

## **CHAPTER III**

### **METHODOLOGY**

This chapter governs selection of subjects, selection of the variables, experimental design, pilot study, criterion measures, reliability of the instruments, tester's reliability, orientation of the subjects, training schedule, test administration and the statistical techniques used. The purpose of the present study was to investigate the effects of yogic practices with and without diet modification on selected physiological, bio-chemical and psychological variables among pregnant women.

#### **3.1. SELECTION OF SUBJECTS**

The purpose of the study was to examine the effects of yogic practices with and without diet modification on selected physiological, Bio-chemical and psychological variables among pregnant women. To achieve the purpose sixty primiparous (Pregnant for first time) women were randomly selected from various maternal health centres in and around Chennai city. Their age ranges between 23 years to 28 years. They were divided into three equal groups, by adopting random sample method. Group one acted as experimental group I –Yogic practices with diet modification (YWD), Group two acted as experimental group II-Yogic practices without diet modification (YWOD) and Group III acted as control group (CG). The nature and importance of the study was explained to the subjects in this study. The study was formulated as pre-test, post-test experimental design.

#### **3.2. SELECTION OF VARIABLES**

The researcher reviewed various scientific literatures, books, journals, internet sources and research papers which revealed the importance of exercise and yogic practices during pregnancy, importance of diet to be followed during pregnancy, weight of the mother in all the three trimester, role of body mass index during pregnancy, importance of blood glucose level, triglycerides, high and low density lipoproteins, emotional status of mother, social and cultural factors and their impacts on the growing fetus. Taking in to consideration of feasibility, criteria, availability of instruments and relevance of the variable at the present study, the following dependent and independent variables were selected for this study.

### **3.3. DEPENDENT VARIABLES**

#### **(A) PHYSIOLOGICAL VARIABLES**

1. Body Mass Index
2. Systolic blood pressure
3. Diastolic blood pressure
4. Resting pulse rate

#### **(B) BIO-CHEMICAL VARIABLES**

- (1) Fasting and postprandial blood glucose level
- (2) Triglycerides
- (3) High density lipoprotein (HDL)
- (4) Low density lipoprotein (LDL)
- (5) Blood Uric acid level

#### **(C) PSYCHOLOGICAL VARIABLES**

- (1) Perceived stress level
- (2) Anxiety

### **3.4. INDEPENDENT VARIABLES**

(1) Yogic practices with diet modification (YWD)

(2) Yogic practices without diet modification (YWOD)

### **3.5. EXPERIMENTAL DESIGN**

Random experimental group design was applied to this research. Sixty pregnant women, who had been pregnant for the first time, from various maternal health centres in and around Chennai city were randomly selected and they were assigned into three equal groups. Each group consists of twenty subjects. Pre-test was conducted for all the sixty subjects on selected Physiological variables namely Body Mass Index, systolic blood pressure, diastolic blood pressure and resting pulse rate, Bio-chemical variables namely fasting and postprandial blood glucose level, Triglycerides, high density lipoprotein, low density lipoprotein and blood uric acid level, Psychological variables namely perceived stress level and Anxiety. This initial test scores formed as pre-test scores of the subjects. Experimental group I was exposed to yogic practices with diet consultation pertaining to pregnancy. Experimental group II was exposed to yogic practices without any modification in their routine diet. The control group was not exposed to any of the training program or diet consultation other than their regular daily activities. The experimental period was for twelve weeks (from 13<sup>th</sup> week of gestation to 24<sup>th</sup> week of gestation- 2nd Trimester). After the experimental training, all the subjects were measured on the selected physical, physiological, Bio-chemical and psychological variables. This final test scores formed as post-test scores of the subjects. The pre-test and post-test scores were subjected to statistical analysis using analysis of covariance (ANCOVA) to find out the significance among the

mean difference, whenever the 'F' ratio for the adjusted post-test was found to be significant Scheffe's post hoc test will be used. In all cases 0.05 level of significant was fixed to test hypothesis.

### **3.6. CRITERION MEASURES**

By glancing the literature and in consultation with professionals and experts, the following variables were selected as criterion measures in this study.

1. Body Mass Index was measured through standardized formula weight in kilogram divided by height in meter square (Adolphe quetelet, 1900)

2. Systolic blood pressure was measured through Sphygmomanometer and stethoscope. (Samuel Siegfried karl Ritter von Basch, 1881. Scipion Riva-Rocci 1896).

3. Diastolic blood pressure was measured through Sphygmomanometer stethoscope. (Samuel Siegfried karl Ritter von Basch, 1881. Scipion Riva-Rocci 1896).

4. Resting pulse rate was measured through digital heart rate measuring machine, Model number EW 243, manufactured by National company, Japan (Robergs and Landwehr, 2002)

5. Blood sugar measured through blood test (Laboratory) (Talib, 1988)

6. Triglycerides measured through blood test (Laboratory)

7. High density lipoprotein (HDL) measured through blood test (Laboratory)

8. Low density lipoprotein (LDL) measured through blood test (Laboratory)

9. Blood Uric acid level measured through blood test (Laboratory)

10. Stress measured through Perceived stress scale (Sheldon Cohen et al. 1983)

11. Anxiety measured through State-Trait Anxiety Inventory questionnaire Charles spiel berger, R.L.Gorsuch, R.E.Lushene-Raymond cattler (1961- revised at 1983).

**Table I**

**SHOWING THE NAME OF VARIABLES, TESTS/ TOOLS  
ADMINISTERED AND UNIT MEASUREMENT**

| <b>S.NO</b>                    | <b>Variables</b>               | <b>Test/Tools Administered</b>                       | <b>Unit of measurements</b>       |
|--------------------------------|--------------------------------|--|-----------------------------------|
| <b>Physiological variables</b> |                                |  |                                   |
| 1.                             | Body Mass Index                | weight in kilogram divided by height in meter square | Kg/M <sup>2</sup><br>percentage % |
| 2.                             | Systolic blood pressure        | Sphygmomanometer and stethoscope                     | Mm of Hg                          |
| 3.                             | Diastolic blood pressure       | Sphygmomanometer and stethoscope                     | Mm of Hg                          |
| 4.                             | Resting pulse rate             | digital heart rate measuring machine                 | Beats/minutes                     |
| <b>Bio-chemical variables</b>  |                                |  |                                   |
| 5.                             | Blood sugar                    | blood test (Laboratory)                              | Mg/dl                             |
| 6.                             | Triglycerides                  | blood test (Laboratory)                              | Mg/dl                             |
| 7.                             | High density lipoprotein (HDL) | blood test (Laboratory)                              | Mg/dl                             |
| 8.                             | Low density lipoprotein (LDL)  | blood test (Laboratory)                              | Mg/dl                             |
| 9.                             | Blood Uric acid                | blood test (Laboratory)                              | Mg/dl                             |

|                                |         |  |              |
|--------------------------------|---------|--|--------------|
|                                | level   |  |              |
| <b>Psychological variables</b> |         |  |              |
| 10.                            | Stress  | Perceived stress scale (Sheldon Cohen et all. 1983)  | Points/marks |
| 11.                            | Anxiety | State-Trait Anxiety Inventory questionnaire Charles spiel berger, R.L.Gorsuch, R.E.Lushene-Raymond cattler (1961- revised at 1983) | Points/marks |

### **3.7. RELIABILITY OF DATA**

In order to obtain the reliability of data, test and retest method was used, by randomly selecting ten subjects. The selected variables in the present study were tested twice for the subjects by the same investigator at similar conditions. The intra class co-efficient correlation was used to find out the reliability of the data.

### **3.8. RELIABILITY OF INSTRUMENT**

For training purpose the equipments such as calculator, sphygmomanometer, stethoscope, digital heart rate measuring unit, stop watch used in the study were obtained from standard manufacturers who have certified these instruments with regards to their calibration.

Extraction of blood and laboratory tests on fasting blood glucose level (FBG), postprandial blood glucose level (PP), high density lipoprotein (HDL), low density lipoprotein (LDL), triglycerides (TG), blood uric acid level (UA) were

done at the public health centre (PHC), T.Nagar by a biochemists. They used instruments for this study such as small bottle, needle, disposable syringes, cotton etc., and the experiment was done in a well established computerized laboratory. The laboratory was certified for (NABL - National accreditation Board of Laboratories) valuable and reliable data which was used for the study.

The psychological questionnaire used to assess the stress (Perceive stress scale) and Anxiety (State trait anxiety questionnaire) were standardized and their validity and reliability proof were attached in the reviews.

### **3.9. SUBJECT RELIABILITY**

Prior to the test administration the exercise and the test procedure were explained in detail to subjects to ensure proper understanding and secure effective co-operation so as to derive reliable data from the tests. The researcher has explained the training methods and its procedures, the training schedule and utility procedure of the training was instructed to the subjects. Demonstration was done before the subjects prior to the actual collection of data. The training program was done under the personal supervision of the researcher.

### **3.10. TESTERS RELIABILITY**

Tester's reliability was established by test-retest procedures. For this purpose ten subjects were randomly selected on the chosen variables, which were

recorded twice under identical conditions on different occasions by the investigator.

The scores thus obtained could be analyzed by using intra-class correlation. This could be tested for significance at 0.05 level of confidence as shown in the table-III.

### **3.11. TESTER'S ASSISTANTS**

The investigator was assisted by qualified nurses and experts in the field of Obstetrics and gynaecology and experts in yogic field, nutritionist. They were assisting the investigator for the conduct of test and collection of relevant data under the direct supervision of the investigator. Those who were assisting the tester were given proper instructions and practice for conducting the actual tests.

### **3.12. PILOT STUDY**

The pilot study was conducted prior to the training program with ten random subjects with the help of experts in the field of Obstetrics and gynaecology to ensure the suitability, frequencies and duration of exercise. The aim of the pilot study was to know the subjects capacity and to know the difficulty of conducting training program and to set a clear understanding about the duration of time which is required for conducting the test and training.

### **TABLE-II**

**INTRA CLASS CO-EFFICIENT OF CORRELATION ON  
SELECTED DEPENDENT VARIABLES**

| <b>S.NO</b> | <b>CRITERION VARIABLES</b>     | <b>CORRELATION OF<br/>CO-EFFICIENT 'r'</b> |
|-------------|--------------------------------|--|
| 1.          | Body Mass Index                | <b>0.92*</b>                               |
| 2.          | Systolic blood pressure        | <b>0.89*</b>                               |
| 3.          | Diastolic blood pressure       | <b>0.85*</b>                               |
| 4.          | Resting pulse rate             | <b>0.87*</b>                               |
| 5.          | Blood sugar                    | <b>0.93*</b>                               |
| 6.          | Triglycerides                  | <b>0.93*</b>                               |
| 7.          | High density lipoprotein (HDL) | <b>0.92*</b>                               |
| 8.          | Low density lipoprotein (LDL)  | <b>0.93*</b>                               |
| 9.          | Blood Uric acid level          | <b>0.93*</b>                               |
| 10.         | Stress                         | <b>0.84*</b>                               |
| 11.         | Anxiety                        | <b>0.82*</b>                               |

\*significance at 0.05 level of confidence

### **3.13. TRAINING PROGRAMME**

During the training period the experimental groups underwent their respective experimental training program in addition to their daily routine activities as per the schedule. Experimental groups namely yogic practices with diet modification and yogic practices without diet modification underwent their respective experimental training on five days per week for twelve weeks.

The duration of training were planned for 90 minutes,that is from 6.30 A.M. to 8 A.M. on all the days except Saturday and Sundays. All the subjects involved in this study were carefully monitored throughout the training program. Intensity of the experimental training was based on difficulty of the exercise, sets, repetitions and recovery time, intensity of effort level exerted while performing an exercise. The intensity of a workout can be changed by changing the exercise order, increasing or decreasing the number of exercise, repetitions, weights or rest periods (Tom McCarthy, 1997).

To optimize training adaptations, overload can be applied by increasing exercise duration namely sets or reps applying external loads or by increasing the level of exercise difficulty (Machar Reid, 2000).

### **3.14. ORIENTATION OF THE SUBJECTS**

The investigator held a meeting with the subjects. The purposes of the “F” tests, the purpose of significance of this study and the requirement of the testing procedure were explained to them in detail. The entire subjects voluntary came forward to co-operate in the testing investigation and in order to enhance to own their performance. The subjects were very enthusiastic and co-operative throughout the project.

### **3.15. TRAINING SCHEDULE**

The training sessions were conducted in the following time schedule

**TABLE-III**

**DURATION FOR THE TRAINING SESSIONS**

| <b>Sessions</b>                                 | <b>Duration</b> |
|---|-----------------|
| Instructions                                    | 5 minutes       |
| Warming up                                      | 10 minutes      |
| Recovery  | 1 minutes       |
| Yogic practices (experimental Training session) | 20 minutes      |
| Recovery  | 2 minutes       |
| Breathing exercise                              | 10 minutes      |
| Recovery  | 2 minutes       |
| Meditation                                      | 10 minutes      |
| Total   | 60 minutes      |

### 3.16. EXPERIMENTAL TRAINING SCHEDULE

TABLE-IV

YOGIC PRACTICES FOR EXPERIMENTAL GROUP ( I & II ) - I<sup>st</sup> to IV<sup>th</sup>  
WEEK.

| Sl.No | Yogic Practices  | Frequency | Repetition | Breathe  | Duration | Rest | Total     |
|-------|--|-----------|------------|----------|----------|------|-----------|
| 1     | Prayer   | First 4   | One round  | -        | -        | 2    | 2 minutes |
| 2     | Loosening  | First 4   | One round  | -        | -        | 2    | 10        |
| 3     | Tadasana   | First 4   | 2 times    | 8 breath | 110 sec  | 10   | 2 minutes |
| 4     | Tiryaka Tadasana   | First 4   | 2 times    | 8 breath | 110 sec  | 10   | 2 minutes |
| 5     | Ardha chakrasana   | First 4   | 2 times    | 8 breath | 110 sec  | 10   | 2 minutes |
| 6     | Utkatasana   | First 4   | 2 times    | 8 breath | 110 sec  | 10   | 2 minutes |
| 7     | Virabhadrasana   | First 4   | 2 times    | 8 breath | 110 sec  | 10   | 2 minutes |
| 8     | Trikonasana  | First 4   | 2 times    | 8 breath | 110 sec  | 10   | 2 minutes |
| 9     | Vrikshasana  | First 4   | 2 times    | 8 breath | 110 sec  | 10   | 2 minutes |
| 10    | Natrajasana  | First 4   | 2 times    | 8 breath | 110 sec  | 10   | 2 minutes |
| 11    | Nadishodhana   | First 4   | 2 times    | 16       | 220 sec  | 20   | 4 minutes |
| 12    | Bhramri  | First 4   | 2 times    | 16       | 220 sec  | 20   | 4 minutes |
| 13    | Meditation (OM)  | First 4   | 1 time     | -        | -        | -    | 10        |
| 14    | Deep Relaxation  | First 4   | 1 time     | -        | -        | -    | 10        |
| 15    | <b>MANTRA CHANTING – OM or AMEEN or ALLAH for Experimental Group –I &amp; II</b> |           |            |          |          |      |           |

**TABLE-V****YOGIC PRACTICES FOR EXPERIMENTAL GROUP (I & II)- V<sup>th</sup> to  
VIII<sup>th</sup> WEEK.**

| <b>Sl.No</b> | <b>Yogic Practices</b>   | <b>Frequency</b> | <b>Repetition</b> | <b>Breathe</b> | <b>Duration</b> | <b>Rest</b> | <b>Total</b> |
|--------------|--|------------------|-------------------|----------------|-----------------|-------------|--------------|
| 1            | Prayer   | First 4          | One round         | -              | -               | 2           | 2 minutes    |
| 2            | Loosening  | First 4          | One round         | -              | -               | 2           | 10           |
| 3            | Ustrasana  | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 4            | Vajrasana  | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 5            | Janu Sirasasana  | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 6            | Paschimottanasana  | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 7            | Upavistha  | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 8            | Bhadrasana   | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 9            | Ardha Padmasana  | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 10           | Sukasana   | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 11           | Nadishodhana   | First 4          | 2 times           | 16             | 220 sec         | 20          | 4 minutes    |
| 12           | Bhramri  | First 4          | 2 times           | 16             | 220 sec         | 20          | 4 minutes    |
| 13           | Meditation (OM)  | First 4          | 1 time            | -              | -               | -           | 10           |
| 14           | Deep Relaxation  | First 4          | 1 time            | -              | -               | -           | 10           |
| 15           | <b>MANTRA CHANTING – OM or AMEEN or ALLAH for Experimental Group –I &amp; II</b> |                  |                   |                |                 |             |              |

**TABLE-VI****YOGIC PRACTICES FOR EXPERIMENTAL GROUP (I & II)- IX<sup>th</sup> to XII<sup>th</sup> WEEK.**

| <b>Sl.No</b> | <b>Yogic Practices</b>   | <b>Frequency</b> | <b>Repetition</b> | <b>Breathe</b> | <b>Duration</b> | <b>Rest</b> | <b>Total</b> |
|--------------|--|------------------|-------------------|----------------|-----------------|-------------|--------------|
| 1            | Prayer   | First 4          | One round         | -              | -               | 2           | 2 minutes    |
| 2            | Loosening  | First 4          | One round         | -              | -               | 2           | 10           |
| 3            | Gomukasana   | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 4            | Modified   | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 5            | Siddhasana   | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 6            | Swastikasana   | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 7            | Ardha padmasana  | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 8            | Bhadrasana   | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 9            | Sethu Bhandasana   | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 10           | Supta  | First 4          | 2 times           | 8 breath       | 110 sec         | 10          | 2 minutes    |
| 11           | Nadishodhana   | First 4          | 2 times           | 16             | 220 sec         | 20          | 4 minutes    |
| 12           | Bhramri  | First 4          | 2 times           | 16             | 220 sec         | 20          | 4 minutes    |
| 13           | Meditation (OM)  | First 4          | 1 time            | -              | -               | -           | 10           |
| 14           | Deep Relaxation  | First 4          | 1 time            | -              | -               | -           | 10           |
| 15           | <b>MANTRA CHANTING – OM or AMEEN or ALLAH for Experimental Group –I &amp; II</b> |                  |                   |                |                 |             |              |

**TABLE-VII****SHOWING THE MODIFIED DIET CHART FOR EXPERIMENTAL  
GROUP I**

| <b>TIMING</b>                | <b>FOOD ITEM</b>  |
|------------------------------|---|
| <b>Early morning<br/>7AM</b> | Milk(1tsp honey or jaggery)-200ml<br>Almonds-7no.,Walnut-6 no., Ground nut boiled   |
| <b>Morning<br/>8AM</b>       | Idli- 3 no. medium/ dhosa 2 no/ Pongal one Katori ( 2 egg white- optional)<br>Sambar-1 katori(150ml)  |
| <b>After ½ hr</b>            | Boiled white chana or groundnut-100gm(garnish with tomato and cucumber)   |
| <b>11Am</b>                  | 150 ml corn soup(carrot and tomato to be added)/Butter milk/ tender coconut water   |
| <b>Lunch 1PM</b>             | White rice(cooked)-130gm/Brown rice/ millets<br>Bengal gram dal curry-1 katori(130g)<br>Roasted colocasia-75gm/ carrot/ Beans/ pumpkin/ bottle gourd<br>Spinach poriyal-100gm<br>Low fat curd-200ml |
| <b>Evening 4pm</b>           | Figs-2 no., dry dates- 3 no.<br>1 small katori watermelon/ pomegranate (or) 1 cup watermelon or pome juice(honey to be added)   |
| <b>6pm</b>                   | ½ Apple or 1 orange   |
| <b>Dinner<br/>8pm</b>        | Ragi and wheat chapathi-2 no. (mediumsized)/ idli/ appam<br>Ladies finger(Okra)-100g /broad beans/Bitter gourd  |
| <b>9pm</b>                   | Low fat milk-1 cup  |

### **3.17. TRAINING PROCEDURE**

The following selected yogic practices were given to the experimental group – (I & II)

#### **BENEFITS OF YOGIC PRACTICES DURING PREGNANCY ( KIDSPOT.COM )**

- Lifts their spirits - exercise boosts levels of serotonin, a brain chemical linked to mood, putting them in better spirits.
- Prepare their body for child birth - labor requires stamina, focus and plenty of determination; the fitter they are, the better equipped they will be for giving birth.
- Reduce constipation – by stretching different muscle groups they will accelerate movement in their intestine.
- Faster return to pre-pregnancy healthy weight – they will gain less body fat, making it easier to lose the excess weight once the baby is born.
- Sleep better – yogic practices can assist in managing restlessness and disturbed sleep during pregnancy.
- Maintain a level of fitness – if they were a regular performer of yogic practices before falling pregnant, they will be keen to stay in shape.
- Reduce stress – pregnancy is both joyous and stressful time, yogic practices can help to balance the disturbed emotions.
- Reduce pregnancy discomfort – yogic practices can help to manage their back pain due to fetal growth and expansion of anterior abdominal cavity.
- Improve their self image – Yogic practices increases the blood flow to their skin, giving them a healthy glow.
- It helps them to prepare for the physical strain of labor.
- It will fasten the post-labor recovery time

### **3.18. PRECAUTIONS AND SAFETY MEASURES WHILE PRACTICING YOGIC PRACTICES**

During pregnancy the way body respond to yogic practices is different, change in hormones, such as levels of relaxin, causes ligaments to soften and can increase the risk of joint injuries. Expansion in abdominal area due to growing fetus, the

centre of gravity will change, which will affect balance. Extra weight gain typically between 10 -15 kilograms will increase the strain on joints and muscles. Increase in resting heart rate with drop in blood pressure during second trimester should be considered and activities involves sudden change in position should be avoided. Yogic practices should be designed in such a way, that exertion level should be maintained low, in order to avoid breathlessness, which in turn affects the blood flow and oxygen supply to the fetus.

#### General guidelines for yogic practices during pregnancy

They should aim for four to five exercise sessions per week, should avoid exertion beyond current fitness level, always begin with 10 minutes warm up, should select soft surface, such as grass or carpet for practice, should not do more than 20 minutes of vigorous activities per session, heart rate should be monitored periodically, should be maintained between 125 to 140 beats per minutes or less than that. They should take plenty of water before, during and after practice. Gentle stretches should be included, bouncing movements should be avoided, cool down should be done at least for 10 minutes, comfortable dressing such as natural fibers, cotton should be a better choice, to let the skin breathe.

### **3.19. YOGA PRAYER**

#### **SHANTHI MANTHRA (At the time of starting)**

Om.....Om.....Om.....

Sahana Vavathu, Sahanou Bhunaktu

Sahaveeryam-Karvavahai

Tejaswinaa Vadhitamastu, Ma...Vidvishavahai

Om.... Shanthi..... Shanthi..... Shanthi hi.....

## **2. LOOSENING EXERCISES**

### **a. PAWANMUKTASANA (CHITHILIKARANA VYAYAMA)**

These group of asanas were concerned with loosening up the joints of the body. It is excellent for those subjects, where vigorous physical exercise is not advised. It is particularly useful for eliminating energy blockages in the joints of the physical body, and for improving co-ordination, self-awareness and self-confidence. (**SwamiSatyanandaSaraswati, 1969**).

Minor exercise from head to toe in the initial stage, before starting asana, they should practice joint mobilization to make their body flexible and fit for yogic practices. The purpose of loosening exercise is to stretch (lengthen) the muscles that are tight (shortened). To enhance the production of synovial fluid in order to lubricate the synovial joint membrane and to stimulate kinesthetic receptors in the joints and tendon. It allows the muscles and joints to work more efficiently and decreases the frequency of muscle strains and tendon injuries. Each practice should be performed in a slow, sustained, steady manner until they experience a stretching or pulling sensation in the muscle. These practices should not cause or increase pain. If they experience any pain, decrease the amount of stretch, they are applying to the muscle. Joint mobilization should be done in a dynamic way, with proper breathing; each movement should be repeated for 10 to 15 times.

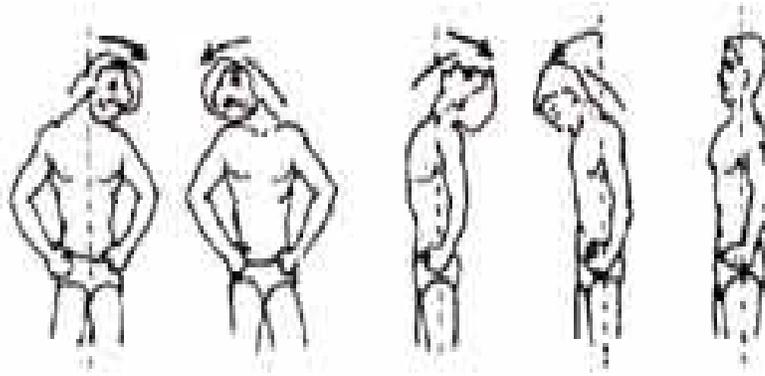
In order to perform joint mobilization / loosening exercise they have to follow the below mentioned instructions.

- Should stand with feet shoulder distance apart
- Toes and foot parallel to each other
- Knees soft, folder 5 to 10 degrees
- Pelvis should be braced and in straight line
- Spine should be kept erect
- Hands at the side of the trunk, with palm facing inwards, towards the thigh
- Shoulders braced, scapula retracted backward and downward
- Neck in neutral position
- Chin tucked inward
- Ears are in line with shoulders at the side
- Eyes looking straight in front, gazing at head level.

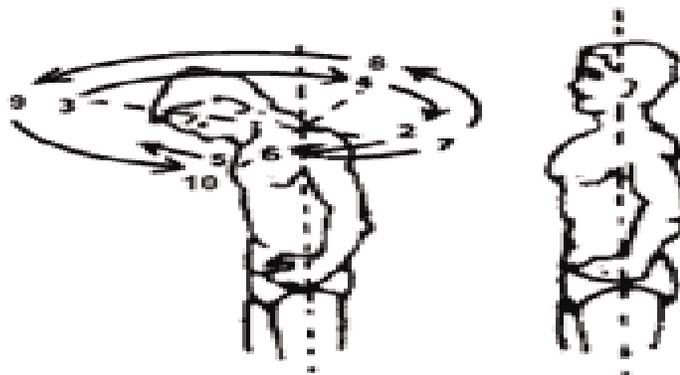
### 3.19.1. THE JOINT MOBILIZATIONS WERE CLASSIFIED AS

- a. Head and Neck movements
- b. Upper body movements
- c. Lower body movements.

#### PRACTICE 1: Greeva Sanchalana (Neck Movements)



- Standing with feet shoulder distance apart, spine erect, shoulders braced and stabilized
- Slowly lift the head up and look upward at your comfort level and bring it back to neutral position then bend your neck downwards, back to neutral position.
- Slowly turn your head towards right side, bring it to the centre, then turn towards left side.
- Slowly bend your head towards right side, ear should come in contact with the right shoulder, take it to the centre, then repeat the movement on the left side.



## **BENEFITS**

All the nerves connecting the different organs and limbs of the body pass through the neck. Therefore, the muscles of the neck and shoulders accumulate tension, especially after prolonged work at a desk or day to day activities. These asana release tension, heaviness and stiffness in the head, neck and shoulder region.(SwamiSatyanandaSaraswathi,1969).

## **PRACTICE 2: SHOULDER SHRUGGING**

Take a deep breathing in and elevate the shoulders upwards towards ears gently, by contracting trapezius and exhale while lowering the shoulder, back to neutral position.

## **PRACTICE 3: SHOULDER BRACING**

- Arms raised at shoulder level
- Elbows folded 90 degree perpendicular to the trunk
- Wrist and fingers stretched in front with palm facing downward towards the floor
- Inhale and brace the shoulder backward by contracting interscapular muscles and protract the scapula
- Gently exhale and retract the scapula by releasing the upper back muscles.

## **PRACTICE 4: SHOULDER ROTATION**

### **COMMON INSTRUCTIONS**

It is mandatory that yogic practices should be done on an empty stomach. It is best to have their meals at least four to six hours before they practice, they should make sure that their bowels should be clean.

## **PRACTICE 1: TADASANA**

This asana is like the base or the mother of all asanas, from which the other asanas emerge. Most of the standing poses are shifts in a certain part of their body or an individual joint that spring from the Tadasana, while the other parts remain neutral.

## **SEQUENCES**

- Stand erect and place your legs slightly apart, with your hands hanging alongside your body.
- You must make your thigh muscles firm. Lift your kneecaps while ensuring you do not harden the lower part or your belly.
- Strengthen the inner arches of your of your ankles as you lift them.
- Now, imagine a stream of white light passing through your ankles, up to your inner thighs, groin, spine, neck, all the way up to your head. Gently turn your upper thighs inward. Elongate the tailbone such that it is towards the floor. Lift the pubis such that it is closer to the navel.
- Look slightly upward.
- Breath in and stretch your shoulders, arms, and chest upwards. Raise your heels, making sure your body weight is on your toes.
- Feel the stretch in your body right from your feet to your head. Hold the pose for 20 seconds. Then exhale and release.

## **PRECAUTIONS**

It is best to avoid this asana if they have the following issues like, Headaches and Low blood pressure.

## **BENEFITS**

- It improves body posture
- Strengthen the ankles, knees, thighs, gluteal and abdominal muscles.
- Relieves sciatic pain.
- It reduces flat feet.
- It makes the spine more agile.
- It helps to improve the balance.
- Regulate the digestive, nervous and respiratory systems.

## **PRACTICE 2: TIRYAKA TADASANA**

Tiryaka tadasana is a very good stretching pose, easy to perform compare to other standing asanas and very effective.

## **SEQUENCES**

- Stand straight with legs together, hands by the side of your thighs.
- Open up the chest, keep your spine erect.
- Interlock your fingers of both hands facing the palms downwards.
- Inhale slowly and raise your hands upwards over to your head.
- Stretch your hands straight touching your biceps to your ears.
- While exhaling slowly bend sideways to your left side to keeping the hands straight and biceps will be touching the ears.
- Try to bend as much as possible.
- Stay at the last point you reached and feel the stretch on the opposite side (right side).
- Feel the stretch on the right side from the waist to the shoulders and hands.
- Inhale slowly and come up to the centre.
- Again exhale and bend sideways to your left side. Keep your biceps touched to your ears.
- Bend sideways as much as possible.
- Stay at the last point and feel the stretch on the opposite side, i.e. on the left side.
- Stay as long as you can.
- Then inhale again and come back to the centre.
- Bring your interlocked hands downwards while exhaling.
- Release the fingers from each other and keep them side by the thighs.
- Apart the legs and relax for a while.

## **BENEFITS**

It's very good pose to stretch the lateral spinal muscles, ligaments structures, spinal nerves and blood vessels along the course of the lateral spine.

It helps to reduce the fat of the abdomen.

Stimulate the bowel movements.

It opens up the chest.

## **PRECAUTIONS**

It's not advisable for subjects with cervical spondylosis, chronic low back pain, headache, hypertension and cardiac abnormalities.

Practice 3: Ardha Chakrasana (Ardha= Half, Chakra= Wheel, Asana= Pose)

Sequences:

- Stand straight with feet shoulder width apart and arms alongside the body
- Balance your weight equally on both feet.
- Breathing in, extend your arms overhead, palms facing each other.
- Breathing out, gently bend backwards pushing the pelvis forward, keeping the arms in line with the ears, elbows and knees straight, head up, and lifting your chest towards the ceiling.
- Inhale and come back to position.
- Breathing out, bring the arms down and relax.

### **BENEFITS**

- Stretch the muscles attached to the anterior thoracic cavity.
- Expand the chest and rib cage, provide more space for lungs to expand.
- Tones the arms and shoulder muscles.
- Prevent tightness in the posterior neck muscles and reduces hunch back posture.

### **PRACTICE 4: UTKATASANA (CHAIR POSE)**

#### **SEQUENCES**

- Stand with feet shoulder width apart.
- Spine erect, Toes and heels parallel to each other.
- Raise your arms to shoulder level, parallel to the floor.
- Keep your palms facing inward.
- Gently bend your knees and push down your pelvis, such as you are sitting in an imaginary chair.
- Make yourself comfortable, Spine should be stretched, thighs parallel to each other.

- Calm your mind and relax your shoulder blade, retract the scapula backward and downward.
- Inhale and straighten your knees, exhale and release your arms to your sides, relax in tadasana pose.

## **BENEFITS**

- Tones the Quadriceps, Gluts and Hamstring muscles.
- Strengthen hip flexors, ankles, calves and back muscles.
- Help to reduce flat foot, by improving proper weight bearing on feet.
- Stimulate the heart, diaphragm and abdominal organs.

## **PRECAUTIONS**

- Subjects with Insomnia, low blood pressure, headaches, arthritis, sprained ankle or ligament injuries, chronic knee pain, low back pain and shoulder injuries should avoid this pose.( Cnyha, 2011).

## **PRACTICE 5: VIRABHADRASANA I**

### **SEQUENCES**

- Stand straight with your feet shoulder width apart by a distance of at least 3-4 feet.
- Turn your right foot out by 90 degrees and left foot in about 15 degrees.
- The heel of the right foot aligned to the centre of the left foot.
- Lift both arms sideways to shoulder height with your palms facing upwards.
- Breathing out, bend your right knee.
- Your right knee and right ankle should form a straight line, knee should not cross the ankle line.
- Turn your head to look to your right.
- Stretch your arms further and lift over head, gently push your pelvis down.
- Breathing in, come up.
- Breathing out, bring your hands from the sides, then repeat it on the left side.

## **BENEFITS**

- Veerabhadrasana is very beneficial for pregnant women in the second and third trimester.
- Strengthen the ankles, calves, thighs, shoulders and lower back muscles.
- Improve the balance.
- Improve the stamina.
- Releases stress in shoulder joints.

## **PRACTICE 6: TRIKONASANA (TRIANGLE POSE)**

### **SEQUENCES**

- Stand straight. Separate your feet comfortably wide apart 3 to 4 feet distance.
- Turn your right foot out 90 degrees and left foot in by 15 degrees.
- Now align the centre of your heel with the centre of your arch of the left foot.
- Ensure that your feet are pressing the ground and the weight of your body is equally balanced on both the feet.
- Inhale deeply and as you exhale, bend your body to the right, downward from the hips, keeping the waist straight, allowing your left hand to come up in the air while your right hand comes down towards floor, keep both arms in straight line.
- Rest your right hand on your shin, ankle, or the floor outside your right foot, whatever is possible without distorting the sides of the waist. Stretch your left arm towards the ceiling, in line with the tops of your shoulders. Keep your head in a neutral position or turn it to the left, eyes gazing softly at the palm.
- Make sure that your body is bent sideways and not backward or forward. Pelvis and chest are wide open.
- Stretch maximum and be steady, keep taking in long deep breaths. With each exhalation, relax your body and gently, just be with the body and the breath.

- As you inhale, come up, bring your arms down to your sides, and straighten your feet.
- Repeat the same on the other side.

### **BENEFITS**

- Strengthen the legs, knees, ankles, arms and chest muscles.
- Stretches and opens the hips, groins, hamstring, calves, shoulders, chest and spine.
- Increase mental and physical equilibrium.
- Help to improve digestion.
- Reduce anxiety, stress, back pain and sciatica.

### **PRACTICE 7: VRIKSHASANA (TREE POSE)**

#### **SEQUENCES**

- Stand erect; Keep the feet shoulder width apart.
- Fold the right leg and place it at the top of left thighs with the toes of right leg should be pointed downwards.
- The right leg should be perpendicular to the left leg.
- Extend your arms above your head.
- Inhale and try to make Namaskar mudra with your palms.
- Balance the pose in straight line.
- Try to make your spine straight and feel the stretching from toes to fingers.
- Exhale deeply and bring your arms and leg down.
- Repeat the same with left leg, it completes one round.

### **BENEFITS**

- It stretches the entire body from toes to fingers.
- It tranquilizes the mind and good for reducing depression and anxiety.
- It increases the stamina, immunity, concentration and self-confidence.
- It helps to open up the hip joint.
- Help to reduce sciatica pain.
- It enhances the flexibility of legs, back and chest muscles.

- Strengthen the ankle, calves, knees and thighs.
- It stretches the groin region.
- Reduce the flat foot.
- Strengthen the ligaments of lower body.
- It calms and relaxes the central nervous system.

## **PRACTICE 8: NATARAJASANA (LORD OF THE DANCE)**

### ***SEQUENCES***

- Stand straight with your feet shoulder width apart and arms by your sides.
- Inhale and bend your right leg backwards and hold with your right ankle with right hand.
- Extend your left arm straight out in front. Beginner can take support from nearby wall.
- Exhale and stretch the spine vertically, hold the position.
- Slowly come back to starting position, repeat this with other side.

### **BENEFITS**

- Strengthen the muscles around ankles, hip and chest region.
- Stretch the thighs, groin and abdominal organs.
- Improve posture, balance and concentration.
- Help to improve digestion.
- Releases stress and calm the mind.

## **PRACTICE 9: USTRASANA (CAMEL POSE)**

### **SEQUENCES**

- Kneel down on the mat and place your hands on your hips.
- Ensure that your knees and shoulders are in the same line, and soles of your feet are facing the ceiling.
- Inhale and draw you tailbone inward.
- Arch your back, gently slide your palms over feet and straighten your arms.
- Keep your neck in neutral position, it shouldn't be strained.
-

## **BENEFITS**

- Opens up the hips, stretch the deep flexor of hip joint.
- Reduce fat on thighs.
- Stretch the muscles of shoulder, back, abdomen groin, thighs and ankles.
- Improve the posture.
- Expand the abdominal region, improve the digestion and elimination and treat constipation.
- Improve the respiration by expanding the thoracic cage.
- Loosen up the vertebra, and improve the flexibility in the spine.
- Relieve lower back pain.
- Helps to heal and balance the chakras, by stimulating endocrine glands.

## **PRACTICE 10: VAJRASANA**

### **SEQUENCES**

- Kneel down on the mat and place your hands on your hips.
- Ensure that your knees and shoulders are in the same line, and soles of your feet are facing the ceiling.
- Inhale and draw you tailbone inward.
- Gently try to rest your hip on the heels of the leg behind.
- Keep your spine erect, shoulder braced, chin pointing up.

## **BENEFITS**

- Reduce fat on thighs.
- Stretch the muscles of shoulder, back, abdomen groin, thighs and ankles.
- Improve the posture.
- Expand the abdominal region, improve the digestion and elimination and treat constipation.
- Improve the respiration by expanding the thoracic cage.
- Loosen up the vertebra, and improve the flexibility in the spine.
- Relieve lower back pain.

- Helps to heal and balance the chakras, by stimulating endocrine glands.

## **PRACTICE 11: MODIFIED JANU SIRASASANA (KNEE TO HEAD POSE)**

### **SEQUENCES**

- To begin, sit on the floor with your back erect.
- Stretch out your legs as wider as possible.
- Inhale and extend your spine as long as possible, from the torso right up to the top of your head.
- Exhale and stretch your right hand towards the right foot sideways, reaching the ball of the toes.
- Left hand should be raised above head to bend sideways towards the right to reach the right elbow or right foot, whichever is possible.
- Hold the pose and breath deep and slow. As you breathe, feel the breath filling the groin, the back of your right leg, and the entire area of your back.

### **BENEFITS**

- It will calm the mind and relieves mild depression.
- It stretches the hamstring, calves and shoulder muscles.
- Stimulate the liver and kidneys.
- Stimulate the digestive organ and enhance its function.
- It relieves the headaches, anxiety and fatigue.
- It helps to cure insomnia, sinusitis and high blood pressure.
- During pregnancy, this asana helps to strengthen the back muscles, but can be practiced only up to the second trimester.

## **PRACTICE 12: PASCHIMOTTANASANA (MODIFIED)**

### **SEQUENCES**

- To begin, sit on the floor with your back erect.
- Stretch out your legs in front
- Inhale and extend your spine as long as possible, from the torso right up to the top of your head.
- Exhale and stretch both your hands towards the knees.

- Hold the pose and breath deep and slow. As you breathe, feel the breath filling the groin, the back of your leg, and the entire area of your back.

### **BENEFITS**

- It will calm the mind and relieves mild depression.
- It stretches the hamstring, calves and shoulder muscles.
- Stimulate the liver and kidneys.
- Stimulate the digestive organ and enhance its function.
- It relieves the headaches, anxiety and fatigue.
- It helps to cure insomnia, sinusitis and high blood pressure.
- During pregnancy, this asana helps to strengthen the back muscles, but can be practiced only up to the second trimester.

### **PRACTICE 13: UPAVISTHA KONASANA (WIDE-ANGLE SEATED FORWARD BEND)**

#### **SEQUENCES**

- Sit in Dandasana (staff pose), then lean your torso back slightly on your hands and lift and open your legs to an angle of about 90 degrees (the legs should form an approximate right angle, with the pubis at the apex).
- Press your hands against the floor and slide your buttocks forward, widening the legs another 10 to 20 degrees.
- Rotate your thighs outwardly, pinning the outer thighs against the floor, so that the knee caps point straight up towards the ceiling.
- Reach out forward with your palms in contact with the floor. Feet pointed inward towards you.
- With your thigh bones pressed heavily into the floor and your knee caps pointing up at the ceiling, walk your hands forward between your legs.
- Keep your arms long.

### **BENEFITS**

- Help to relieve arthritic pain.
- Reduce the sciatic pain.

- Detoxify the kidneys.

## **PRACTICE 14: BHADRASANA (BUTTERFLY POSE)**

### **SEQUENCES**

- Sit down with your legs stretched forward.
- Bend your legs to bring your feet towards you so that your heels get closer to the body.
- The legs should be on the ground, with your soles maintain contact.
- Hold the toes with your fingers and draw your feet closer to the perineum.
- Keep your spine erect throughout.
- You may proceed to bring your body forward, with creating pressure on the anterior abdominal wall, retain in the position for a while and relax to starting position.

### **BENEFITS**

- Pregnant women can practice this yoga regularly, which improve the labor pain, however they should not bend forward, and they should sit straight with the heels closer to the body without applying force.
- Tension is released from the spinal coccygeal and acral regions,thus improve the blood supply to lower back, abdominal organs and pelvic floor muscles, hence very effective for correcting urinary incontinence.
- Help to improve the kidney function.
- It is good for breathing disorders.
- It helps to keep he mind relaxed and focused.
- Improve the flexibility in ankles, knees, hips and inner thigh muscles.
- It activates the root chakra.
- It is very useful pose to reduce the sciatic pain and varicose vein.
- Help to correct the menstrual disorders.

## **PRACTICE 15: ARDHA PADMASANA (LOTUS POSE)**

### **SEQUENCES**

- Sit on the floor and stretch your legs, your legs should be straight in front.

- Hold the right leg in both the hands, fold the legs slowly and place it on your left thigh.
- Fold the left leg and hold it with both hands and place it on the right thigh closer to the other leg.
- Both your knees should touch the floor and the foot should face upwardly.
- Your spine should be erect, both hands should be together or put the palms facing upside on the knee joints and the thumb must touch your index finger and the other fingers should face upward.
- Concentrate on breathing, relax stretch your legs and repeat it on the other side.

## **BENEFITS**

- This help to increase the focus of mind and concentration.
- It helps to preserve vital fluids in the body and prevents abdominal diseases and female disorders connected with the reproductive organs.
- It helps to achieve peace in the mind, solitude and longevity to the practitioner.
- It increases the hunger level there by maintain the metabolic rate high.
- It stretches the ankle, knee and hip joints.

## **PRACTICE 16: SUKASANA**

### **SEQUENCES**

- Sit on the floor and stretch your legs, your legs should be straight in front.
- Hold the right leg in both the hands, fold the legs slowly and place it on your left thigh.
- Fold the left leg and hold it with both hands and place it on the right thigh closer to the other leg.
- your knees should touch the floor and the foot should face upwardly.
- Your spine should be erect, both hands should be together or put the palms facing upside on the knee joints and the thumb must touch your index finger and the other fingers should face upward.

- Concentrate on breathing, relax stretch your legs and repeat it on the other side.

## **BENEFITS**

- This help to increase the focus of mind and concentration.
- It helps to preserve vital fluids in the body and prevents abdominal diseases and female disorders connected with the reproductive organs.
- It helps to achieve peace in the mind, solitude and longevity to the practitioner.
- It increases the hunger level there by maintain the metabolic rate high.

## **PRACTICE 17: MODIFIED GOMUKASANA (COW POSE)**

### **SEQUENCES**

- Slide your knees together in front of you, stacking the right knee directly on the top of left.
- Align the spine and sit back in between your feet which should be equidistant from your hips.
- Support your body weight evenly on both sides.
- Extend your left arm up towards, the sky, and then bring your left hand down to the centre of your back.
- Reach your right arm out to the same side, parallel to the floor; rotate the arm inward, your thumb will turn first towards the floor, until your palm faces the sky above.
- Take a deep breath and, as you exhale, sweep your right arm behind and in the hollow of your lower back.
- Keeping your spine long, hook fingers or hold hands behind your back.
- If they don't reach, hold a belt or strap in both hands. Then lift your left elbow towards the sky and draw your right elbow towards the ground, keep your left arm closer to your head.
- Release your arms, uncross your legs, and repeat Gomukasana with the left knee on top and left elbow pointing down.

## **BENEFITS**

- Stretches your hips, thighs, ankles, chest, shoulders, anterior deltoid, triceps, inner armpit muscles and latissimus dorsi.

## **PRACTICE 18: MODIFIED GARUDASANA (EAGLE POSE)**

### **SEQUENCES**

- Sitting with legs straight, feet parallel to each other.
- Catch your right leg with both your palm and bend your right leg on knee joint, gently place it on the left thigh.
- Fold your left leg and place it under the right leg, as in ardha padmasana.
- Place your right elbow over the left elbow and wrap the right hand around the left hand.
- Place the palms together to resemble the beak of an eagle.
- Keep your spine long and arms in line with forehead.
- Relax for some time and repeat it on the other side.

## **BENEFITS**

- It stretches the arms, upper back, neck and shoulder muscles.
- It helps to prevent postural kyphosis, which is very common in second and third trimester of pregnancy.

## **PRACTICE 19: SIDDASANA**

### **SEQUENCES**

- Sit in any of your comfortable meditative position
- Slide your knees together in front of you, stacking the right knee directly on the top of left.
- Align the spine and sit back in between your feet which should be equidistant from your hips.
- Support your body weight evenly on both sides.
- your arms, should be in chin mudhra position

## **BENEFITS**

- Stretches your hips, thighs, ankles.
- Increases your flexibility in your spine

## **PRACTICE 20: SWASTIKASANA**

### **SEQUENCES**

- Sit in any of your comfortable meditative position
- Slide your knees together in front of you, stacking the right knee directly on the top of left.
- Align the spine and sit back in between your feet which should be equidistant from your hips.
- Support your body weight evenly on both sides.
- your arms, should be in chin mudhra position

## **BENEFITS**

- Stretches your hips, thighs, ankles.
- Increases your flexibility in your spine

## **PRACTICE 21: SETU BANDHASANA (BRIDGE POSE)**

### **SEQUENCES**

- Start with supine lying or in Shavasana.
- Keep your arms on the sides of your thighs.
- Fold your knees and place it closer to the hands.
- The distance between the feet should be 10 inches.
- Inhale and raise your back in relaxed manner as high as possible.
- Maintain the breathing with slow inhalation and exhalation.
- Bring your back down with deep exhalation and rest.

## **BENEFITS**

- It helps to stretch the lower back and neck muscles.
- It will strengthen the back muscles, which supports the spine.
- It helps to stimulate the better function of nervous system.
- Help to improve the coordination of body and mind.
- It facilitates the blood supply to the abdominal organs, enhances the digestion and improves the movement in the colon.
- It has calming effect on brain, thus helpful in reducing stress, depression and anxiety.
- It is a weight bearing pose for the spine, helps to strengthen the spine.
- It enlarges the thoracic cavity space and provides room for better expansion of lungs.

## **PRACTICE 22: SUPTA MATSYENDRASANA**

### **SEQUENCES**

- Start with supine lying or in Shavasana.
- Keep your arms on the sides of your thighs.
- Fold your right knee and place the foot closer to the left knee.
- The distance between the feet should be 10 inches.  
Inhale and raise your back in relaxed manner as high as possible.
- Maintain the breathing with slow inhalation and exhalation.

## **BENEFITS**

- It helps to stretch the lower back and neck muscles.
- It will strengthen the back muscles, which supports the spine.
- It helps to stimulate the better function of nervous system.
- Help to improve the coordination of body and mind.
- It facilitates the blood supply to the abdominal organs, enhances the digestion and improves the movement in the colon.
- It has calming effect on brain, thus helpful in reducing stress, depression and anxiety.

## **PRACTICE 23: NADI SHODHANA PRANAYAMA**

Nadi shodhan pranayama is a breathing technique which helps to clear blocked energy channels, thus calming the mind. This technique is also known as Anulom Vilom pranayama.

Nadis (energy channels) can get blocked due to physical and mental trauma, toxicity in the physical body and stress and emotional disturbances.

Ida, Pingala and Sushmna are three of the most important nadis in the human body. When the Ida nadi is not functioning smoothly or is blocked, one experiences cold, depression, low mental energy and sluggish digestion, blocked left nostril. Whereas when the pingala nadi is not smoothly functioning or is blocked, one will experience heat, quick temper and irritation, itching body, dry skin and throat, excessive appetite, excessive physical energy and blocked right nostril.

NadiShodhan pranayama helps to relax the mind and prepares it to enter a meditative state. It helps to keep the mind calm, happy and peaceful. It helps to remove the accumulated tension and fatigue.

### **SEQUENCES**

- Sit comfortably with your spine erect and shoulders relaxed.
- Place your left hand on the left knee, with fingers in Chin Mudra. (Thumb and index finger gently touching at the tips).
- Place the tip of the index finger and middle finger of the right hand in between the eyebrows, the ring finger and little finger on the left nostril, and the thumb on the right nostril.
- You should use the ring finger and little finger to open or close the left nostril and thumb for the right nostril.
- Press your thumb down on the right nostril and breath out gently through the left nostril.
- Breath in from the left nostril and then press the left nostril gently with the ring and little finger. Removing the right thumb from the right nostril, breath out from the right.

- Breath in from the right nostril and exhale from the left, this complete one round of Nadi Shodhan pranayama. Continue inhaling and exhaling from alternate nostrils.
- Complete 9 such rounds by alternately breathing through both the nostril. After every exhalation, remember to breathe in from the same nostril from which you exhaled. Keep your eyes closed throughout and continue taking long, deep, smooth breaths without any force or effort.

## **BENEFITS**

- Excellent technique to calm the mind.
- Our mind has a tendency to keep regretting or glorifying the past and getting anxious about the future. This pranayama helps to bring the mind back to the present moment.
- Enhance the function of circulatory and respiratory functions.
- Releases accumulated stress in the body and mind, thus help to relax effectively.
- Help to harmonize the left and right hemispheres of the brain, which correlate to the logical and emotional sides of our personality.
- It purify and balance the subtle energy channels, thereby ensuring smooth flow of prana through the body.
- Maintain body temperature.

## **PRACTICE 24: BHRAMARI PRNAYAMA**

### **SEQUENCES**

- Sit in Ardha padmasana or any other meditative pose which is comfortable.
- Close your eyes and breathe deeply.
- Now close your ear lids with your thumbs.
- Place your index finger just above your eyes.
- Place your middle finger just at the side of your nose, applying very gentle pressure.
- Place your ring and little fingers just above and below the lips respectively.
- Now concentrate your mind on the area between your eyebrows.

- Keep your mouth closed, breathe out slowly through your nose with making a humming sound of Om.
- Repeat this process for 5 times.

## **BENEFITS**

- All age people can try this breathing exercise including pregnant women.
- During pregnancy this helps to maintain and regulate the functioning of the endocrine system and provides easy child birth.
- Concentration of the mind is facilitated through humming sound. It has a positive effect on body and mind particularly on the central nervous system.
- It reduces cerebral tensions, anger, anxiety, insomnia and hypertension.
- The chanting of 'Om' develops a feeling of positivity and spiritualism in your soul.
- This helps to reduce the high vital sign, fatigue and mental stress.
- It has a positive impact on ear, nose, mouth and eyes by activating these sensory organs.
- It is an instant option to de-stress yourself.
- Most effective pranayama for awakening the Kundalini.

## **PRACTICE 25: UDGITHA PRANAYAMA (OM CHANTING)**

When OM is chanted as a pranayama, it is called as Udgitha Pranayama.

## **SEQUENCES**

- Sit in any comfortable cross-legged sitting posture. Sukhasana/ Siddhasana/ Artha Padmasana. Choose a pose where you can stay perfectly still for the duration of pranayama and meditation.
- Keep the spine upright and tall. Keep the arms and shoulders relaxed.
- Keep the eyes closed throughout the practice.
- Take a couple of deep breaths, just making a connection with the breathing pattern.

- Take a deep inhalation, while exhaling, begin the OM chanting. Begin by feeling the vibration of the “O” sound building up in the naval area and travelling upward.
- As you continue the chant, feel the vibration moving upward towards the base of the throat. When the vibration reaches the throat area, convert the sound to a deep humming sound of “M”.
- Continue to feel the vibration moving upward until it reaches the crown of the head ( Sahasrara Chakra).
- Continue the practice for about 10 -12 chants. Stay totally focused and tuned in to the sound vibration of the OM sound throughout the practice.
- When you finish the Udgitha pranayama, keep the eyes closed and continue to listen to the vibration of the OM sound filling your entire being with this pulsating energy.

## **BENEFITS**

- Medical studies have found that chanting OM with concentration enables you to reduce the adrenaline level that in turn helps in reducing the stress levels.
- It segregates you from the world and the associated tensions. It helps to excel in yourself and your ideologies.
- It helps to improve the concentration by focusing the mind.
- It improves the secretion of endorphins that make you feel refreshed and relaxed.
- It helps to balance the hormonal secretion and rejuvenates the cells.
- It helps to correct the mood swing and thereby improve the interpersonal relationship.
- As per many researches, it has been found that the vibration significantly affects the spinal cord and improves its function.
- OM chanting helps to reduce stress, anxiety and emotional imbalances, further helps to detoxify the body.
- It helps in regularizing blood circulation and provides more oxygen to the body.

- It helps to regulate the heart rate and respiratory rate. It improves the digestive function.
- It improves the quality of sleep.
- OM chanting will strengthen your mind, improve yourself consciousness, improve the analytic function and improve your thought processes.
- It reduces the negativity.

## **PRACTICE 26: MEDITATION / DEEP RELAXATION TECHNIQUE**

When the stress overwhelms our nervous system our body is flooded with chemicals that prepare us for “fight or flight”. While the stress response can be lifesaving in emergency situations where we need to act quickly, it wears our body down when constantly activated by the stresses of everyday life. We cannot avoid all stress, but we can counteract it by learning the relaxation techniques, which puts the break on stress and bring the equilibrium to body and mind. When the relaxation response is activated, your heart rate slows down, breathing becomes slower and deeper, blood pressure drops or stabilizes, your muscles relax and blood flow to the brain increases. In addition to its calming physical effects, the relaxation response also increases energy and focus, combats illness, relieves aches and pains, heightens problem solving abilities and boosts motivation and productivity.

### **(a) DEEP BREATHING TECHNIQUE**

Deep breathing is a simple and powerful relaxation technique. It is easy to learn and applicable to all.

### **SEQUENCES**

- Sit comfortably with your back straight. Put one hand on your chest and the other on your stomach.
- Breathe in through your nose, deeply from the abdomen, rather than shallow breaths from your upper chest, the hand on your stomach should rise. The hand on your chest should move very little.

- Exhale through your mouth, pushing out as much air as you can while contracting your abdominal muscles. The hand on your stomach moves in as you exhale, but your other hand should move very little.
- Continue to breathe in through your nose and out through your mouth. Try to inhale enough so that your lower abdomen raises and falls. Count slowly as you exhale.

(b) Progressive Relaxation Technique:

Progressive muscle relaxation is a two-step process in which you systematically tense and relax different muscle groups in the body. With regular practice, progressive muscle relaxation gives you an intimate familiarity with what tension—as well as complete relaxation—feels like in different parts of your body. This awareness helps you to find out and counteract the first signs of the muscular tension that accompanies stress. And as your body relaxes, so will your mind.

## SEQUENCES

- Loosen your clothing, and get comfortable.
- Take a few minutes to relax, breathing in and out in slow, deep breaths.
- Relax your entire body, slowly shift your attention to your right foot. Take a moment to focus on the way it feels.
- Slowly tense the muscles in your right foot, squeezing as tightly as you can. Hold for a count of 10.
- Relax your right foot, focus on the tension flowing away and the way your foot feels as it becomes limp and loose.
- Stay in this relaxed state for a moment, breathing deeply and slowly.
- Now shift your attention to your left foot. Follow the same sequence of muscle tension and release.
- Move slowly up through your body, contracting and relaxing the muscle groups as you go.
- It may take some practice at first, but try not to tense muscles other than those intended.
- The sequence of relaxation should be as to start with foot, calf muscles, thighs, hip, gluts, stomach, chest, back, arms, hand, neck, shoulders and face.

### **3.20. 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 selected variables to find out the effect of yogic practices with and without diet modification among pregnant women. The normality of the data collected was tested through F test (ANCOVA). The adjusted post test mean differences among the experimental groups were tested and if the adjusted post test result was significant the Scheffe's post hoc test was used to determine the significance of the paired means differences (Thirumalaisamy, 1995).

The investigator has analysed scientific results obtained by application of various methodologies discussed above and the results were analysed and presented in form of detailed discussion graphs and various tables in the next chapter.

### **3.21. ADMINISTRATION OF TESTS**

#### **3.21.1. PHYSICAL VARIABLES**

##### **3.21.1.1. HEIGHT**

###### **Purpose**

The purpose of the test was to measure the height of the subjects.

###### **Equipment**

Stadiometer, scale, piece of chalk, pencil and score sheet.

###### **Procedure**

The subject was made to stand on the stadiometer with bare foot. At the time of measuring the heels are on the platform without elevating it, and the scale is brought down firmly in contact with vertex. A mark is made with chalk piece on the side of scale in the stadiometer. After that the subject stepped away from the stadiometer stand board.

### **Scoring**

The vertical distance from the stadiometer standboard to chalk piece mark is measured. The measurement is taken to the nearest one centimeter.

### **3.21.1.2. BODY WEIGHT**

#### **Purpose**

The purpose of the test was to measure the body weight.

#### **Equipment**

**A standard weight checking machine.**

#### **Procedure**

The weight should be recorded preferably on an empty stomach, without shoes, slippers and maximum clothing. The subject was taken to stand barefoot in the center of the platform exerting equal pressure on the feet without any movement. The machine was repeatedly calibrated with the help of an accurate balance. The zero was ensured before the subject stood on its platform and after the subject got down.

#### **Scoring**

The weight was recorded in kilograms.

### **3.21.1.3. BMI (BODY MASS INDEX)**

Body mass index is defined by the expression of

Weight (kg) / Height (m)<sup>2</sup>

A BMI of below 25 is acceptable, 25-30 is over weight and above 30 is obese.

### **3.21.2. PHYSIOLOGICAL VARIABLES**

#### **3.21.2.1. RESTING PULSE RATE**

##### **Purpose**

The purpose of this test was to record the number of heart beats per minute.

##### **Equipment**

A stop watch (1/100 of a second) and a chair.

##### **Procedure and Scoring**

The resting heart rate of all the subjects was recorded in sitting position in the morning session. Before taking the resting heart rate, the subjects were asked to sit in a chair inside a room and relax for 20 minutes. To record the heart rate, finger tips were placed on the radial artery at the subject's wrist in such a manner that palpation was clear and the number of palpation was counted for one minute.

#### **3.21.2.2. BLOOD PRESSURE**

##### **PURPOSE**

To measure the systolic and diastolic blood pressure.

##### **Equipment's**

Sphygmomanometer and Stethoscope.

##### **Procedure**

The subject was sitting at ease. The manometer was placed so as to be at the same level as the cuff on the subject upper arm and the observer's eye. All clothing should be removed from the arm. The cuff should be applied closely to the upper arm, with the lower border not less than 2.5 centimeters above the cubital fossa. The radial pulse was palpated while the cuff was inflated. The cuff was inflated to a pressure of 30 mm Hg above the level of which radial pulsation can no longer be felt. The stethoscope was then placed lightly over the brachial artery. The pressure in the cuff was lowered 5 mm Hg at a time until the first sound heard, that was systolic pressure, continued to lower the pressure in the cuff until the sounds suddenly became faint that was the diastolic pressure. At that instant the pressure in millimeter of mercury was noted.

### **Scoring**

The blood pressure in millimetres of mercury was recorded.

### **3.21.3. BIO-CHEMICAL VARIABLES**

#### **3.21.3.1. HIGH-DENSITY LIPOPROTEINS (HDL), LOW-DENSITY LIPOPROTEINS (LDL) and TRIGLYCERIDES**

This test is used to measure the Low-density lipoproteins (LDLs) and triglycerides was measured by using the Blood serum or plasma.

**Collection:** 9 -12 hours fasting is recommended by national cholesterol education program expert panel-adult treatment panel (NCEP – ATP III) patient should sit comfortably for at least 5 minutes before sample collection. Tourniquet should be released within 1 minute of application.

**Equipments required:**

Liquid gold reagents for Cholesterol estimation are suitable for use with all fully automatic analyzers, semiautomatic analyzers, spectrometers and colorimeters and colorimeters having 490 – 510 nm filters. HDL -Cholesterol estimation by cholesterol Kit is not suitable on fully automatic analyzers; however cholesterol estimation can be done fully automatic analyzers.

| <b>PROCEDURE</b>         |        |          |        |
|--------------------------|--------|----------|--------|
| Pipette into tube marked | Blank  | Standard | Test   |
| Serum / plasma           | -      | -        | 10ul   |
| Reagent 2                | -      | 10ul     | -      |
| Reagent 1                | 1000ul | 1000ul   | 1000ul |

Mix well. Incubate at 37<sup>0</sup> C for 10 minutes.

Programme the analyzer as per assay parameters.

1. Blank the analyzer with reagent blank.
2. Measure absorbance of standard followed by the test.
3. Calculate results as per given calculation formula.

**Reference range:**

- Less than 200 mg/dL
- HDL cholesterol: 40–70 mg/dL in males, 40–80 mg/dL in females
- LDL cholesterol: less than 130 mg/dL
- TC/HDL ratio: under 4.0 in males, 3.8 in females

**3.21.2.2. BLOOD SUGAR**

**REQUIREMENTS**

1. Disposable syringe and needle

2. Alcohol
3. Sterile gauze or cotton
4. Collection bottle containing anticoagulant
5. Disposable gloves

## **SOURCE**

Blood is generally obtained of the veins of forearm or wrist by performing venipuncture. The medial cubital vein is usually chosen for venepuncture because it does not roll or slip beneath the skin.

## **PROCEDURE:**

Ask the subject to sit calmly alongside of the table, keeping her arm on the table with palm upwards. Venipuncture should be performed with proper care and skill. The veins hence to be enlarged applying a tourniquet in the arm just above the elbow and just tight enough to stop the blood flow. Select the puncture site carefully after inspecting the arm. Clean the area with cotton touched alcohol. Remove the syringe and needle from the protective wrap. Ensure that the needle is not blocked and the syringe does not contain air. Grasp the elbow of the subject with your left hand hold his arm fully extended. Anchor the vein with your thumb and draw the skin tight over the vein to prevent it from moving. Hold the syringe in the right hand and push it firmly and steadily into the center of the vein. The needle should be held at an angle of 30 -40 degree and introduced into the vein steadily and firmly.

Push the needle along the line of the vein to a depth of 1-1.5 cm. Look for blood appearing in the barrel, slightly pull back the piston and fill with the required amount of blood.

### **3.21.2.3. FPG (FASTING PLASMA GLUCOSE)**

For the estimation of FPG, a standard test using the GOD – Method was administered. The blood samples (fasting) of the subjects were drawn in the morning . One ml of blood was drawn and poured into a vial with anti coagulants and incubated at room temperature for 10 minutes. After the serum was separated, with the help of the reagents provided in Trinder’s method ,the readings were directly read on the computerized photometer. — Normal value 70-110 mg/dl.

#### **3.21.2.4. PPG (Post Prandial Plasma Glucose)**

A standard test using the POD –method was administered for the estimation of PPG. The blood samples of the subjects were drawn in the morning after two hours of breakfast. One ml of blood was drawn and poured into the vial with anticoagulants and it was incubated at room temperature for 10 minutes. After the serum was separated with the help of the reagent provided in the Trinder’s method, readings were taken from the computerized photometer. — Normal value 90-130 mg/dl.

#### **3.21.2.5. BLOOD URIC ACID**

Serum uric acid was estimated by following the method of Caraway (1955). In this method, serum was first deproteinised by tungstic acid. Then the uric acid present in the protein free filtrate was treated with Folin’s uric acid reagent in the presence of sodium carbonate to give a blue colour. The blue colour developed was compared with that of standard uric acid solution by measuring their optical densities in a Spectronic 21 at 700 nm, and the amount of uric acid was estimated.

#### **MATERIALS USED**

Serum, 10 per cent sodium tungstate, 2/3 N sulphuric acid, 10 per cent sodium carbonate, Uric acid reagent dilute (Folin & Denis), 20 mg uric acid stock, standard 0.4 mg uric acid working standard.

Preparation of reagents:

10 per cent Sodium tungstate: 10 grams of sodium tungstate, in 100ml of distilled water.

### **URIC ACID REAGENT (FOLIN AND DENIS) STOCK**

100 mg sodium tungstate ( $\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$ ) was dissolved in 800 ml of distilled water in a round-bottomed flask and 80 ml of 85 per cent phosphoric acid was added. Reflex condenser was attached and gently boiled for 2 hours, cooled to room temperature and diluted to 1 litre with water. This reagent was stored in a brown bottle. The acidity of the reagent is important in the reaction.

Uric acid reagent (Folin and Denis) Dilute:

10 ml of stock was diluted to 100 ml with water. Both stock and dilute reagents were stable.

20mg per cent uric acid stock standard:

100 mg of uric acid was dissolved in 300 ml of 0.77 per cent sodium tetraborate ( $\text{Na}_2\text{B}_4\text{O}_7$ ) taken in a 500ml standard flask and 0.9 ml of glacial acetic acid was added and diluted to the mark with water.

0.4mg per cent Uric acid working standard:

Dilute 2.0 ml of stock to 100ml with water in a flask (prepared freshly).

### **Procedure**

A quantity of 7.0 ml water was taken in a test tube, 1.0 ml of serum was added followed by 1.0 ml of 10 per cent sodium tungstate and 1.0 ml of  $\frac{2}{3}$  N  $\text{H}_2\text{SO}_4$ . These were mixed well and left for 5 minutes and filtered. Three test tubes A, B and C were marked as Standard, Test and Blank respectively and the procedures undertaken were as follows:

|                            | A  | B  | C  |
|----------------------------|----|----|----|
|                            | ml | ml | ml |
| Uric acid working standard | 50 | -  | -  |
| Protein free filtrate      | -  | 50 | -  |
| Water                      | -  |    | 50 |

One ml of 10 per cent sodium carbonate was added to each tube followed by 1.0ml of dilute phosphotungstic acid reagent. These were mixed and kept for 30 minutes. Readings were taken in a spectronic 21 at 700 nm. The per cent Transmittance (T) of Standard, Test samples were read and converted into Absorbance.

Serum Uric acid values obtained were expressed as mg/100ml

### **3.21.3. PSYCHOLOGICAL VARIABLES**

#### **3.21.3.1. PERCEIVED STRESS SCALE**

The perceived stress scale is a classic stress assessment instrument. It was developed in 1983 ( chohen et al.) it helps to understand, how different situations affect our feelings and our perceived stress. The questions in this scale asked you to explain your thoughts and feelings in last month. The choice of how often you felt that feeling can be measured as never (0), almost never (1), sometimes (2), fairly often (3), very often (4). We need to reverse the scores for questions 4, 5, 7 and 8 (i.e) change the obtained score as 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0. Score ranging from 0 to 40.

Scores marked as 0 to 13 would be considered low stress

Scores marked as 14 to 26 would be considered moderate stress

Scores marked as 27 to 40 would be considered high stress.

#### **3.21.3.2. ANXIETY QUESTIONNAIRE**

State Trait Anxiety Inventory scale was introduced by Cattell, 1960, and it was elaborated by Spielberger in 1983.

## **DESCRIPTION**

**PURPOSE:** To measure via self-report, the presence and severity of current symptoms of anxiety.

**CONTENT:** There are two sub-scale in this measure

1. State Anxiety Scale (S-A) evaluates the current state of anxiety “right now” to measure, subjective feelings of apprehension, tension, nervousness, worry, activation and arousal of autonomic nervous system.
2. Trait Anxiety Scale (T-A) assess the relatively stable and security aspects of anxiety, including the states of calmness, confidence and security.

STAI has 40 items, 20 items for state anxiety and 20 items for Trait anxiety sub-scales.

**RESPONSE OPTIONS/SCALE:** Response for the State Anxiety scale assess intensity of current feeling “right now”.

1 = not at all, 2 = somewhat, 3 = moderately so, 4 = very much so.

Response for the Trait Anxiety scale assess frequency of feelings in general,

1 = almost never, 2 = sometimes, 3 = often, 4 = almost always.

First published in 1970 as STAI-X, revised in 1983 as STAI- Y (publisher, Mind Garden, 855 Oak Grove Avenue, Suite- 215, Menlo park CA94025).

Method of administration: paper and pencil administration. This is a self-reported questionnaire, which can be administered in an individual format; specific instructions were provided for each of the S-A and T-A sub scale.

**SCORING:** Item scores were added to obtain subtest total scores.

Scoring should be reversed for 19 items out of 40 which were anxiety absent items.

Score Interpretation: Range of scores for each subset is 20- 80. High scores, represent the greater level of anxiety.

Cut point of 39- 40 (S-A) significant.

**DURATION:** It takes 10 to 20 minutes to complete.

Translations / Adaptations: The STAI has been translated and adapted in 48 languages.

**SCORING:** S-A and T-A scales comprise 20 items each and scores on 4 point forced choice likert type response scales.

Scores ranging from,

20 to 35 Mild Anxiety

36 to 50 Moderate Anxiety

51 to 65 Severe Anxiety

66 to 80 Very severe Anxiety.