CHAPTER III

 METHODOLOGY

The procedure adopted in the present research work is related to the selection of subjects, selection of variables, Selection of tests, Experimental design, orientation of the subjects, Administration of tests and Administration of training Programme.

Selection of Subjects

The Purpose of the study was to find out the “Effect of Yogic Exercises on Health Related Fitness of Women”. To achieve this purpose 60 Women in the age group ranging from 18 to 22 years studying in Smt.Bangaramma sajjan Arts and Commerce College for Women, Vijayapura Karnataka state were selected randomly as subjects were divided into two equal group of thirty each known as Experimental group and Control group.

Selection of Variables

The investigator reviewed through the available relevant related literature and discussed with the experts in the field and also discussed with the research guide before selection of variables for the present research work. The researcher used the availability of technique based on the data researcher done the analysis regarding feasibility, Reliability and the outcome of the results were taken care of before finalizing the variables. The variables selected for the present research work Cardiovascular Endurance, Muscular Endurance, Muscular Strength, Flexibility and Body Composition.

Selection of Variables

- Independent Variables
- Dependent Variables
Independent Variables

- **Sitting Asanas** - Padmasan, Vajrasan, Vakrasana, Paschimottanasana.
- **Standing Asanas** - Tadasana, Vrikshasana, Garudasana, Trikonasana.
- **Supine Asanas** - Shavasana, Naukasana, Halasana, Sarvangasana, Chakrasana.
- **Proline Asanas** - Makarasana, Bhujanagasana, Dhanurasana, Shalabhasana.

Pranayama

- Anuloma Viloma pranayama
- Sheetali Pranayama
- Sheetakari Pranayama

Dependent Variables

- Cardiovascular Endurance
- Muscular Strength
- Muscular Endurance
- Flexibility
- Body Composition

Experimental Design

The selected subjects were divided into two equal groups of 30 subjects, out of which one wasExperimental Group and a Control Group. Experimental Group underwent the yogic exercises training in selected Asanas and Pranayama. The training period of an Experimental group was 16 weeks 6 days per week for duration of 60 minutes. Control group did not undergo any training rather than their routine work.
Selection of Tests

The test items were selected for this study after thorough review of literature as well as consultation with experts, Physical Education Professionals, and also Research supervisor. The selection tests and the criterion variables are presented in the following table.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Test Items</th>
<th>Criterion Variables</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Harvard step test</td>
<td>Cardiovascular Endurance</td>
<td>The number of heart beats were noted down between 1 to 1.5 minutes, 2 to 2.25 minutes, and 3 to 3.5 minutes after finishing stepping up and down for 5 minutes.</td>
</tr>
<tr>
<td>2</td>
<td>Half sit up test</td>
<td>Muscular strength</td>
<td>Number of Half sits up performed in one minute.</td>
</tr>
<tr>
<td>3</td>
<td>Push up test</td>
<td>Muscular Endurance</td>
<td>The aim of this test is to do as many push up as possible in one minute.</td>
</tr>
<tr>
<td>4</td>
<td>Sit and Reach test</td>
<td>Flexibility</td>
<td>Ruler or measurement tape.</td>
</tr>
<tr>
<td>5</td>
<td>Body Mass Index</td>
<td>Body Composition</td>
<td>Ruler or measurement tape, weighing machine.</td>
</tr>
</tbody>
</table>
### Sixteen Weeks of Yogic Exercise Training Schedule

<table>
<thead>
<tr>
<th>SI No</th>
<th>Yogic Exercises and Pranayama</th>
<th>Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Warm up</td>
<td>10 minutes</td>
</tr>
<tr>
<td>2)</td>
<td>Sitting Asanas</td>
<td>8 minutes</td>
</tr>
<tr>
<td></td>
<td>Padmasana, Vajarasana, Vakrasana, Paschimottasana.</td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>Standing Asanas</td>
<td>8 minutes</td>
</tr>
<tr>
<td></td>
<td>Tadasana, Vrikshasana, Garudasana, Trikonasana.</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Supine Asanas</td>
<td>10 minutes</td>
</tr>
<tr>
<td></td>
<td>Shavasana, Naukasana, Halasana, Sarvangasana, Chakrasana</td>
<td></td>
</tr>
<tr>
<td>5)</td>
<td>Proline Asanas</td>
<td>8 minutes</td>
</tr>
<tr>
<td></td>
<td>Makarasana, Bhujanagasana, Dhanurasana, Shalabahasana.</td>
<td></td>
</tr>
<tr>
<td>6)</td>
<td>Pranayama</td>
<td>6 minutes</td>
</tr>
<tr>
<td></td>
<td>Anuloma Viloma Pranayama, Sheetali Pranayama, Sheetakari Pranayama.</td>
<td></td>
</tr>
<tr>
<td>7)</td>
<td>Relaxation</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60 minutes</td>
</tr>
</tbody>
</table>
Orientation of the Subjects

The investigator explained the purpose of the study and the importance of the training programme to the subjects in order to get their cooperation as well as to secure reliable data. A few days were spent to teach various Yogic Exercises involved in the training prior to the commencement of the training programme.

Pilot Study

The Researcher wanted to know the Effect of Yogic Exercises on Health Related fitness development. For the purpose of pilot study the researcher selected 20 subjects for the study. Pre test was administered and recorded. Then the Researcher was given one month training on yogic exercises. The post test was administrated soon after the one month training. The Researcher compared the pre and post test Results. The post test Results indicated significant development in Health Related fitness variables.

Collection of Data

The Researcher wanted to know the Effect of Yogic Exercises on Health Related Fitness development. For the purpose of the study the researcher selected 60 subjects for the study. Pre test was administered and recorded. Then the Researcher was given 16 weeks training on yogic exercises. The post test was administrated soon after the 16 weeks training. The Researcher compared the pre and post test Results. The post test Results indicated significant development in Health Related fitness variables.
Administration of the Training

Padmasana

1. Sitting Posture should be erect with both legs outstretched.

2. Sole of the right foot should be caught with the left hand and the ankle with the right hand and placed it on the left thigh.

3. The same should be repeated with the left foot.

4. Respective knees should be in gyana mudra.

5. Eyes must be closed.

6. Left leg should be stretched out first when to the original position.

7. Then the right leg follows.

Plate –I. Subject Performing the Padmasana
Vajrasana

1. Sitting Posture to be adapted on a flat surface.

2. Knees are to be flexed and legs are to be bent backwards and support the thighs.

3. Right palm must be kept on right knee and left palm left knee.

4. Slowly inhale and then exhale.

5. While exhaling one should assume that disorders are being exited through the nostrils.

Plate –II. Subject Performing the Vajrasana
Vakrasana

1. Erect sitting posture on the floor to be taken with outstretched legs.

2. Palm should be kept facing downwards and touch the ground on either side.

3. Left leg must be folded at knee and placed near right thigh vertically.

4. Sole should be flat on the ground.

5. Left thigh should be touching the chest.

6. Left palm must be placed on the floor near the right palm.

7. Fingers of both hands should be facing each other.

8. Support to the palms must be taken and upper part of the body should be turned towards the right.

9. Sight should be over the shoulder.

10. Breathing must be normal.

11. Maintain this posture until strain is felt in the back.

12. Original position must be resumed by turning the neck and trunk and then left hand must be lifted.

13. Left leg must be opened.

14. Steps to repeated for other side and limb.
Plate –III. Subject Performing the Vakrasana
Paschimottanasana

1. Erect sitting posture with outstretched legs to be adapted.

2. Neck and head and spine should be erect and aligned.

3. Palms to be placed on respective Knees.

4. Head and trunk must be bend forward slowly in an attempt to catch toes with the fingers without bending the knees.

5. Breathing should be deep and exhaled slowly. Head must be attempted to touch both the knees.

6. Arms must be bent and elbows are treed to touch the floor.

7. Exhaling completely and holding breath stay in this posture for a few seconds.

8. Starting posture must be regained after a few seconds slowly while breathing normally.

Plate –IV. Subject Performing the Paschimottanasana
Tadasana

1. Erect standing posture on flat floor to be adapted.

2. Heels should be lifted and both hands are to be raised upwards slowly while inhaling simultaneously.

3. Palms to be facing upwards.

4. Retaining breath, heel are to be lifted slowly so as to help stand on toes. Body should be stretched upwards. as much as possible.

5. Legs and arms to be kept straight.

6. Being body to original posture while exhaling slowly.

Plate –V. Subject Performing the Tadasana
Vrikshasana

1. Erect standing posture with joined feel to be adapted.

2. Knees and legs to be absolutely straight and arms on either side.

3. Right foot to be lifted and folded at the knee without bending left knee.

4. Ankle should be held with both hand and leg to be pulled up.

5. Right foot to be rested on the inner position of upper left thigh with downward position toes.

6. Body should be balanced on the left leg properly.

7. Palm and finger of both hands should be joined in front of chest with fingers upward.

8. While raising both hands slowly upwards above the head, inhale and hands and the body to be stretched to the maximum limit.

9. Balance to be maintained and vision to be straight ahead and pose should be kept with breathing normally.

10. Lower hands to chest level while exhaling.

11. Return to original posture with lowering right leg.

12. Repeat steps for the next leg.
Plate –VI. Subject Performing the Vrikshasana
Garudasana

1. Erect standing posture to be adapted.

2. Knees to be bent slightly, lift foot to be lifted and body is to be balanced by right foot by crossing left thigh over right thigh.

3. Put left toe on the ground by pressing the foot back and top foot to be hooked behind lower right calf for balancing on right foot.

4. Arms to be stretched straight forward so that they are parallel to the ground.

5. Hands to raised in forward direction of torso by keeping right above the left one and then elbows to be bent.

6. Right elbow to be snagged into the left foot crook.

7. Forearms to be raised making right angle with the ground so that the back of hand are facing each other.

8. Thumb of right hand is to be pressed and passed in front of left little finger.

9. Palms are to pressed together with fingers outstretched towards the ceiling by lifting the elbows in upward direction.

10. Legs and arms to be unwinded and normal standing posture to be regained.

11. Same process to be practiced.

12. Inhale and exhale gradually and steadily.
Plate –VII. Subject Performing the Garudasana
Shavasana

1. Sleeping on back posture to be adapted.

2. Legs should be separated.

3. Eyes to be closed and breathing deeply and slowly through the nostrils.

4. Concentration to be done from head to feet. Start relaxing each part of body.

5. Body is to be totally relaxed with each breath.

6. Allow stress, tension, worry, pressure exit on each exhaling.

Plate –VIII. Subject Performing the Savasana
**Trikonasana**

1. Erect standing posture to be adapted.

2. Stretch the feet comfortably apart.

3. Linter of right heel to be aligned with the center of the arch of left foot.

4. Feet should be pressed against the ground and weight of the body to be equally distributed on both feet.

5. Inhale deeply and bend body to the right while exhaling downward from the hips, waist to be kept straight.

6. Lift hand to be up in the air while right hand comes down toward the floor. Both arms to be kept in straight line.

7. Right hand to be rested on the shin, ankle, or floor outside the right foot.

8. Left arm to be stretched toward the ceiling in line with the tops of the shoulders.

9. Head to be kept in a neutral position or can be turned to the left, eyes gazing softly at the left palm.

10. Make sure that the body is bent sideways and not backward or forward.

11. Stretch maximum.

12. Deep long breath should be taken.

13. Bring the arms down to the sides while inhaling and straighten the feet.

14. Steps to be repeated on the other side.
Plate –IX. Subject Performing the Trikonsana
Naukasana

1. Sleeping posture on the back to be adapted.
2. Feet are to be kept together and hands to be placed on thighs.
3. Inhale deeply and head to be raised gradually, to be followed by neck and shoulder and then legs so that the body resembles the structure of a boat.
4. There should be no jerking or bending of knees and elbows.
5. Retain pose by holding breath as long as comfortable.
6. Exhale and get back to original posture.

Plate –X. Subject Performing the Naukasana
**Halasana**

1. Supine position with hands straight by the side of thighs to be adapted. palms should rest on the ground.

2. Legs should be raised together without bending knees stop at $30^\circ$ angle.

3. After few seconds raise legs to $60^\circ$ angle and retain.

4. Slowly raise legs to $90^\circ$ angle.

5. Taking support of the hands being the legs towards the head.

6. Continue bending legs till they go beyond the head and backwards as far as possible.

7. Place palms on the head by interlocking fingers elbow to be brought on the ground.

8. Return to the original position by following the steps in the reverse order slowly.

**Plate –XI. Subject Performing the Halasana**
Makarasana

1. Lie on the floor on the stomach. so that chin, chest and abdomen touch the floor.

2. Both legs to be stretched out at wide distance.

3. Both hands to be kept on respective sides.

4. Hands to be kept underneath the chine from both sides same as standing in upright position and elbows are placed on floor.

5. Both legs should be bent one by one while inhaling and lifted towards the hip, heels should touch buttock.

6. Bring back to original posture by exhaling slowly.

Plate –XII. Subject Performing the Makarasana
Sarvangasana

1. Erect sleeping posture to be adapted.

2. Palms to be on the floor close to the body and heels and toes to be together.

3. Legs to be slowly raised in a vertical position inhaling.

4. Exhale and raised the legs upwards from second position.

5. Palms to be brought underneath the hips for support.

6. Body should be raised as straight as possible.

7. At last the body should be resting on the shoulders the chin touching the chest.

8. While reverting back to original position. Legs to be folded on the knees, heels to be on the thighs and above the buttock.

9. Slowly body to be returned to the floor palms supporting the body weight.
Plate –XIII. Subject Performing the Sarvangasana
Chakrasana

1. Supine position to be adapted.

2. Knees to be bent completely till feet touch buttocks.

3. Arms to be bent at elbows over the head and palms to be placed under the shoulders on the floor.

4. Gradually raise the hands, chest, stomach and waist by arching the spine while inhaling body shoulder be raised as high as possible.

5. Hand and feet to be brought as close as possibly to form a whole type shape.

6. Original position to be regained by reversing the steps.

Plate –XIV. Subject Performing the Chakrasana
Bhujangasana

1. Lie flat on the stomach and relax completely.
2. Forehead to be kept on floor.
3. Arms and legs to be placed together near the body and hands to be put beside the chest with palm facing downwards.
4. Raise upper part of body while inhaling up to maximum extent.
5. No jerking should be made.
6. Vertebra should be bent gradually and pressure should be feet from cervical, dorsal, lumbar and sacral area of body.
7. Chest and head should be pointed upwards.
8. Revert to original position by recessing the steps.

Plate – XV. Subject Performing the Bhujangasana
Dhanurasana

1. Lie down on abdomen.

2. Feet to be raised slightly by bending knees. Bend knees while exhaling, drawing heels near buttocks.

3. Ankle to be grabbed gently. Knees should be extended to hip width.

4. Pull feet using hands to bring thighs off the ground while inhaling. Head, shoulders and chest to be raised.

5. Gaze should be at an upward Angle.

6. Pose to be retained for five seconds and original posture to be regained by reversing steps.

Plate –XVI. Subject Performing the Dhanurasana
Shalabhasana

1. Lie on the Stomach with chin stretched touching the ground
2. Hands to be kept on the side.
3. Hands to be brought under the legs to support them.
4. Inhale slowly and right leg to be lifted upward knees should be bent as much as possible without strain.
5. Position to be released by bringing right leg back to original position. Exhale during this process.
6. Repeat for the other leg.

Plate –XVII. Subject Performing the Shalabhasana
Pranayama

Anulom vilome pranayama

Anulom vilome pranayama is an alternate nostril breathing. Inhale air through right nostrils and exhale through left and inhales air through left nostrils and exhales through right.

Procedure

- The following instructions were given to the subjects during training programme. Ask the subjects to close their eyes and relax in the sitting position for 2 minutes tell the subjects were settling down.
- Ask the subjects to close right nostril with right thumb and inhale through the left nostril upto the lungs maximum capacity.
- The subjects should hold the breath.
- Ask the subject close the left nostrils with middle and ring figure and exhale through the right nostril rhythmically. This will be continued upto one set of anulom vilome pranayama.
Plate- XVIII  Subject erforming the Anulom Vilome Pranayama.
Sheetkari Pranayama

1. Padmasana to be adapted in sitting posture.

2. Hands to be placed on corresponding knees and Gyana mudra to be assumed.

3. Lips to be parted while keeping teeth together.

4. Tongue tip to be hold against lower teeth.

5. Inhale through mouth with hissing sound.

6. Inhalation to be continued till lungs are filled.

7. Mouth to be closed now.

8. Exhalation to be done through the nostrils immediately.
Plate – XIX Subject erforming the Sheetkari Pranayama
Sheetali Pranayama

1. Erect sitting posture to be maintained.

2. Eyes to be closed and whole body to be relaxed with normal breathing.

3. Tongue to be put on the lower lip and tongue should be tried to rolled.

4. Inhalation from the mouth to be done.

5. Breathe to be retained for as long as possible.

6. Mouth to be closed slowly and exhaled through the nose.

Plate – XX Subject Performing the Sheetali Pranayama
Administration of Tests

Harvard Step Test

**Purpose:** the intention of this test is to measure Cardiovascular Endurance.

**Equipment Requires:** 20 inches platform 15.8 cm high than one stop watch.

**Procedure:** The subject has to performed steps up and down on the platform at the rate of 30 steps per minute for 5 minutes or until exhaustion. Exhaustion when the subjects cannot maintain the stepping rate for 15 seconds. Immediately the subjects will ask to sits down on the completion on the test. The total numbers of heart beats will be counted between 1 to 1.5 minutes, between 2 to 2.5 minutes and between 3 to 3.5 minutes after finishing the step of test.

**Scoring:** the Cardiovascular fitness index score is determined by the following equation. If the total test time was 300 seconds and the number of heart beats between 1-1.5 minutes was 90, between 2-2.5 it was 80 and between 3-3.5 it was 70, then long form of cardiovascular fitness index score would be : (100x300) / (240x2) = 62.5.

**Fitness index** (long form) = (100 x test duration in seconds) divided by (2x sum of heart beat in the recovery periods).
Plate- XXI Execution of Harvard Step Test
Half Sit up Test

**Purpose:** the purpose of the half sit-up test is to measure Abdominal muscular strength.

**Equipment Required:** flat surface, mat and one stop watch, four strips of tape to place 3.5 inches apart on the mat to provide start and end position for the curl-up.

**Procedures**

- Lie in supine position with knees at a right angle and feet flat on the ground.
- Palms should be facing down on the mat fingers should be touching the first piece of tape.
- Performance sit-ups the fingers move from first piece to second piece tape and return to the original position.

**Scoring:** the number of half-sit ups performed in one minute.
Plate-XXII Execution of Half Sit up Test
Push up Test

**Purpose:** The purpose of the ground push-ups test was used to measure the muscular endurance the group of muscles of the body.

**Equipment Required:** flat ground, Flat mat and stop watch is required.

**Procedure:** keep the arms straight, elbows are locked, the body must be straight hands placed slightly wider than the shoulder width apart with fingers pointing forward feet should on the floor. On the command start the push-up by bending the elbows and lowering the body until the shoulders drop below the elbow level return to the starting position.

**Scoring:** The number of correctly completed push-ups in one minutes.

Plate-XXIII Execution of Push up Test
Sit and Reach Test

**Purpose:** The purpose of the sit and reach test is to measure functions hip region flexibility including lower back and back of legs.

**Equipment Required:** sit and reach box, a ruler was used.

**Procedures:** ask the subjects must sit on the ground legs fully extended in front of them, feet eight inches apart, toes pointed upwards, sole of the feet touching the Base of the sit and reach box. Reaches forward slowly the fingertips of hands in contact with the slide at all times. Once the farthest extension point is reached position should be held for a two count.

**Scoring:** The subjects were given three attempts and the best of the performance were recorded. The score were measured in centimeters.

Plate-XXIV Execution of Sit and Reach Test
Body Mass Index (BMI)

Subjects body mass ratio to their height squared, used to measure the body composition it is expressed in kilograms per meter squared (kg/m²).

Equipment Required: Stadiometer is required to measure height of the subjects and weighing machine is used to measure the weight of the subjects.

Procedure: BMI is calculated from body mass (M) and height (H). BMI = m/(H×H), where M= body mass in kilograms and H = height in meters. The higher the score indicating higher level of body fat.

Scoring: the determine BMI rating the following table is used. The table indicates BMI classification systems. The rating score is the same for female and male.

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt; 18.50</td>
</tr>
<tr>
<td>Normal Range</td>
<td>18.5 - 24.99</td>
</tr>
<tr>
<td>Overweight</td>
<td>≥ 25.00</td>
</tr>
</tbody>
</table>
Plate-XXV Execution of Standing Height Measurement
Plate-XXVI Execution of Body Weight Measurement
Statistical Techniques

The data were gathered from two groups on Health related fitness variables to find out the improvement in the health related fitness by giving 16 weeks of yogic exercises training the statistical procedures which was used to find out the significant development of health related fitness performance between the two groups by using analysis of covariance (ANCOVA) procedure. The statistical procedure was carried out by using SPSS, 15.0 Packages.