Chapter III

Methodology
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In this chapter the selection of Subjects, research design, selection of variables, criterion measures, tester reliability, Instrument reliability, orientation of the subjects, administration of tests, construction of training programmes and statistical techniques adopted for the analysis of data have been described.

SELECTION OF SUBJECTS

Sixty climacteric women of teaching faculty from various colleges in Coimbatore District, Tamilnadu, India were selected randomly and served as the subjects for the purpose of this study. The selected subjects were in the age group of 45 to 55 years.

EXPERIMENTAL DESIGN

This study was formulated using random group design consisting of specific yogic exercises and combination of specific yogic exercises with autogenic training groups. The subjects (N=60) were divided at random, into three equal groups of twenty climacteric women in each. The groups were assigned the names as follows:

1. Experimental group I- Specific yogic exercise group.
2. Experimental group II – Combination of specific Yogic exercise with autogenic training group.
3. Control group.
All the groups were subjected to pre-test prior to the experimental treatment. The experimental groups participated in their respective duration of twelve weeks, six days in a week throughout the study. The various tests administered were: prior to training (pre-test), mid period of training sixth week (second-test) and twelfth week (post-test) of the training schedule.

**SELECTION OF THE VARIABLES**

By going through the literature and after consulting with the experts in yoga and autogenic training, the investigator has chosen the variables which are specifically related to climacteric women. The selected physiological variables are pulse rate, vital capacity, systolic blood pressure, diastolic blood pressure and percent body fat. The selected psychological variables are job anxiety and depression. The selected biochemical variables are high density lipoprotein, low density lipoprotein, fasting Blood sugar hemoglobin and blood urea. Because at the climacteric stage they are much affected by these variables due the changes occurred in the body.

**RELIABILITY OF TEST**

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

**TESTER RELIABILITY**

To ensure that the investigator was well versed in the technique of conducting the tests, the investigator had a number of training
sessions in the testing procedures. All the measurements were taken by the investigator with the assistance of persons well acquainted with the tests and their procedures. In selected physiological, psychological and biochemical variables, the qualified lab technician administered the test.

The testers competency was obtained by pre-test, mid-test, post-test process whereby the consistencies of results were obtained. As very high correlation was obtained, the tester competency in taking measurement and test reliability were accepted.

SUBJECT RELIABILITY

The above test, re-test co-efficient of correlation also established that the subject reliability was highly significant.

INSTRUMENT RELIABILITY

Physiological measuring instruments used are generally available in the various research laboratories in India and abroad. Questionnaire used for measuring the psychological attitude was a standard one for many menopausal studies called Greene climacteric scale, with the permission of Dr. Greene. (Greene 1976) Biochemical measuring instruments were used from the Thyrocare India Biochemical Laboratory, which is a highly reputed laboratory in India.
ORIENTATION OF SUBJECTS

The investigator held a meeting with the subjects prior to the administration of tests. The purpose and significance of the study and the requirements of the testing procedures were explained to them in detail, so that there was no ambiguity in their minds regarding the efforts required for them. All the subjects voluntarily came forward to co-operate in the testing procedures and treatment to put in their best efforts in the interest of the scientific investigation in order to enhance their own performance. The subjects were very enthusiastic and co-operative throughout the project.

COLLECTION OF DATA

The data were collected from (N=60) climacteric women twenty in each group as specific yogic exercise group, combination of specific yogic exercise group and control group. Prior to training, after six weeks, after twelve weeks the data of physiological variables such as pulse rate, vital capacity, systolic blood pressure, diastolic blood pressure and percent body fat were collected through digital blood pressure and pulse rate monitor, peak flow meter and skin fold caliper, psychological variables such as anxiety and depression was collected through standardized questionnaire, biochemical variables such as high density lipoprotein, low density lipoprotein, fasting blood sugar, hemoglobin and blood urea were collected through blood samples with the help of the lab technician.
DESCRIPTIONS AND ADMINISTRATION OF THE TEST

PULSE RATE

**Purpose**: The purpose of this test was to measure the pulse rate.

**Equipments**: Pulse rate Monitor, comfortable table and chair.

**Procedure**: The pulse rate of all the subjects was recorded in a sitting position. Before taking the resting pulse rate, the subjects were asked to sit on a chair and relax for some time. To record the pulse rate, the subjects left arm was completely made bare to ensure that certain clothing does not press the blood vessels. The instrument was kept at the level of the heart; the subjects forearm was kept straight in relaxed position and the cuff was wrapped round the arm evenly then the instruments was automatically inflated until the artery collapsed fully and relaxed when the pulse rate was displayed on the monitor.

**Scoring**: Pulse rate was measured by the digital pulse rate monitor and recorded the beats per minute.

VITAL CAPACITY

**Purpose**: The purpose of this test is to measure the vital capacity of the subjects.

**Equipments**: Peak flow meter, table and a comfortable chair.

**Procedure**: To take vital capacity a wet Spiro meter was placed on a level surface table and adjusted for datum i.e. zero and the meter was rechecked. The subjects were instructed to stand erect with ease in a relaxed manner. Subjects had to exhale to the maximum with both the nostrils. Then they would inhale deeply through the nostrils to
hold the inhaled O2 in the lungs. The hose connected to the wet Spiro meter was held intact in the mouth of the subjects having the lips fully closed and subjects had to take care to see that both nostrils were closed so as to exhale through mouth as much as possible. The meter would indicate the reading for vital capacity.

**Scoring** : The reading indicated in the wet Spiro meter for each subjects was recorded the nearest liters.

**PERCENT BODY FAT**

High percentage of Body fat in relation to the total body weight is determined which may lead to obesity. Skin fold measurements are based upon the assumption that 50 percent of the body's fat lies beneath the surface of the skin, that it can be separated from muscle tissue, and that it can be accurately and reliably measured. Over weight and obesity are clearly associated with hypertension and heart diseases, but it is also an important factor contributing to higher level of physical performance in the activities where the total body fat must be removed.

**Purpose** : To measure the body fat in three different skin fold sites.

**Equipments**: Skinfold Caliper, pen, pad and white papers.

**Procedure** : The thumb and index finger are used to pinch the loose skin, this pinch consisting of a double layer of skin plus subcutaneous fat comprises the skinfold which is measured with a special caliper. The most accurate calipers maintain a constant jaw
pressure of 10 grams per square millimeter of surface area within 3 or 4 seconds to eliminate the error. If this precaution was not taken, the skin fold would have gradually decreased because the tissues will be squeezed out from the jaws of the caliper. The measurement was taken on the right side of the body with the standing position as given below.

1. Triceps skinfold was taken a vertical fold on the midline of the upper arm over the triceps, half way between tip of the shoulder to the tip of the elbow. The arm should be extended and relaxed when the measurement is taken.

2. Suprailium skinfold was taken on a diagonal fold above the crest of the ilium directly below the mid-axilla (armpit).

3. Thigh skinfold was taken a vertical fold on the front of the thigh midway between the hip and the knee joint on the standing position. The midpoint should be marked while the subjects were seated.

**Scoring**: The measurements were taken nearest millimeter and recorded against each individual. Three skinfold were used for estimating body density, fat using Durnin and Rehman formula. After estimating the body density, the fat percentage was calculated by using Durnin and Rehman formula and recorded in millimeters.
BLOOD PRESSURE

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

Equipments : Digital blood pressure monitor, Comfortable chair and table

Procedure : To take diastolic blood pressure, the subject was asked to sit on the chair comfortably and relax for some time. To record the diastolic blood pressure, the subjects left arm was completely made bare to ensure that certain clothing does not press the blood vessels. The instrument was kept on the table; the subjects forearm was kept straight in relaxed position and the cuff was wrapped round the arm evenly then the instruments was automatically inflated until the artery collapsed fully and relaxed then the systolic and diastolic blood pressure was displayed in the monitor.

Scoring : When the blood pressure was displayed in the monitor it was recorded as systolic and diastolic blood pressure separately in millimeters of mercury (mm. /hg)

ANXIETY AND DEPRESSION

Purpose : To measure the anxiety and Depression level of climacteric women.

Equipments : Standard questionnaire, questionnaire key, pen, pad and white papers.

Procedure : The subjects were seated on the chair. A questionnaire and a pencil were distributed. Proper instructions were given for filling
up the questionnaire. Mutual discussions were absolutely eliminated and the subjects read the questions one by one and ticked the answers of their choice. After filling up the questionnaire they were collected from the subjects and were arranged properly. Points gained were noted for each question and summing up of points was carried out. The level of anxiety and Depression was calculated by using the key.

**Scoring**: Each symptom is rated by the subject according to its severity using a four point rating scale. Such a rating method was used in her original factor analysis (1) and gives greater sensitivity to the measures than does a binary present/absent rating. Scores are assigned as follows: Not at all = 0, A little = 1, Quite a bit = 2, extremely = 3. Among the 11 Questions Anxiety (A) — sum items 1 to 6, Depression (D) — sum items 7 to 11. The Scale can also be used to identify menopausal women who are severely and possibly clinically anxious and/or depressed. The recommended cut-off points are:

- **Anxious** = Anxiety Score of 10 or more
- **Depressed** = Depression Score of 10 or more.

**HIGH DENSITY LIPOPROTEIN**

**Purpose**: The purpose of this test was to measure the level of high density lipoprotein in the blood sample.

**Equipments**: Disposable single use syringe, elastic band, sample test tube, test tube case, chair, table, wet cotton and alcohol.
Procedure: Collection of the blood sample was done by the lab technician. The subjects were asked to sit on the chair comfortably. The elastic band was wrapped around the upper arm to stop the flow of blood, ask the subjects to tighten their fist as much as possible so that the vein can be visible for the easy collection of blood was possible. The area where the blood has to be collected was cleaned with alcohol using a cotton wool. The needle was slowly pricked on the vein and enough blood samples were collected then the needle with syringe was taken back from the vein and cotton was placed on the particular point to stop the bleeding then the elastic band was removed from the upper arm, then the syringe with needle is dismantled after that the blood sample was pored in the sample test tubes and labeled correctly and taken by the lab technician to the laboratory to test the level of high density lipoprotein in the blood sample.

Scoring: Laboratory results revealed the amount of high density lipoprotein in the blood sample and it was recorded separately straight to the name of the subjects in milligram/deciliters.

LOW DENSITY LIPOPROTEIN

Purpose: The purpose of this test was to measure the level of low density lipoprotein in the blood sample.

Equipments: Disposable single use syringe, elastic band, sample test tube, test tube case, chair, table, cotton and alcohol.
**Procedure**: Collection of the blood sample was done by the lab technician. The subjects were asked to sit on the chair comfortably. The elastic band was wrapped around the upper arm to stop the flow of blood, ask the subjects to tighten their fist as much as possible so that the vein can be visible for the easy collection of blood was possible. The area where the blood has to be collected was cleaned with alcohol using a cotton wool. The needle was slowly pricked on the vein and enough blood samples were collected then the needle with syringe was taken back from the vein and cotton was placed on the particular point to stop the bleeding then the elastic band was removed from the upper arm, then the syringe with needle is dismantled after that the blood sample was poured in the sample test tubes and labeled correctly and taken by the lab technician to the laboratory to test the level of low density lipoprotein in the blood sample.

**Scoring**: Laboratory results revealed the amount of low density lipoprotein in the blood sample and it was recorded separately straight to the name of the subjects in milligram/deciliters.

**FASTING BLOOD SUGAR**

**Purpose**: The purpose of this test was to measure the level of fasting blood sugar in the blood sample.

**Equipments**: Disposable single use syringe, elastic band, sample test tube, test tube case, chair, table, wet cotton and alcohol.
**Procedure**: Collection of the blood sample was done by the lab technician. The subjects were asked to sit on the chair comfortably. The elastic band was wrapped around the upper arm to stop the flow of blood, ask the subjects to tighten their fist as much as possible so that the vein can be visible for the easy collection of blood was possible. The area where the blood has to be collected was cleaned with alcohol using a cotton wool. The needle was slowly pricked on the vein and enough blood samples were collected then the needle with syringe was taken back from the vein and cotton was placed on the particular point to stop the bleeding then the elastic band was removed from the upper arm, then the syringe with needle is dismantled after that the blood sample was poured in the sample test tubes and labeled correctly and taken by the lab technician to the laboratory to test the level of fasting blood sugar in the blood sample.

**Scoring**: Laboratory results revealed the amount of fasting blood sugar in the blood sample and it was recorded separately straight to the name of the subjects in mgs./dl.

**HEMOGLOBIN**

**Purpose**: The purpose of this test was to measure the level of hemoglobin in the blood sample.

**Equipments**: Disposable single use syringe, elastic band, sample test tube, test tube case, chair, table, wet cotton and alcohol.
**Procedure** : Collection of the blood sample was done by the lab technician. The subjects were asked to sit on the chair comfortably. The elastic band was wrapped around the upper arm to stop the flow of blood, ask the subjects to tighten their fist as much as possible so that the vein can be visible for the easy collection of blood was possible. The area were the blood has to be collected was cleaned with alcohol using a cotton wool. The needle was slowly pricked on the vein and enough blood samples were collected then the needle with syringe was taken back from the vein and cotton was placed on the particular point to stop the bleeding then the elastic band was removed from the upper arm, then the syringe with needle is dismantled after that the blood sample was pored in the sample test tubes and labeled correctly and taken by the lab technician to the laboratory to test the level of hemoglobin in the blood sample.

**Scoring** : Laboratory results revealed the amount of hemoglobin in the blood sample and it was recorded separately straight to the name of the subjects in gms./dl.

**BLOOD UREA**

**Purpose** : The purpose of this test was to measure the level of blood urea in the blood sample.

**Equipments** : Disposable single use syringe, elastic band, sample test tube, test tube case, chair, table, wet cotton and alcohol.
**Procedure**: Collection of the blood sample was done by the lab technician. The subjects were asked to sit on the chair comfortably. The elastic band was wrapped around the upper arm to stop the flow of blood, ask the subjects to tighten their fist as much as possible so that the vein can be visible for the easy collection of blood was possible. The area were the blood has to be collected was cleaned with alcohol using a cotton wool. The needle was slowly pricked on the vein and enough blood samples were collected then the needle with syringe was taken back from the vein and cotton was placed on the particular point to stop the bleeding then the elastic band was removed from the upper arm, then the syringe with needle is dismantled after that the blood sample was pored in the sample test tubes and labeled correctly and taken by the lab technician to the laboratory to test the level of blood urea in the blood sample.

**Scoring**: Laboratory results revealed the amount of blood urea in the blood sample and it was recorded separately straight to the name of the subjects in mgs. / dl.
CONSTRUCTION OF COMBINATION OF SELECTED YOGIC EXERCISE WITH AUTOGENIC TRAINING AND SELECTED YOGIC EXERCISE PROGRAMME

Training programme which included prayer, breathing exercise, loosening exercise, suryanamaskar, asana, pranayama, meditation and specific autogenic training was designed systematically and scientifically. The training programme is a comprehensive through one which would improve the selected physiological, psychological and biochemical problems of the climacteric women.

PILOT STUDY

In addition to the literature available, a pilot study was conducted to collect the following training details by sending a questionnaire to a number of experts in yoga and autogenic training from various states in India.

1. The volume of various specific yogic exercises and combination of specific yogic exercise with autogenic training programme.
2. The volume of technical and tactical training.
3. The means and method to be followed.

Based on the literature available and the opinion of the experts, the following training details were determined for specific training programme:
Duration of training period : Twelve weeks

Maximum of training schedules followed in a week : six days

Number of sessions per day : One (morning)

Duration of session : Preparation phase I - 30 minutes
                   : Preparation phase II - 40 minutes

The exercises, frequency, density, density in percentage and the volume of training for combination of selected yogic exercise with autogenic training and selected yogic exercises, technical and tactics, means and method to be followed and plans were summarized in the tables.

LOAD PROGRESSION

The principle of progression of load was adopted. The load dynamics was arranged such a way that the volume increases initially and intensity increased in the end.

TRAINING MEANS AND METHODS

The following means and methods were adopted for improving selected physiological, psychological and biochemical variables during the training programme.
VITAL CAPACITY

PULSE RATE & BLOOD PRESSURE

VITAL CAPACITY
PERCENT BODYFAT

BLOOD TEST TO ANALYSE BIO CHEMICAL VARIABLES
TRIKONASANA

PASCHIMOTTANASANA
PRASARITA PADOTTASANA

SETHUBANDHA SARVANGASANA
Matsyasana

Paschimottanasana

Paschimottanasana
<table>
<thead>
<tr>
<th>YOGIC EXERCISES</th>
<th>BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prayer</td>
<td>Controlling the emotional problems and calming the mind to get full involvement to participate in the training schedule</td>
</tr>
<tr>
<td>Sithilikarana vyayama</td>
<td>Different breathing exercises and loosening exercises to warm the body and regulate blood pressure and sugar level</td>
</tr>
<tr>
<td>Suryanamaskar</td>
<td>Enables the endocrine glands to function properly and it alleviates depression and anxiety</td>
</tr>
<tr>
<td>Asana</td>
<td>Gives effect to the abdominal organs, normalize the functions of glands and relieves the symptoms of menopause and melts mild depression and anxiety</td>
</tr>
<tr>
<td>Pranayama</td>
<td>Increases the vital capacity, reduces cholesterol sugar and urea in blood and regulates the blood pressure.</td>
</tr>
<tr>
<td>Meditation</td>
<td>It reduces anxiety and depression and maintains blood pressure and pulse rate level.</td>
</tr>
<tr>
<td>Relaxation</td>
<td>Savasana is performed for relaxation, as it reduces anxiety and depression.</td>
</tr>
</tbody>
</table>
TABLE 2

BENEFITS OF COMBINATION OF SELECTED YOGIC EXERCISES WITH AUTOGENIC TRAINING GROUP

<table>
<thead>
<tr>
<th>YOGIC EXERCISES</th>
<th>BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prayer</td>
<td>Controlling the emotional problems and calming the mind to get full involvement to participate in the training schedule</td>
</tr>
<tr>
<td>Sithilikarana vyayama (loosening exercises)</td>
<td>Different breathing exercises and loosening exercises to warm the body and regulate the blood pressure and sugar level</td>
</tr>
<tr>
<td>Suryanamaskar</td>
<td>Enables the endocrine glands to function properly and it alleviates depression and anxiety and percentage of body fat.</td>
</tr>
<tr>
<td>Asana</td>
<td>Gives effect to the abdominal organs, normalizes the functions of glands and relieves the symptoms of menopause and melts mild depression and anxiety</td>
</tr>
<tr>
<td>Pranayama</td>
<td>Increases vital capacity, reduces cholesterol, sugar and urea in the blood and regulates blood pressure.</td>
</tr>
<tr>
<td>Autogenic Training</td>
<td>It reduces anxiety and depression and maintains blood pressure and pulse rate level as it makes the body totally relaxed.</td>
</tr>
<tr>
<td>Relaxation</td>
<td>Three types of relaxation totally relaxes the nervous system and muscular systems and alleviates symptoms of anxiety and depression</td>
</tr>
</tbody>
</table>
## TABLE 3

LOADING PATTERN IN THE SPECIFIC YOGIC EXERCISE GROUP - TRAINING SCHEDULE

<table>
<thead>
<tr>
<th>YOGIC EXERCISES</th>
<th>Training period - I</th>
<th>Training period - II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Duration</td>
</tr>
<tr>
<td>Prayer</td>
<td>One time</td>
<td>1 min.</td>
</tr>
<tr>
<td>Breathing practice</td>
<td>Two times</td>
<td>4 min</td>
</tr>
<tr>
<td>Sithilikarana vyayama (loosening exercises)</td>
<td>One time alternate</td>
<td>4 min</td>
</tr>
<tr>
<td>Suryanamaskar</td>
<td>One time</td>
<td>4 min</td>
</tr>
<tr>
<td>Meditation</td>
<td>One time</td>
<td>5 min</td>
</tr>
<tr>
<td>Pranayama</td>
<td>Three times</td>
<td>4 min</td>
</tr>
<tr>
<td>Asana</td>
<td>Two times</td>
<td>5 min</td>
</tr>
<tr>
<td>Relaxation</td>
<td>One time</td>
<td>3 min</td>
</tr>
</tbody>
</table>
TABLE 4
LOADING PATTERN IN THE COMBINATION OF SELECTED YOGIC EXERCISE WITH AUTOGENIC TRAINING GROUP - TRAINING SCHEDULE

<table>
<thead>
<tr>
<th>Yogic exercises</th>
<th>Training period-I</th>
<th>Training period -II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Duration</td>
</tr>
<tr>
<td>Prayer</td>
<td>One time</td>
<td>1 min.</td>
</tr>
<tr>
<td>Breathing exercise</td>
<td>Two times</td>
<td>2 min.</td>
</tr>
<tr>
<td>Sithilikarana vyayama (loosening exercises)</td>
<td>One time alternate</td>
<td>4 min</td>
</tr>
<tr>
<td>Suryanamaskar</td>
<td>Two times</td>
<td>3 min</td>
</tr>
<tr>
<td>Pranayama</td>
<td>Three times</td>
<td>4 min</td>
</tr>
<tr>
<td>Asana</td>
<td>Two times</td>
<td>5 min</td>
</tr>
<tr>
<td>Autogenic Training</td>
<td>Two times</td>
<td>5 min</td>
</tr>
<tr>
<td>Relaxation</td>
<td>One time</td>
<td>6 min</td>
</tr>
</tbody>
</table>
The following statistical techniques were used for the analysis of data in this study.

The purpose of the study was to determine whether the selected yogic exercises and combination of selected yogic exercises with autogenic training will improve the selected physiological, psychological and biochemical variables of the climacteric women before and after the training programme of twelve weeks.

In order to find out whether the obtained differences between the means of the selected variables in the pre test and post test are statistically significant, repeated measures of Analysis of Variance (ANOVA) were applied. When the F- ratio was found to be significant, Newman Keul's test was applied to test which of the possible comparisons among the means were significant.

Analysis of Co-Variance (ANCOVA) was applied to determine the significance of mean difference between the three groups namely. When F - ratio was found to be significant, the Schefé's Post Hoc test was applied to test the significance of pairs of the adjusted final group means.