CHAPTER III

METHODOLOGY

The Research methodology involves the systematic procedure by which researcher starts from the initial identification of the problem to its final conclusion. The role of the methodology is to carry on the research work in a scientific and valid manner. The purpose of the study was to find out the significant influence of hatha yoga sadhana on selected physiological, psychological and clinical variables among anorexia syndrome teenage girls.

This chapter provides an overview of the method used in the study for the selection of subjects, selection of variables, experimental design, and reliability of data, training schedule, training program, collection of data and statistical technique which has been explained in detailed.

3.1 SELECTION OF SUBJECTS

For the present investigation thirty (30) anorexia syndrome teenage girls were selected randomly from various places at Chennai. Totally Twelve weeks (12) of training were given on hatha yoga sadhana to the subjects. All the anorexia syndrome teenage girl subjects were divided into two groups one being an experimental group and the other as control group each group consists of 15 subjects. Experimental group underwent hatha yoga sadhana practice and Control group did not under go any special training.
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 from Tamilnadu Physical Education and Sports University, University of Madras and also with help of professional experts in yoga, the following physiological, clinical and psychological variables were selected.

3.2.1. SELECTION OF THE DEPENDENT VARIABLES AND TEST

**Physiological Variables**

i. Heart Rate

ii. Systolic Blood Pressure

iii. Diastolic Blood Pressure

**Clinical variables**

i. Hemoglobin

ii. Total Cholesterol

iii. Calcium

**Psychological Variables**

i. Depression

ii. Emotional Maturity

iii. Anxiety
TABLE - I

<table>
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<tr>
<th>S.No</th>
<th>Physiological Variables</th>
<th>Test/Tool</th>
<th>Units</th>
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<tr>
<td>1</td>
<td>Heart Rate</td>
<td>Stop watch and Stethoscope</td>
<td>per minute</td>
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<tr>
<td>2</td>
<td>Systolic Blood Pressure</td>
<td>Sphygmomanometer and Stethoscope</td>
<td>mm/Hg</td>
</tr>
<tr>
<td>3</td>
<td>Diastolic Blood Pressure</td>
<td>Sphygmomanometer and Stethoscope</td>
<td>mm/Hg</td>
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Clinical Variables

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<td>2</td>
<td>Total Cholesterol</td>
<td>Standard Laboratory test</td>
</tr>
<tr>
<td>3</td>
<td>Calcium</td>
<td>Standard Laboratory test</td>
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Psychological Variables

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<td>Questionnaire</td>
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<td>Questionnaire</td>
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<tr>
<td>3</td>
<td>Anxiety</td>
<td>Questionnaire</td>
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</table>

3.2.2 SELECTION OF THE INDEPENDENT VARIABLES

1. Experimental group - Hatha Yoga Sadhana.

2. Control group - No training.

3.3 EXPERIMENTAL DESIGN

The study was formulated as a random group design, consisting of pre and post test. Thirty anorexia syndrome teenage girls were randomly selected and divided into two equal groups. The groups were assigned as experimental group and control group. The
pre test was conducted on all the subjects on selected physiological, clinical and psychological variables such as systolic blood pressure, diastolic blood pressure, heart rate, hemoglobin, total cholesterol, calcium, depression, emotional maturity and anxiety. The experimental group participated in their hatha yoga sadhana practice for a period of 12 weeks. The post test was calculated on all the selected variables after 12 weeks of the training period for both the groups.

3.4 PILOT STUDY

A pilot study was conducted to assess and finalize the training programme to ensure the intensity and duration of the training programme within the limits of the subject’s capacity to produce their desired effect. For this purpose, 30 subjects were selected and given hatha yoga sadhana respectively to determine the intensity and duration of a training session. The calculated intra-class correlation of the pilot shows that there was significant improvement in physiological, psychological variables and clinical. Based on the response of the subjects in the pilot study and during the training, the investigator adopted the suitable training schedule for the study. The number of repetitions assigned to each subject was tested and it was found that were within the reach of the individual’s capacity.

3.5 ORIENTATION OF THE SUBJECTS

Prior to the test the investigator explained to the subjects about the purpose of the study. The investigator also explained briefly in depth about the effects and benefits of the training to the subjects participating in the study. Commonly used suryanamaskar, asanas and pranaymas and meditations are selected after consulting an expert in hatha yoga sadhana with the co-operation of the subjects.
The method and the value of each loosening exercises, suryanamaskar, asanas, pranayamas, meditation, relaxation were explained and performed first by the investigator. The investigator got full co-operation and motivated them to involve completely and execute the training to their extreme level for the maximum output from the subject

3.6 RELIABILITY OF DATA

The reliability of data was ensured by establishing the instrument reliability, test reliability, tester competency and subjet’s reliability.

3.6.1 RELIABILITY OF INSTRUMENT

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

3.6.2 TESTERS COMPETENCY

Reliability was established by the test-retest processes. Thirty anorexia syndrome teenage girls from all the two groups were tested on selected variables. The repeated measurement of individuals on the same test is done to determine reliability.

The intra class correlation coefficient obtained for test-retest data are presented in Table II.
TABLE II

INTRA CLASS CORRELATION COEFFICIENT OF TEST – RETEST SCORES

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>VARIABLES</th>
<th>COEFFICIENT OF CORRELATION</th>
</tr>
</thead>
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<tr>
<td>1.</td>
<td>Heart rate</td>
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</tr>
<tr>
<td>2.</td>
<td>Systolic blood pressure</td>
<td>.98*</td>
</tr>
<tr>
<td>3.</td>
<td>Diastolic blood pressure</td>
<td>.99*</td>
</tr>
<tr>
<td>4.</td>
<td>Total Cholesterol</td>
<td>.97*</td>
</tr>
<tr>
<td>5.</td>
<td>Hemoglobin</td>
<td>.98*</td>
</tr>
<tr>
<td>6.</td>
<td>Calcium</td>
<td>.97*</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level

As for psychological variables Emotional maturity, Depression and Anxiety, the authors of the questionnaire have determined reliability and the same was adapted for this study and considered as reliable.

3.6.3 SUBJECTS RELIABILITY

The intra class correlation value of the above test and retest also indicated subject reliability as the same subjects were used under similar conditions by the same tester. The co-efficient of reliability was significant at 0.05 level, for the above test under investigation.

3.7 TRAINING PROGRAMME

The subjects were selected at random and were divided into two groups and the experimental group underwent hatha yoga sadhana from 6.00 am to 7.00 am from monday to friday (5 days/week) for 12 weeks, whereas the control group underwent...
no training. The hatha yoga sadhana for the selected experimental group were presented in the following order.

1. Experimental Group I - Hatha yoga sadhana (loosening exercises, surya Namaskar, asanas, pranayama, meditation and relaxation)

2. Control Group - No training

<table>
<thead>
<tr>
<th>Group</th>
<th>Training</th>
<th>Duration of Training</th>
<th>Training section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group – I (Experimental)</td>
<td>Hatha Yoga Sadhana practice</td>
<td>12 weeks (Monday to Friday)</td>
<td>5 days / week 1 hour / day (6am to 7am)</td>
</tr>
<tr>
<td>Group – II (Control)</td>
<td>No training</td>
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<td></td>
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</tbody>
</table>

3.8 TRAINING SCHEDULE FOR EXPERIMENTAL GROUP – I

(HATHA YOGA SADAHANA)

Experimental group - I Hatha yoga sadhana for 60 min, proper warm up and relaxation were given to the subjects during the experimental period. The yogic training program was scheduled for one session in the morning between 6.00 am to 7.00 am for 5 days (Monday to Friday) a week and the same was continued for 12 weeks. Five to ten min warm up and relaxation were also included.
**TABLE-IV**

**HATHA YOGA SADHANA PRACTICES**  
(Experimental Group – I) 1 TO IV WEEKS

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Yogic Practices</th>
<th>Frequency</th>
<th>Repetition or round</th>
<th>Breathe</th>
<th>Duration</th>
<th>Rest</th>
<th>Rest</th>
<th>Total duration</th>
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<tbody>
<tr>
<td>1</td>
<td>Loosening Exercises</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4weeks / Six days</td>
<td>One round</td>
<td>-</td>
<td>-</td>
<td>2 sec</td>
<td></td>
<td>2 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Suryanamaskar</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4weeks / Six days</td>
<td>3 – 6 round</td>
<td>-</td>
<td>-</td>
<td>30 sec</td>
<td></td>
<td>10 minutes</td>
</tr>
<tr>
<td>3</td>
<td>Tadasana</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4weeks / Six days</td>
<td>One round</td>
<td>-</td>
<td>-</td>
<td>2 sec</td>
<td></td>
<td>2 minutes</td>
</tr>
<tr>
<td>4</td>
<td>Urdhva Hastasana</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4weeks / Six days</td>
<td>One round</td>
<td>-</td>
<td>-</td>
<td>2 sec</td>
<td></td>
<td>2 minutes</td>
</tr>
<tr>
<td>5</td>
<td>Utthanasana</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4weeks / Six days</td>
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<td>-</td>
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<td>2 minutes</td>
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<tr>
<td>6</td>
<td>Prasarita Padottanasana</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4weeks / Six days</td>
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<td>-</td>
<td>-</td>
<td>2 sec</td>
<td></td>
<td>2 minutes</td>
</tr>
<tr>
<td>7</td>
<td>Adhomukha Svanasana</td>
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<td>One round</td>
<td>-</td>
<td>-</td>
<td>2 sec</td>
<td></td>
<td>2 minutes</td>
</tr>
<tr>
<td>8</td>
<td>Uthitha Trikonasana</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4weeks / Six days</td>
<td>One round</td>
<td>-</td>
<td>-</td>
<td>2 sec</td>
<td></td>
<td>2 minutes</td>
</tr>
<tr>
<td>9</td>
<td>Ustrasana</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4weeks / Six days</td>
<td>One round</td>
<td>-</td>
<td>-</td>
<td>2 sec</td>
<td></td>
<td>2 minutes</td>
</tr>
<tr>
<td>10</td>
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<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td></td>
<td>2 minutes</td>
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<td>110 sec</td>
<td>10 sec</td>
<td></td>
<td>2 minutes</td>
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<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td></td>
<td>2 minutes</td>
</tr>
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<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td></td>
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<td>16</td>
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<td>10 sec</td>
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<td>2 minutes</td>
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<td>One round</td>
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</tr>
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<td>-</td>
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<td>2 min</td>
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</tr>
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<td>-</td>
<td>2 sec</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Uthitha Trikonasana</td>
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<td>One round</td>
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<td>2 sec</td>
<td>2 min</td>
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<td>One round</td>
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<td>-</td>
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<td>2 min</td>
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</tr>
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<td>Virasana</td>
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<td>-</td>
<td>10 min</td>
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<tr>
<td>11</td>
<td>Adhomukha Virasana</td>
<td>1st 4 weeks / Six days</td>
<td>2 times</td>
<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td>2 min</td>
<td></td>
</tr>
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<td>12</td>
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<td>2 min</td>
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<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td>2 min</td>
<td></td>
</tr>
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<td>15</td>
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<td>8 breath</td>
<td>110 sec</td>
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<td>2 min</td>
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<td>2 times</td>
<td>8 breath</td>
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<td>10 sec</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Supta Virasana</td>
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<td>2 times</td>
<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td>2 min</td>
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<td>20</td>
<td>Savasana</td>
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<td>2 times</td>
<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td>2 min</td>
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</tr>
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<td>PRANAYAMA</td>
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</tr>
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<td>22</td>
<td>Ujjai</td>
<td>1st 4 weeks / Six days</td>
<td>2 times</td>
<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Viloma</td>
<td>1st 4 weeks / Six days</td>
<td>2 times</td>
<td>8 breath</td>
<td>110 sec</td>
<td>10 sec</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Meditation</td>
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<td>1 times</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5 – 10 min</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Relaxation</td>
<td>1st 4 weeks / Six days</td>
<td>1 time</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10 - 20 min</td>
<td></td>
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</table>
**TABLE VI**

**HATHA YOGA SADHANA PRACTICES**

*(EXPERIMENTAL GROUP - I) IX TO XII WEEKS*

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Yogic Practices</th>
<th>Frequency</th>
<th>Repetition or round</th>
<th>Breathe</th>
<th>Duration</th>
<th>Rest</th>
<th>Total duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loosening Exercises</td>
<td>1st 4 weeks / Six days</td>
<td>One round</td>
<td>-</td>
<td>-</td>
<td>2 sec</td>
<td>2 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Suryanamaskar</td>
<td>1st 4 weeks / Six</td>
<td>3 – 6 round</td>
<td>-</td>
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<tr>
<td>3</td>
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<td>-</td>
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<td>2</td>
<td>2 minutes</td>
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<tr>
<td>4</td>
<td>Urdhva Hastasana</td>
<td>1st 4 weeks / Six</td>
<td>One round</td>
<td>-</td>
<td>2 sec</td>
<td>2</td>
<td>2 minutes</td>
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<td>5</td>
<td>Uthanasana</td>
<td>1st 4 weeks / Six</td>
<td>One round</td>
<td>-</td>
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<td>2</td>
<td>2 minutes</td>
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<td>6</td>
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<td>One round</td>
<td>-</td>
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<td>2 minutes</td>
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<tr>
<td>7</td>
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<td>-</td>
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<td>2 minutes</td>
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<td>8</td>
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<tr>
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<td>Virasana</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>10 minutes</td>
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<tr>
<td>11</td>
<td>Adhomukha Virasana</td>
<td>1st 4 weeks / Six</td>
<td>2 times</td>
<td>8 breath</td>
<td>110 sec</td>
<td>10</td>
<td>2 minutes</td>
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<tr>
<td>12</td>
<td>Janushirsasana</td>
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<td>10</td>
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<td>Paschimotasana</td>
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<td>Shalabasana</td>
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<td>Viparita Krani</td>
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<td>10</td>
<td>2 minutes</td>
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<td>20</td>
<td>Savasana</td>
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**PRANAYAMA**

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<th>Repetition or round</th>
<th>Breathe</th>
<th>Duration</th>
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3.9 TRAINING PROGRAMME

Programme based on the recommendations of Bihar School of Yoga was given to Experimental Group I

TRAINING: LOOSENING THE LIMBS/ PAVANA MUKTASANA (I)

Ankle bending

- Sit on the floor, legs outstretched on the floor. The fingers should point out of the hips or lean back against a wall.
- Bend the right foot back toward the body.
- While exhaling point the right foot and toes forward and down.
- On inhale, bring the foot back toward you.
- Repeat 10 times.
- Do the same with the left foot. One can make two rounds of this
- Exercise and after some practice, exercise both foot at the same time.

Ankle Rotation

- Sit on the floor or lean back against a wall. Extend the legs fully in front.
• Tightly roll the Yoga Mat or Yoga Blanket and put it under the knees, then place the palms on the floor. The fingers must be pointing towards the hips.

• Breathing freely and slowly, bend the right foot creating a right angle with the floor. Slowly rotate the foot clockwise for about 10-15 times then rotate it counterclockwise. Do not allow the knees to move.

Wrist bending

• Sit comfortably on the floor or Yoga Mat.

• At shoulder height and parallel to the floor, straighten the hand in front.

• Turn the palm down and extend the fingers and thumb forward and close together.

• Inhale while bending the hand at the wrist backward as if pressing hard against an object.

Hand clenching
• Do a seated pose where one feels most comfortable or sit straight on a chair. Bring the arm in front at shoulder level, keeping it straight and parallel to the floor.

• Make a fist with the thumb side up, thumb inserted into the other fingers.

• Open the hand with inhale then stretch all your five fingers. Fold the hand back into a fist as you exhale, thumb tucked in.

• Repeat this exercise for about 8 times then do the same with the other hand. After some practice, one may be able to do Hand Clenching on both hands at the same time.

**Neck exercise**

• Bend the head forward, chin on chest, then back to original position.

• Bend to the right, then back to the original position.

• Bend backward, then back to the original position.

• Bend to the left, and then back to the original position.

• Bend forward, chin on chest, move from right to the left, then move from left to right.
Shoulder lifts

- Do this exercise slowly and keep your spine straight and your neck relaxed.
- Raise your right shoulder, then drop it down.
- Raise your left shoulder, then drop it down.
- Raise both shoulders at once, then drop them down again.

Shoulder stretches

- Sit in any comfortably erect position
- Hold the strap and straighten the arms forward. With inhale, move the arms up until they are overhead, and with exhale bring them down behind.
- Coordinate this movement with breathing, making the movement smooth.
- Make sure the strap is sufficiently long and hands sufficiently far apart, so that one can keep the arms straight.
COUNT 1 Namaskarasana

Stand on the mat and start with the Yoga Mountain Pose. Bring your palms together in prayer position. Exhale.

COUNT 2 Urdhva hasthasana

With inhalation, raise the arms overhead, keeping the palms together.

COUNT 3 Padahasthasana

Exhale and then bend forward until your hands touch your feet.
COUNT 4 Ashva sanchalasana

With inhalation, step the right leg back, arch back and lift the chin.

COUNT 5 Hasthadandasana

Exhaling, step the left leg back into plank position. Keep your spine and legs in a straight line and support your weight on hands and feet.

COUNT 6 Ashtanga namaskar

Retaining the breath, lower your knees, your chest and then your forehead, keeping your hips up and toes curled under.

COUNT 7 Urdhvamukha shvanasana

Inhaling, stretch forward and bend back. Keep your arms straight.

COUNT 8 Adhomukha shvanasana

Exhaling, curl your toes under, press down into your heels, and lift your hips.

COUNT 9 Ashvasanchalasana

As you inhale, move your left leg back, with the top of the foot stretched out flat on the floor, and lift your chin.

COUNT 10 Padahasthasana

Exhale and then bend forward until your hands touch your feet

COUNT 11 Ardhachakrasana

Inhaling, stretch your arms forward and over your head. Slowly bend backward from the waist.
COUNT 12 Tadasana Exhaling, gently come back to Tadasana

The following asanas were given

Tadasana

Stay with the feet on the mat, hands beside the thighs with stretched spine.

Urdhva Hastasana

As one inhale, raise the arms overhead, keeping the palms together.
Utthita Trikonasana

The Sanskrit word tri means three and kona means corner or angle. Thus “three corner or three angle posture” is often called the triangle posture.

1. Come to sthiti tadasana.

2. Separate the feet slightly further than shoulder distance apart about a meter.

3. Inhale and raise both arms straight out from the shoulders parallel to the floor with the palms facing down.

4. Exhale slowly while turning the torso to the left, bend at the waist and bring the right hand down to the left ankle. The palm of the right hand is placed along the outside of the left ankle. The left arm should be extended upward. Both legs and arms are kept straight without bending the knees and elbows.

5. Turn the head upward to the left and gaze up at the fingertips of the left hand. Maintain at the final posture for 1 minute with normal breathing. This posture can be held longer by breathing gently through the nostrils rather than holding the breath.

6. Return to sthiti and repeat the same to the left side.
Adhomukha Svanasana

1. Come onto the floor on the hands and knees. Stretch the elbows and relax the upper back between the shoulder blades, which gives the feeling that the arms fall into the shoulder blades.

2. Exhale and lift the knees and draw the back backwards from the pelvis, so that the arms and back form one line.

3. Stretch the legs in such a way that one get the feeling that someone behind is pulling the legs and hips backwards from the top of the upper legs. Let the head hang down in a relaxed sort of way.

4. Having placed the back and legs correctly, stretch out the arms. This result in a stretching from two sides of the back: a stretching from the pelvis and a stretching from the arms. When the back and the chest are placed correctly, you will notice that you can quietly breathe in and out through the belly. One should not let the chest hang downwards or make the back extremely sunken. In this Asana, the back should be lengthened along its entire length.
Uttita Parsvakonasana

1. Come to sthiti Tadasana.

2. Inhale and spread your legs apart about 3 to 4 feet.

3. Stretch your arms straight out from the shoulders parallel to the floor with your palms facing down.

4. Turn your right foot toward the right side of the body 90 degrees, so that the toes are pointing away from the body.

5. Exhaling, Bend your right knee about 90 degrees and bring the trunk to rest on the right thigh, place the right hand

6. Place the palm of your left hand flat on the floor next to the outside of your right foot. Rest the right elbow on the outside of the right knee.

7. Stretch the right arm over your head, parallel with the floor, with the inside of the elbow resting on the ear. Hold for about 30-60 seconds while breathing gently through the nostrils.

8. Slowly return to a standing position and repeat the same to the other side.
Ardha chandrasana

1. Start with a trikonasana with the left hand resting on the hip.

2. Slightly bend right knee then move a bit forward.

3. Move the right hand forward - a few inches from the toes of the right leg

4. Exhale and press the right hand and right heel into the floor for balance. Lift the left leg parallel to the floor.

5. Raise the left hand. It should be aligned with the right hand. Bear the weight on the right leg.

Uttanasana with prop

1. Start with the Mountain Pose.
2. As you inhale, raise the arms above the head.

3. Bend forward until the hands touch the feet and rest the head on the brick for support.

4. Slowly bend further so that the belly is touching the upper legs. After grabbing the ankles or toes, use a slight stretching force to lengthen the body. With the pull from the hands, move the belly to upper legs and prevent the chest to sink and lose the supportive power of the lower back during the exercise.

**Dandasana**

![Dandasana Image]

Sit erect with the spine straight and pull the knee caps, and palms on the mat.

**Virasana**

![Virasana Image]
1. Start with the hands and knees on the floor as in the Cat Pose. Have the knees hip-width apart so the thighs are parallel with one another, and separate the feet until they are slightly wider than the hips. Check that the feet are pointing directly backward, not turning in or out.

2. Sit between the feet by first supporting oneself with the hands and then slowly lowering hips to the floor. If one is unable to sit comfortably, or if one feel any pain in the knees, elevate the hips by placing a folded Yoga Blanket beneath.

**Baddhakonasana**

1. From dandasana, fold the legs so that the feet touches each other.

2. Keep the back straight and focus on the breathing.

**Swastikasana**
1. From dandasana, fold the right leg and keep it on the other calf muscle.

2. The left leg is folded and kept on the right calf muscle so that the ankles touch each other.

**Navasana**

1. Sit down on Yoga Mat. Pull in the legs and grab upper legs on the back side below the knees. Tilt the upper body backwards so that the lower back carries the weight and the entire upper back is aligned in a straight perpendicular line.

2. Slightly pull legs with the arms to maintain the posture.

3. Extend the arms forward and parallel to the floor.

4. Stretch the legs and feet together. See to it that the back remains straight. When the position easy, one can reduce the stretching power of arms without changing the position. Eventually bring the arms along the body parallel to the floor and focus on a particular spot for balance. Quietly breathe in and out through belly and try to maintain relaxation during the efforts.
Upavistakonasana

1. From dandasana, open the legs wide apart
2. On inhalation, raise the hands
3. On exhalation, bend forward, stay comfortably

Pascimatanasana (Back / Western Portion Up Pose or Extreme Stretching Pose)

1. Come to sthiti dandasana.
2. Inhale, raise both the arms sideways at shoulder level parallel to the ground.
3. Turn the palm facing upwards.
4. Continue to inhale and raise the arms further up vertically biceps touching the ears and stretch the trunk from the coccyx region. Now turn the palm forwards.
5. Exhale; bend the trunk forwards from the lower back. Stretch the arms. Hands parallel to the ground.
6. Exhale completely, from hooks of index fingers and catch hold of the big toes.

7. Bend the back further forward from the lumbar region so that the trunk is stretched along the thighs and the face rest on the knee. Bend the hands at the elbow and relax the abdomen muscles. Do not allow the knees to bend.

8. Maintain the position for about a minute with normal breathing.

9. Return to sthiti reversing the steps and the breathing.

10. Relax in sithila dandasana

**Janushirsasana**

1. From dandasana, fold right leg and keep sole of foot on the left thigh

2. On inhale stretch hands above the head

3. On exhalation, bend forward and remain for sometime. Then come back and do for the other side.

**Adhomukha Virasana**
1. Kneel and sit on the feet with the heels pointing outward. Knees should be separated, about the width of the hips. Keep the bolsters in front, between the knees.

2. Place the forehead on the bolsters, and then swing the arms forward

**Bharadvajasana**

1. From dandasana, fold the left leg and keep it underneath the anus.

2. Then fold the other leg under the left ankle.

3. Inhale, raise the right hand and exhalation twist the trunk. Do it on other side also.

**Marichyasana**
1. Sit on the floor with both legs straight in front.

2. Bend the left leg towards the chest.

3. Rotate the torso toward the left knee. Wrap the right arm around the left knee, positioning the knee in the crook of the right elbow.

4. Clasp the hands. Keep the back straight all throughout the pose.

**Salamba sarvangasana**

1. Lie flat on the back in the shavasana.

2. Inhale, raise the legs together slowly and grace fully (without bending the knees) till it forms about 45° to the ground.

3. Continue to inhale and raise the legs further to 90° positions. Bring the arms down and place them next to the buttocks.

4. Exhale; raise the buttocks and the trunk, taking support of the arms and elbows, without lifting the head. Rest the elbows on the ground firmly and support the back with both palms.

5. While retaining the legs parallel to the ground, straighten the trunk bye pushing it with the hands until the chin is well set in the suprasternal hollow.
6. Inhale and raise the legs vertically keeping the body erect and come to the final shoulder stand position.

7. Maintain effortlessly with normal breathing for about 2-3 minutes. Carefully avoid all jerks.

8. Slowly come back to sthiti and relax in savasana.

**Halasana**

1. Lie flat on the back in the shavasana.

2. Inhale, raise the legs together slowly and gracefully (without bending the knees) till it forms about 45 to the ground.

3. Continue to inhale and raise the legs further to 90° positions. Bring the arms down and place them next to the buttocks.

4. Exhale; raise the buttocks and the trunk, taking support of the arms and elbows, without lifting the head. Rest the elbows on the ground firmly and support the back with both palms.

5. Maintain the legs parallel to the ground; straighten the trunk bye pushing it up with the hands until the chin is well set in the suprasternal hollow.

6. Exhale; bring down the toes further to touch the ground. Release both hands and rest the arms straight on the ground parallel to each other with palms facing the ground.
7. Maintain this position with normal breathing for one minute.

8. Inhale; come back slowly step by step to rest the trunk on the floor.

9. Now exhale and bring down the legs to the ground.

10. Relax in savasana.

**Viparita Karani**

1. Keep the bolster against the wall.

2. Lie down against the wall so that the hips is raised and rested on the bolster.

3. Slowly put the legs up on the wall. Rest there comfortably.
Ustrasana (Camel Pose)

1. Sit in Vajrasana.

2. Stand on the knees.

3. Place the palm on the waist with fingers pointing forwards.

4. Inhale and bend the trunk backwards and place the palms on the heels (the thigh should be perpendicular to the ground)

5. Maintain for about a minute with normal breathing.

6. Exhale while coming back to sthiti.

7. Relax in sithila dandasana.

Supta padangusthasana

1. lie down on the mat.

2. Raise the right leg and hold the big toe with the right palm
3. Drop the leg and do it for other side.

**Supta baddhakonasana**

1. From dandasana, fold the legs so that the feet touches each other.

2. Keep the bolster touching the lower back.

3. Then slowly with inhalation, drop the entire back on the bolster, with the hands stretched.

**Supta virasana**

1. Sit in virasana.

2. Keep the bolster touching the lower back.

3. Then slowly with inhalation, drop the entire back on the bolster, with the hands stretched.
Savasana

After the asanas session, either Savasana relaxation was given or Ujjayi and Viloma Pranayama were given.

3.10 ADMINISTRATION OF TESTS

3.10.1 PHYSIOLOGICAL VARIABLES

BLOOD PRESSURE (SYSTOLIC AND DIASTOLIC BLOOD PRESSURE)

Purpose

To measure the systolic and diastolic blood pressure at rest.

Equipment

Sphygmomanometer and stethoscope was used to measure the blood pressure.

Procedure

It can be viewed straight on and within 15 inches of the viewer. Right arm will be used when possible. Upper arm should be bare and unconstructed by clothing. Select the appropriate size cuff. The bladder width should equal at least 40% of the circumference of the upper arm, and the length of the bladder should be 80% of the circumference of the arm, but no more than 100%. Palpate the location of the brachial artery (on the upper arm’s inner aspect). Position the center of the cuffs bladder over the brachial artery. Apply the cuff evenly and snugly one inch
(2.5cm) above the antecubial fossa (bend of arm). Check snugness at both top and bottom of the cuff. Position the arm the cuff is at heart level. The arm should rest firmly supported on a table, slightly abducted and bent, with palm up. For the first reading only, obtain estimated systolic pressure. Palpate the radial artery pulse. Inflate the cuff to the point where the pulse can no longer be felt. Slowly deflate the cuff, noting on the gauge the point where the pulse reappears/can again be felt. This is the estimated systolic pressure. Rapidly deflate the cuff. Wait at least 15-30 seconds before re-inflating the cuff to begin the first auscultators measurement. (This allows good circulation to be reestablished). Calculate the maximum inflation level (MIL) by adding 30mm Hg to the estimated systolic pressure. At the time of testing the clients’ position was, legs should be uncrossed, feet resting firmly on the floor and the back supported while blood pressure is being measure. (Clients may need to be reminded to uncross their legs each time ready to take a blood pressure reading). Insert the stethoscope earpieces, angled forward to fit snugly. Place the bell or the diaphragm head of the stethoscope lightly over brachial artery at the bend of the elbow, but with good skin contact. Avoid too much pressure, which can close off the vessel and distort the sounds, therefore altering the reading). The bell head is preferred because it permits more accurate auscultation of the Korotkoff sounds than the diaphragm, especially in the interpretation of the diastolic readings).

Deflate the cuff slowly and consistently at the rate of 2mm per pulse beat. The rate of deflation should be slow enough to accurately evaluate the exact millimeter marking of the Korotkoff sounds heard. Once deflation has begun, never reinflate. Where the first sharp rhythmic sounds appears in relation to the number of markings on the gauge. This is the systolic pressure.

Continue deflation at the established rate. The gauge where the last sound is heart. This is the diastolic pressure (5th Korotkoff phase) in adults. Continue
deflation for 10mm Hg past the last sound. (This assures that the absence of sound is not a “skipped” beat but is the true of the sound). Then deflate the cuff rapidly and completely.

**Record**

The readings to the nearest 2 mm (round off upward). This means all readings taken with non-electronic equipment will be stated and written in even numbers.

**Scoring**

Unit of measures was mm/Hg *(Perloff, et al., 1993)*.

**HEART RATE**

**Purpose**

To record the resting heart rate of each subject per minute.

**Equipment**

A stop watch and stethoscope was used to measure the resting heart rate.

**Procedure**

The resting pulse rate of the subjects was measured by the stethoscope. The resting heart rates for all the subjects were recorded in a sitting position, in the morning. The subjects were asked to sit down on the bench and relax for 15 minutes prior to the test.

**Scoring**

The number of beats per minute was recorded as the scores *(Coastill, 2006)*.
3.10.2 CLINICAL VARIABLES

HEMOGLOBIN

**Purpose**: To record hemoglobin level in the blood.

**Equipments**: Standard Laboratory test

**Procedure**: Recorded in a sitting relaxation position

**Scoring**: Investigation Reports

TOTAL CHOLESTEROL

**Purpose**: To record Total cholesterol in the blood.

**Equipments**: Standard Laboratory test

**Procedure**: Recorded in a sitting relaxation position

**Scoring**: Investigation Reports

CALCIUM

**Purpose**: To record Calcium in the blood.

**Equipments**: Standard Laboratory test

**Procedure**: Recorded in a sitting relaxation position

**Scoring**: Investigation Reports
3.10.3 PSYCHOLOGICAL VARIABLE

DEPRESSION

**Purpose** : The purpose of this test is to measure the Depression level of the subjects.

**Equipment** : Goldberg Depression Questionnaire designed by Ivan Goldberg (1993)

**Procedure** : The questionnaire administered in group setting and the subjects were seated comfortably. The researcher has explained about the questionnaire and made them to fill up the questionnaire.

The following instructions were given to the subjects.

This questionnaire has 18 statements, each statement describe some personal experience. Each statement was evaluated on given six options.

The researcher requested them to read each statement carefully and decide to what extent each statement was true asked them to put tick mark at the appropriate option

**Scoring** : 0 points Not at all

1 point Just a little

2 points somewhat

3 points moderately

4 points Quite a lot

5 points Very much

The higher the number the more severe the depression.

**Norms** : 0-9 No Depression Likely

10-17, Possibly Mildly Depressed
18-21, Borderline Depression
22-35, Mild-Moderate Depression
36-53, Moderate-Severe Depression
54 and up, Severely Depressed

**Emotional maturity scale (EMS)**

**Purpose:**

Emotional maturity is not only the effective determinant of personality pattern but it also helps to control the growth of adolescent’s development. The concept “mature” emotional behavior of any level is that which reflects the fruits of normal emotional development. A person who is able to keep his emotions under control, who is able to broke delay and to suffer without self-pity, might still be emotionally stunned and childish.

**Procedure:**

A) Emotional stability.

B) Emotional progression.

C) Social adjustment.

D) Personality integration.

E) Independence.

**Test**

Given questioners forty eight, tick what they want to say.

Quartile deviations of scores for N = 60.

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B  emotional progression  .63
C  social adjustment  .58
D  personality integration  .86
E  independence  .42

Scores          Interpretation

50-80           extremely emotionally mature
81-88           moderately emotionally mature
89-106          emotionally immature
107-240         extremely emotionally immature

ANXIETY

Purpose : The purpose of this test is to measure the Anxiety level of the subjects

Equipment : Anxiety Questionnaire developed by Tayler (1952).

Procedure : The questionnaire administered in group setting and the subjects were seated comfortably. The researcher has explained about the questionnaire and made them to fill up the questionnaire.

The following instructions were given to the subjects. Questionnaire has 50 statements, each statement describe some personal experience. Each statement was evaluated on either true or false. The researcher requested them to read each statement carefully and decide to what extent each statement was true asked them to put tick mark at the appropriate option
Scoring: Scoring procedure for the positive statement:

If the answer is true for the positive statements, it gets ‘0’ mark.

If the answer is false for the positive statements, it gets ‘1’ mark.

Scoring procedure for the negative statement, marks are rewarded in the reverse. If the answer is true for the negative statements, it gets ‘1’ mark.

If the answer is false for the negative statements, it gets ‘0’ mark.

The maximum possible score is 50. Scores

Norms: Anxiety level

0-8 Normal anxiety

9-18 significantly anxious

19-30 highly anxious

31 and above Anxiety level in very high and uncontrollable.

3.11 COLLECTION OF DATA

To achieve the purpose of the study two groups consisting of 15 subjects each were selected at random, the experimental group was treated with hatha yoga sadhana for about twelve weeks (5 days/week). After the training period all subjects were tested on selected criterion variables at different levels as pre and post training.

The pre and post test data on the selected criterion variables were collected by administering the test as per the standardized procedures before and after the twelve
weeks of the training programme. Similarly the blood sample was collected from individuals.

3.12 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, psychological and clinical variables to find out the effect of Hatha yoga sadhana on selected physiological, psychological and clinical variables among Anorexia syndrome teenage girls. 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 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.