a few minutes, the mind and body will relax (Swami Satyananda Saraswati, 1993).

NADI SUDDHI

Nadi Suddhi (Sun and Moon Breath)

Meaning

Nadi Suddhi means the alternate nostrils breath or Sun and Moon Breath. It is also called Anuloma Viloma Pranayama, Anuloma and Viloma means with the hair and against the hair respectively or we might say, with the grain and against the grain.

Procedure

Sit in a comfortable sitting posture. Close the right nostrils by right thumb and slowly, smoothly and deeply inhale the air through the left nostril. Then close the left nostril by right hand little and ring fingers. Open the right nostril by releasing the right thumb, now slowly and smoothly breath out the air through right nostril. Then slowly, smoothly, and deeply inhale the air through right nostril. Then close the right nostril by the
thumb. Gently open the left nostril by releasing right hand little and ring finger. Now slowly and smoothly breathe out the air through left nostril. This is called one round or cycle. 3 to 5 cycles can be practised in a practice session (Dr. K. Chandrasekaran, 1999).

**KAPALBHATI PRANAYAMA**

*Kapalbhati Pranayama (frontal brain cleaning)*

- Sit in any comfortable meditative pose.
- Close the eyes and relax.
- Perform 60 to 100 rapid respirations.
- Unlike bhasrika, the inhalation should be spontaneous with the emphasis on exhalation.
- Then exhale deeply and perform jalandhara, moola and uddiyana bandhas simultaneously.
- Meditate on the void in the region of the eyebrow center, feeling the all-pervading emptiness and calmness.
- Release the bandhas, inhale slowly and relax.
- This is one round. Repeat up to 5 times (Swami Satyananda Saraswati, 1993).
UJJAYI PRANAYAMA

Ujjayi Pranayama (the psychic breath)

Sit in any comfortable position. Contract the glottis in the throat, and perform khechari mudra, i.e., fold the tongue back so that the under side is pressed against the back of the upper palate. Breathe deeply and softly, like the gentle snoring of a sleeping baby. Feel that you are breathing through the throat only (Swami Satyananda Saraswati, 1993).

BHRAMARI PRANAYAMA

Bhramari Pranayama (the pranic humming control)

Sit in a comfortable meditative asana. The spinal cord should be erect and the heat straight. Close the eyes and relax the whole body for a short time.

Keep the mouth closed throughout the practice. Inhale deeply through both nostrils. Retain the breath inside and perform jalandhara and / or moola bandha. After about 4 seconds' practice release the bandhas and plug both ears with the index fingers. Keeping the mouth closed, separate the teeth and slowly exhale, producing a long continuous humming sound like a bee.
The exhalation should be slow and steady. Feel the sound vibrations in the brain and be conscious only of the sound. This is one round. Start with 5 rounds and slowly increase the number (Swami Satyananda Saraswati, 1993).

BHASTRIKA PRANAYAMA

Bhastrika Pranayama (the bellows breath)

Sit in any comfortable meditative asana. Hold the head and spine erect. Close the eyes and relax.

**Stage 1:** Place the left hand on the left knee and the index and middle fingers of the right hand on the forehead. Put the thumb beside the right nostril and the ring finger beside the left nostril. Close the right nostril by pressing the thumb against the side of the nostril. Breathe rapidly through the left nostril 20 times, expanding and contracting the abdomen rhythmically. Then take one deep inhalation, close both nostrils by pressing both sides of the nose with the thumb and ring finger, and perform jalandhara and / or moola bandha. Retain the breath for a comfortable period of time, then release the bandhas and exhale.

Close the left nostril with the ring finger. Breathe rapidly through the right nostril 20 times with rhythmic expansions and contractions of the abdominal muscles.
Then inhale deeply, close both nostrils and perform jalandhara and / or moola bandha. Hold for some time and slowly exhale. This is one round. Practise 3 rounds. Then proceed to stage.

**Stage 2:** Sit in the same position with hands on the knees. Breathe rapidly 20 times through both nostrils. Then inhale deeply, retain the breath and perform jalandhara and / or moola bandha. After a comfortable period release the bandhas and breathe out. This is one round. Practise 3 rounds. This is the end of the complete practice of bhastrika. Advanced practitioners may increase the number of inhalations and exhalations up to 50 and the number of rounds may also be increased up to 5 for each stage *(Swami Satyananda Saraswati, 1993).*

### 3.18. Training details of yogic practice

- **Duration of the training:** 12 Weeks
- **Number of days per week:** 6 Days
- **Duration of the session:** 90 Minutes

### 3.19. Training phases of yogic practice

The yogic practices consist of three phases in a session.

- **Phase – I:** Asanas
Phase – II - Pranayamas
Phase – III - Meditation

3.20. Time schedule for a session

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asanas</td>
<td>40 Minutes</td>
</tr>
<tr>
<td>Pranayamas</td>
<td>20 Minutes</td>
</tr>
<tr>
<td>Distributed Relaxation</td>
<td>15 Minutes</td>
</tr>
<tr>
<td>Meditation</td>
<td>15 Minutes</td>
</tr>
</tbody>
</table>

The training period consisted of twelve weeks, one session a day. The Yogic practice was carried on from Monday to Saturday totaling a training week to six days as Sunday was allotted for rest. Out of 72 sessions of yogic practices 216 rotations of various asanas and pranayamas in the sequence of sitting, lying and standing were performed. The performance of asanas had three phases:

i. The start
ii. The Hold
iii. The Release

The asanas from the designed package were performed with a sequence of sitting, lying and standing while care was also taken that the counter movements exist during the variations from one asana to another (i.e.) when an asana required forward
bending it was complimented by an asana that had a backbend while going for the next.

**Eg:** Paschimothanasana (against) Bhujangasana

The pranayama practice was also practised in this similar manner, which also had three distinct phases of breathing like

(i) Inhalation

(ii) Suspension and

(iii) Exhalation

Care was taken to provide a suitable noise free, dust free and comfortable ambience to undergo systematic yogic practice. It was also checked that all the asanas and pranayamas selected are covered systematically on rotations from the framed training package.

### 3.21. Statistical Techniques

The pre and post training performance of the groups was analyzed with One-Way **ANOVA**.

Analysis of co-variance (**ANCOVA**) was used to find out whether there was any significant difference between the adjusted final means. **Scheffe's** Post-hoc test was used to find out the better group.