CHAPTER III

METHODOLOGY

In this chapter the procedures adapted for the selection of subjects, selection of variables, pilot study, criterion measures, orientation of subjects, reliability of data, instrument reliability, tester’s reliability, subject reliability, administration of tests, training programme, collection of data, experimental design and statistical techniques for the analysis of the data have been explained.

3.1. SELECTION OF SUBJECTS

The purpose of this present study was to find out the effects of asanas, pranayama and combination of asanas and pranayama training on dexterity, body composition and biochemical variables of college men.

To achieve the purpose of this study, 120 male subjects were selected at random from Government Law College, Madurai, Tamil Nadu, India. The age of the subjects ranged between 18 and 25 years. The selected subjects were divided into four equal groups consisting of thirty subjects (n=30) each. No attempt was made to equate the groups. Experimental group I underwent asanas training (AT), experimental Group II was treated with pranayama training (PT), Group III underwent combination of asana and pranayama training (APT) and Group IV acted as control group (CG) for the training period of 12 weeks. The subjects in control group were not engaged in any specific training program.

All subjects were informed about the nature of the study and their consent was obtained to co-operate till the end of the experiment and testing period. A qualified physician examined the subjects medically and declared them fit for the
study. The subjects were free to withdraw their consent in case they felt any discomfort during the period of their participation, but there were no dropouts.

### 3.2. SELECTION OF VARIABLES

The goals of training may be directed towards the improvement in dexterity, body composition, basal metabolic rate and biochemical variables. The investigator had gone through the relevant literature in the area of yoga asana and pranayama training and its various aspects in association with the guide and other experts in this area. The variables were selected after considering the feasibility and availability of proper techniques and instruments.

#### 3.2.1 DEPENDENT VARIABLES

Prolonged yoga asana practices can decrease pulse rate, respiratory rate and blood pressure, it can contribute to stabilizing the nervous system equilibrium, normalizing gastrointestinal functions and endocrine function, increase the joint range of motions, endurance level, energy level, and cardiovascular efficiency, improve the eye-hand coordination, reaction time, dexterity skills, depth perception, sleep, etc. The research scholar selected dexterity as dependent variable and he was interested to know whether these factors influence the coordinating ability and dexterity level of an individual by selected training for the study.

Regular activity can significantly lower the likely good of obesity, along with improving body composition (Decreasing body fat). Sedentary individuals are twice as likely to develop coronary heart diseases as people who engage in regular physical activity (Powell et al., 1987). Body fat percentages for optimal fitness and for an athlete tend to lower than optimal health values because excess fat may
hinder physical performance and activity (Sharma, 2005). The basal metabolism is based on calories needed for internal secretion and other systems are inter related with the body composition variables of body weight and body fat. If the body weight and body fat is increased the basal metabolic rate will be affected. Lazzer et al. (2010) the age-related decline in BMR is due to a reduction in FFM. Anthropometric predictors of BMR are as accurate as body composition estimated by BIA. The research scholar aimed to know that the asana and pranayama is really influence the body composition in relation with the basal metabolic rate. Therefore the body weight, percentage of fat, lean body mass, and basal metabolic rate (BMR) were selected as dependent variables.

A sedentary life style is life styles, where there is little or no physical activity. They are at the greatest risk for developing hyper kinetic disease like cardio vascular disease, obesity, diabetes, stroke and some form of cancer (David and Jerom, 2007). Therefore, the biomechanical variables such as low density lipoprotein (LDL) triglycerides (TG) were taken as dependent variables because these variables are found to be highly associated with cardio vascular diseases. Our body requires essential fat because it serves as an important metabolic fuel for energy production and other bodily functions. Regular aerobic exercises and abstinences from cigarette smoking significantly increase high density lipoprotein (HDL) lower LDL (Mcardle et al., 2001). Therefore biomechanical variables such as high density lipoprotein (HDL) and hematocrit (HCT) were taken as dependent variables

Hence, the following dependent variables were selected and are presented below.
1. Dexterity

2. Body Composition variables
   a. Body Weight
   b. Percent Body Fat
   c. Lean Body Mass
   d. Basel Metabolic Rate (BMR)

3. Biochemical variables
   a. High-density lipoprotein (HDL - C)
   b. Low-density lipoprotein (LDL - C)
   c. Triglycerides (TG) and
   d. Hematocrit (HCT)

3.2.2. INDEPENDENT VARIABLES

The yogic practices and pranayama practices are comprising the physical and psychological benefits, points out that it can also contribute to increasing somatic and kinesthetic awareness, self-acceptance and self-actualization, social skills, well-being, as well as to improving concentration, memory, attention, mood, learning efficiency, symbol coding, etc.

Asana provides the means for people of any age not only to get a stay in shape but also to develop balance, coordination and a sense of centeredness. It renews, invigorates and heals the body, stretching and toning the muscles, joint and spine
and directing blood and oxygen to the internal organs including the glands and nerves (Raman, 1998).

Yogic practice leads to decrease in fasting plasma glucose, LDL and increase in HDL (Bijlani et al. 2005). Alternate nostril breathing decrease the pulse rate and blood pressure while increasing parasympathetic activity (Dhungel et al. 2008) and lower the LDL and raise the HDL (Mayo, 2002). Hence asanas and pranayama were selected as independent variables.

Further, the investigator was also interested to know whether the combination of asanas and pranayama were effective to bring out positive changes in dexterity, body composition and bio-chemical variables of college men. In this study there were three independent variables.

1. Asanas training (AT)

2. Pranayama training (PT)

3. Combination of asana and pranayama training (APT)

3.3. PILOT STUDY

A Pilot Study was conducted to assess the initial capacity of the subjects in order to fix the load and to make sure that the duration of exercise included in the program was within the limits of the subjects to ensure the satisfactory effect. For this, Fifteen Subjects were selected at random and divided into three groups of five each, in which Group I underwent asanas training (AT), Group II underwent pranayama training (PT) and Group III underwent combination of asanas and pranayama training (APT) under the supervision of investigator with experts in the field of yoga for a period of four weeks. Based on the response of the subjects in the
pilot study the training programme for the experimental groups to the main study, for the period of 12 weeks was designed. After completion of the pilot study the present study was conducted on 120 subjects.

3.4 CRITERION MEASURES

By glancing the literature and in consultation with the professional experts, the following variables were selected as the criterion measures to this study for testing hypothesis.

**TABLE-3.1**

CRITERION MEASURES

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Criterion Variables</th>
<th>Test Items</th>
<th>Unit of Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dexterity Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dexterity</td>
<td>The O'connor Tweezer</td>
<td>In numbers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dexterity Test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Body composition Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Body weight</td>
<td>Weighing machine</td>
<td>In Kg</td>
</tr>
<tr>
<td>3</td>
<td>Body Fat</td>
<td>Skin fold caliber</td>
<td>Millimeter</td>
</tr>
<tr>
<td>4</td>
<td>Lean Body Mass</td>
<td>Skin fold caliber</td>
<td>In kilogram</td>
</tr>
<tr>
<td>5</td>
<td>Basal Metabolic Rate</td>
<td>Harris-Benedict formula</td>
<td>In kilo Calories</td>
</tr>
<tr>
<td></td>
<td>Bio chemical Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>High Density Lipoprotein (HDL)</td>
<td>Cobas integra blood analyser</td>
<td>In mg/dl</td>
</tr>
<tr>
<td>7</td>
<td>Low-Density Lipoprotein (LDL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Triglycerides (TG)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Haematocrit (HCT)</td>
<td>Winthrop Tube Test</td>
<td>In percentage</td>
</tr>
</tbody>
</table>
3.5. ORIENTATION OF THE SUBJECTS

Before collection of data, the subjects were oriented about the purpose of the study. The investigator explained the procedure of assessing the dexterity and body composition variables such as weighing scale for body weight, skin fold caliper for percent body fat and lean body mass and measuring tape, weighing scale and date of birth records for basal metabolic rate. The investigator explained to the subjects about the collection and analysis of blood to be followed for bio-chemical variables such as High-density lipoprotein (HDL), Low-density lipoprotein (LDL), Triglycerides (TG) and Hematocrit (HCT). The subjects had a preliminary visit to the laboratory to familiarize with the test protocol.

Instruments such as biomonitor, sphygmomanometer, Stethoscope, and cobas integra blood analyser (Bio-medical lab instrument) were used to measure selected variables. All instruments were in good working condition. Their calibrations were tested and found to be accurate enough to serve the purpose of the study. Certificates of accuracy of the above instruments were obtained from appropriate instrument testing agencies, and also by recalibrating the scale by using amounts of variables wherever required. To determine the reliability of instruments, measurement on each of the tests of the variables were recorded five times under similar conditions using the same instrument. Hence, their calibrations were accepted as accurate enough for the purpose of the study.

3.6 RELIABILITY OF DATA

The reliability of data was ensured by establishing the instrument reliability and subject reliability
3.7 INSTRUMENT RELIABILITY

O’Connors tweezer dexterity instrument, stop watch, weighing machine, skin fold caliper, measuring tape and caber Integra blood analyzers were used to measure the selected variables. All the instruments used in the study were in good condition and purchased from reputed and reliable companies. Their calibration were tested and found to be accurate enough to serve the purpose of the study. To determined the reliability of instrument, measurement on each of the tests of the variables were recorded five times under similar conditions using the same instruments(except bio chemical variables). Hence, their calibration were accepted as accurate enough for the purpose of the study.

3.8. TESTER’S RELIABILITY

To ensure the uniformity and reliability of testing technique, the investigator had a number of practice sessions in the testing procedure with the guidance of the respective experts. The investigator took all the measurements for the study with the assistance of professional experts.

Tester’s reliability was established by test-retest process. To determine the reliability of the measurement involved in the study, the tester correlated the data from ten subjects. Meticulous care was taken to ensure the fitness of each subject before the administration of each test, so that the consistency of the result could be ensured. The intra class correlation co-efficient obtained for test-re test data are presented in Table-3.2
Table – 3.2

Intra class correlation co-efficient obtained for test- re test scores

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Variables</th>
<th>‘R’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dexterity</td>
<td>0.89*</td>
</tr>
<tr>
<td>2</td>
<td>Body Weight</td>
<td>0.99*</td>
</tr>
<tr>
<td>3</td>
<td>% body fat</td>
<td>0.99*</td>
</tr>
<tr>
<td>4</td>
<td>Lean Body Mass</td>
<td>0.87*</td>
</tr>
<tr>
<td>5</td>
<td>Basal metabolic rate</td>
<td>0.99*</td>
</tr>
<tr>
<td>6</td>
<td>High Density Lipoprotein</td>
<td>0.93*</td>
</tr>
<tr>
<td>7</td>
<td>Low-Density Lipoprotein</td>
<td>0.94*</td>
</tr>
<tr>
<td>8</td>
<td>Triglycerides</td>
<td>0.93*</td>
</tr>
<tr>
<td>9</td>
<td>Hematocrit</td>
<td>0.94*</td>
</tr>
</tbody>
</table>

*Significant at 0.05 level.

3.8.1 SUBJECT RELIABILITY

The intra-class correlation values of the above tests and retest also indicated subject, tester and instrument reliability as the same subject and instruments were used under similar conditions by the same tester. However in the case of High-density lipoprotein (HDL), Low-density lipoprotein (LDL), Triglycerides (TG) and Hematocrit (HCT) only five subjects were retested. The coefficient of reliability were significant at the P < 0.05 level for the above tests under investigation.

3.9 ADMINISTRATION OF THE TESTS

The investigator held a meeting with the subjects prior to the administration of the tests. The purpose, the significance of the study and the requirements of the testing procedure were clearly explained to them in detail so that there was no
ambiguity in their minds, regarding the efforts which they had to put for the successful completion of the tests.

3.9.1 THE O'CONNOR TWEEZER DEXTERITY TEST

The O’Connor Tweezer Dexterity test was used to assess the finger dexterity of the subjects. For this purpose the O'Conn or tweezer dexterity instrument and stopwatch was used. The subject was seated comfortably at a table about 30 inches in height. The Tweezer Dexterity Test is placed in front of him/her about one foot from the edge of the table with the tray at the right if the participant is right-handed, or vice versa. It should be at an angle of about 90 degrees with the subject's working hand, but may be changed if so desired. All four groups were assessed on a tweezer dexterity task detailed below, at the beginning and end of training periods. The assessment was modeled on the O'Connor tweezer dexterity test. Subjects were instructed to pickup cylindrical metal pins with a tweezer using the dominant hand and place them in holes in a metal plate, as quickly as possible. They were told when to begin the test and after four minutes were asked to stop.

The examiner should show by gesturing that the holes are filled from left to right for a right-handed individual and each row is to be completed before the next is started. It is to be further explained that the elbow may rest on the table, but no other hints are to be given. The subjects then allowed to place 10 pins (and no more) in the top line for practice. After the allowance of a moments' rest, the test was begun with a stopwatch. The number of pins placed in 4 minutes was counted as the dexterity score of the individual and scores were recorded in numbers (Manjunath and Telles, 1998)
3.9.2 BODY WEIGHT

The body weight of the subjects was measured by using the weighing machine. Subject was asked to step on the scale with minimum clothing, gym shorts. Actually no appreciable accuracy is lost if the amount of clothing is consistent. The subject was weighed at the same time of day and to the same degree of accuracy, the nearest half kilogram. The hair was pressed down to avoid the variation in weight, since the hairstyle may variate the body weight. The investigator controlled the weighing situations to reduce the embarrassment of the part of the subjects. The measurements are taken in kilogram (Yobu, 1988).

3.9.3 BODY FAT

Body fat was calculated from the percent body fat and the percent body fat was assessed by the skin fold caliper in millimeters and the measurement was substituted in standardized norms and converted into kilograms. The measuring procedure for percent body fat is as follows.

The investigator grasped the skin fold between thumb and index finger and attached the jaws of the calipers about 1 cm from the thump and finger. Measurements of skin fold thickness taken from the following sits.

1. Abdomen – At the midaxillary line at waist level, adjacent to the umbilicus.
2. Chest – over the lateral border of the pectoralis major muscles just medical to the axilla.
3. Triceps – Midway between the acromian and olecranon process on the posterior aspect of the arm, with arm held vertically.
Each site was pinched up with a fold of fat encased between two thicknesses of the skin. The fold was pulled up and away from the muscle to ensure only fat is being measured. The subject was asked to contract the underlying muscle. Measurements are taken on the right side of the body with subject standing. The reading was taken for each site between 2 and 5 seconds after the caliper was placed. And the measurement was taken early in the morning to eliminate the diurnal variation in the state of hydration. Measurements are taken in millimeter (Shaver, 1981).

3.9.4 LEAN BODY MASS

The lean body mass of the subjects were assessed from the body weight – fat weight (calculated from % body fat). The skin fold caliper measurement was used to calculate the fat weight. Lean body mass (LBM) includes all of the body tissue such as bone, muscle, nerve fiber coverings etc. Lean body mass was calculated using the following equation and the scores was recorded in kilogram.

\[
\text{LBM (Kg)} = \text{Total body weight} - \text{body fat}
\]

3.9.5 BASAL METABOLIC RATE

Harris and Benedict (1919) formula was used to find out the basal metabolic rate. Calculator and scales for weight and tape measure for height required. Use the formula below to determine basal metabolic rate and daily energy expenditure. If required, you can convert weights and lengths. The Harris-Benedict Equation has for a long time been the standard formula and is widely used for estimating basal metabolic rate. Use the calculations below to calculate, basal metabolic rate where: \( Wt = \) weight in kg, \( Ht = \) height in cm, \( A = \) age in years.
Men: kcal/day = (13.75 x Wt) + (5 x Ht) - (6.76 x Age) + 66

3.9.6. BIO-CHEMICAL VARIABLES TEST

To find out the level of High-density lipoprotein (HDL), Low-density lipoprotein (LDL), Triglycerides (TG) and Hematocrit (HCT). Test tubes, centrifuge tubes, vacutainer, sterilized syringe and needle, spirited cotton, pipette, distilled water and cobas integra blood analyser.

Collection of Blood

A tourniquet was tied above the elbow without obliterating the arterial pulse at the wrist. The skin was sterilized over the vein and a disposable sterile needle fitted to a disposable syringe of appropriate capacity, usually 10 mm was inserted into the vein. When the needle entered the vein, the piston was withdrawn slightly. The tourniquet was released when the blood appeared and the desired amount of blood withdrawn into the syringe. The tourniquet was released. The needle was withdrawn. The needle still in position, the blood was slowly transferred to an appropriate container using minimum amount of pressure.

Procedure

Subjects were asked to report at the laboratory after an overnight fasting and 5 ml of venous blood samples were collected in heparins test tubes. The collection was completed in one minute or less. The vacutainers were put inside the ice box. The blood samples reach the laboratory within 10 minutes. The connector of the test strip was inserted into the test slot of the meter until it is firm. The machine makes a beep and display shows up to indicate the meters are ready for testing. Thus the pre-samples were collected in two days prior to training. After the twelve-week-training programme, the subjects were asked to assemble at the laboratory, in fasting state on
the day after the last session of the training period. The blood samples were again collected in heparins test tubes for post-training estimation of biochemical variables.

**Scoring**

The test result appeared in the display of cobas integra blood analyser monitor and the scores were recorded in mg/dl.
FIG: 3.1 FLOW CHART SHOWING THE METHODOLOGY ADOPTED IN THIS STUDY

COLLEGE LEVEL MEN STUDENTS
N = 120; No Equated groups

EXP. GROUP I
Asana training group – 6 days per week (AT) N = 30

EXP. GROUP II
Pranayama Training - 6 days per week (PT) N = 30

EXP. GROUP III
Combination of Asana and Pranayama training group - 6 days per week (APT) N = 30

CONTROL GROUP
Control group (CG) N = 30

PRE - TEST

POST - TEST

STATISTICAL ANALYSIS

Paired t – test (t - Ratio)
(to calculate the individual training effects from the base line to post test)

ANCOVA (F – Ratio)
3.10. TRAINING PROGRAMME

Yoga a Vedic science has been applied in the field of therapeutics in modern times. Yoga has given patients the hope to reduce medication besides slowing the progression of the disease. Yoga employs stable postures or asanas and breath control or pranayama. (Singh et al 2004). Asanas has already proves its mettle in the improvement of oxidative stress as well as in improving the glycemic status of diabetics through neuroendocrinal mechanism. (Yadav et al 2005).

One hundred and twenty college men were randomly selected and their age ranged between 18 and 25 years. The experimental groups underwent their respective training programmes six days per week for a period of twelve weeks in addition to their regular college activities.

Experimental Group I : Underwent Asanas Training (AT).
Experimental Group II : Underwent Pranayama Training (PT).
Experimental Group III : Underwent a Combination of Asanas and Pranayama Training (APT).
Control Group : Control Group (CG) was not engaged in any specific training programme

In each training session, the training was imparted for a period between 45 and 60 minutes, which included 5 minutes warming up and 5 minutes relaxation procedure after the training programme for six days per week for a period of 12 weeks. The training sessions were held between 6.30 am to 7.30 am, from Monday through Saturday. The length of the training intervention for this study was based on
the fact that twelve weeks has been shown to be of sufficient to provide significant changes on selected variables (Rice et al., 1999).

The experimental groups underwent their respective training programmes under the supervision of the investigator. The subjects were carefully monitored and questioned about their health status throughout the training period. None of them have reported any complication. The control group was not given any treatment apart from their routine. Further, all the participants were instructed neither to change their life style nor to change their dietary intake for the entire duration of the training. The training schedule for the experimental groups was designed as per the results of the pilot study and also based on the guidelines given by Baechle (1994). Combination of asana and pranayama group training schedule was framed using the same asana and pranayama training groups by alternate days from Monday through Saturday.

The subjects underwent their training programme under strict supervision of the investigator. Prior to every training session, subjects underwent 10 minute loosening exercises, which included suryanamaskar. All the subjects involved in the training programmes were questioned about their statures throughout the training period. None of them reported any injuries.

### 3.11 TRAINING SCHEDULE

The training was scheduled in the morning session for six days per weeks for twelve weeks. The training schedule of AT, PT and APT is presented from table - 3.3 to 3.4

Training program for the experimental groups was described in details in the flow charts and schedule as follows.
FIG: 3.2 FLOW CHART SHOWING THE EXPERIMENTAL TREATMENT ADOPTED FOR
EXPERIMENTAL GROUP-I

ASANA TRAINING ON COLLEGE LEVEL MEN

GROUP-I,
ASANA TRAINING GROUP – 6 days per week (AT) N=30

Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

Asana Training
Asana Training
Asana Training
Asana Training
Asana Training
Asana Training
FIG: 3.3 FLOW CHART SHOWING THE EXPERIMENTAL TREATMENT ADOPTED FOR

EXPERIMENTAL GROUP-II

PRANAYAMA TRAINING ON COLLEGE LEVEL MEN

GROUP-II
PRANAYAMA TRAINING GROUP – 6 days per week (PT) N=30

Monday
Pranayama Training

Tuesday
Pranayama Training

Wednesday
Pranayama Training

Thursday
Pranayama Training

Friday
Pranayama Training

Saturday
Pranayama Training
FIG: 3.4 FLOW CHART SHOWING THE EXPERIMENTAL TREATMENT ADOPTED FOR

EXPERIMENTAL GROUP - III

COMBINATION OF ASANA AND PRANAYAMA TRAINING
ON COLLEGE LEVEL MEN

GROUP - III,
ASANA AND PRANAYAMA TRAINING GROUP
6 days per week (APT) N=30

Monday
Asana Training

Tuesday
Pranayama Training

Wednesday
Asana Training

Thursday
Pranayama Training

Friday
Asana Training

Saturday
Pranayama Training
### Table - 3.3
**TRAINING SCHEDULE FOR ASANAS GROUP**

<table>
<thead>
<tr>
<th>Name of the Asanas</th>
<th>Duration of Asanas in each session*</th>
<th>Load progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suriyanamaskar</td>
<td>2 min [2 Rounds]</td>
<td>Adding 1 round for every 2 weeks</td>
</tr>
<tr>
<td><strong>Standing Asanas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vrikshasana</td>
<td>1 min</td>
<td></td>
</tr>
<tr>
<td>Ardhakati Chakrasana</td>
<td>1 min [each side]</td>
<td></td>
</tr>
<tr>
<td>Ardha Chakrasana</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>Trikonasana</td>
<td>2 min [each side]</td>
<td></td>
</tr>
<tr>
<td><strong>Sitting Asanas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vajrasana</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>Paschimottanasana</td>
<td>1 min</td>
<td></td>
</tr>
<tr>
<td>Ustrasana</td>
<td>30sec.</td>
<td></td>
</tr>
<tr>
<td>Gomukhasana</td>
<td>2 min [each side]</td>
<td></td>
</tr>
<tr>
<td><strong>Prone Position Asanas</strong></td>
<td></td>
<td>Adding 10 seconds to all the asanas for every 2 weeks</td>
</tr>
<tr>
<td>Makarasana</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>Bhujangasana</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>Shalabhasana</td>
<td>30sec.</td>
<td></td>
</tr>
<tr>
<td>Dhanurasana</td>
<td>30sec.</td>
<td></td>
</tr>
<tr>
<td><strong>Supine Position Asanas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pavana Muktasana</td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>Navasana</td>
<td>1 min</td>
<td></td>
</tr>
<tr>
<td>Matsyasana</td>
<td>30sec.</td>
<td></td>
</tr>
<tr>
<td>Sarvangasana</td>
<td>2 min</td>
<td></td>
</tr>
</tbody>
</table>

* 5 to 10 seconds rest between each asanas

*Asanas are described by dev ji (1970) and duration by dang (1999).*
### TABLE – 3.4
TRAINING SCHEDULE FOR PRANAYAMA GROUP

<table>
<thead>
<tr>
<th>Name of the Pranayama</th>
<th>Duration of Pranayama In each session*</th>
<th>Load progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sectional breathing (Three sections)</td>
<td>6 min (Each sections 2 min)</td>
<td>Adding 10 sec for each section in every 2 weeks</td>
</tr>
<tr>
<td>Kapalapathi</td>
<td>3 min (3 rounds)</td>
<td></td>
</tr>
<tr>
<td>Bhastrika</td>
<td>3 min (3 rounds)</td>
<td></td>
</tr>
<tr>
<td>Anuloma-Viloma</td>
<td>2 min (3 rounds)</td>
<td>Adding 1 round for every 2 weeks</td>
</tr>
<tr>
<td>Nadi Shuddhi Pranayama</td>
<td>6 min (6 rounds)</td>
<td></td>
</tr>
<tr>
<td>Surya Bedhana Pranayama</td>
<td>3 min (6 rounds)</td>
<td></td>
</tr>
<tr>
<td>Bhramari Pranayama</td>
<td>3 min (3 rounds)</td>
<td></td>
</tr>
</tbody>
</table>

*5-10 seconds gap between each Pranayama.

Pranayama are described by Prakasan (1997) and duration by Iyengar BKS (2010).

Combination of asanas and pranayama training the same asanas and pranayama training schedules was followed by alternate days from Monday through Saturday.

### 3.12 PREPARATORY MOVEMENTS (WARM-UP) FOR ASANAS AND PRANAYAMA

#### Breathing Practice

The breathing practices are advised to practice in the first. These practices are intended to have an inner awareness and thereby enhance the coordination of the body, breath, and mind. Thus it is advised to start with the breathing practices. There are many types of breathing practices. Some of them are introduced here.
**Hands in and out breathing**

- Stand erect. Bring up the arms to horizontal position, palms facing each other, fingers pointing forward.
- Move the arms backwards as much as possible while inhaling. The arms swing back with shoulders as hinges in the same horizontal plane. Chest is expanded.
- Bring the arms back to front position while exhaling fully. Repeat 10 rounds.

**Hands – stretch breathing**

- Interlock the fingers, in front of the chest, palms inwards.
- Inhale slowly, stretch the arms straight out while twisting the interlocked hands, palms facing outwards.
- Exhale. Bring the hands back. Palms on the chest with relaxation. Repeat 10 times.
- Repeat the same movements in oblique (45˚) and vertical planes.

**Ankle – stretch breathing**

- Stand erect. Keep the hands straight down, palms facing forward.
- While inhaling, raise the hands and stretch up the body on the toes. The hands with interlocked palms facing upwards and the arms stretched.
- While exhaling bring the hands down completely retracing the steps. Stand on the soles. Repeat 5 times.
Stretching Practices (Loosening Exercise)

Jogging

- Stand erect and place the fists loosely on the chest.
- Increase the speed gradually and come to a steady jogging speed.
- Carry on deep rhythmic breathing and relax the whole body during jogging.
  
  Continue for a while.

- Continue the practice with side jogging by spreading the legs sideward.
  
  Stand a while and perform Mukha Dhouti. Relax in standing position.

Mukha Dhouti (Cleaning Through a Single Blast Breath)

- Stand with a slight forward bend of the trunk, palms on the thighs and legs about a metre apart.
- Inhale deeply and expel the air forcibly as in a jet through the mouth continuously. This is done by the help of the diaphragm by prolonged exhalation.
- Repeat several times.

Front and Back Bending of Waist

- While inhaling, stretch up the hands and bend backwards.
- Return to the vertical position and bend forward while exhaling.
- Touch the ground with palms, if possible. Come up and bend backwards during inhalation. Repeat 4 or 5 times.

Side Bending and Twisting of Waist

Side bending

- Keep the legs about a meter apart.
• Raise the hands sideways parallel to the ground while inhaling.
• Bend to the right till the right hand touches the right heel while exhaling.
  Bend in the same plane.
• Look at the palm of the left hand directing forwards. Come up with inhalation. Repeat 4 or 5 times.
• Repeat the same on the left.

**Twist with bending**

• Repeat side bending, except that the right foot is touched with the left hand and left foot with the right hand.

**Twist**

• Stand erect with hands spread out parallel to the ground, feet about ½ meter apart.
• Keeping the legs firm on the ground twist to the right, right hand straight and left hand bent at the elbow touching the chest.
• Exhale continuously during this twist.
• Come back while inhaling.
• Repeat on the left side.
• All twisting should be above the waist. Below the waist, maintain the body straight and firm. No bending at the knee – joints.
• Repeat with increasing speed.

3.13 DESCRIPTION OF ASANAS

3.13.1 Surya Namaskar

Meaning : Salutation to sun
Each stage of suryanamaskara is accompanied by regulation of breath.

**Starting Position:** Stand erect with the legs together and adopt namaskara mudra (palms together) in front of the chest.

**Pose 1:** Stand erect with the legs together and palms together. Take the hands above the head and bend the trunk backwards. Inhale fully.

**Pose 2:** Bend the body to the front and touch the knees by the forehead. Keep the palms on the floor on either side of the legs. Exhale fully.

**Pose 3:** In this stage, kick the right leg back, take the left knee forward, look up and inhale. Press the buttock close to the heel.

**Pose 4:** In the next step, take the left leg also back, resting only on palms and toes; keep the body straight from head to toes inclined to the ground at about $30^\circ$. Exhale completely.

**Pose 5:** Bend at the knee and rest the knees on the floor without altering the positions of the palms and toes. Rest the forehead on the ground. In this position inhale while moving backwards and then exhale completely.

**Pose 6:** Without moving the hands and toes, come forward on the chest and Rest the forehead. In this position Sastanga Namaskara, forehead, chest, palms, knees and feet are the eight organs that will be raised
up. Stay in ‘Breath-out’ condition. (Bahya Kumbhaka)

**Pose 7:** Inhale; raise the head and trunk making the spine concave upwards without changing the position of the hands and feet. Keep the Knees off the ground.

**Pose 8:** Exhale. Raise the buttocks, push the head down and have a complete arch with the heels touching the ground and palms on the floor.

**Pose 9:** Same as 5th pose. Inhale and exhale.

**Pose 10:** Inhale and bring the right leg in between the two hands and in line with them. Arch the back concave upwards as in pose 3.

**Pose 11:** Exhale and bring the left foot forward the right foot and touch the knees with as in pose 2.

**Pose 12:** Inhale. Come up, stand erect, hands in namaskara mudra.

**Relaxation position:** In Tadasana keep the legs apart. Hands hanging loosely, yes closed observe the breathing. Relax.

**STANDING ASANAS**

**Starting Position (Tadasana) for Standing Asanas**

Stand erect in straight line. Keeping the heels together and toes a little apart. Expand the chest and drop the shoulders to a relaxed position. Keep the neck straight. Fingers together, facing downward and palms stretched along the thighs by the sides. Relaxed face. This is called Tadasana.
3.13.2 Vrikshasana

**Meaning:** Vriksh- Tree, in the final position of the Asana, the body looks like a tree.

- Start with Tadasana position.
- While inhale rises the arms sideways to the shoulder level twist your palms forward.
- Raise the hand above the head with the biceps touching the ear.
- Rise on toes, stretch fully.
- Knees straight, abdomen pulled in.
- Exhale and bring the hands sideways down to shoulder level. Twists the palms downward.
- Come back to starting position.

**Breathing pattern**

Inhale when raise the arms and exhale while coming down. Normal breathing in the final position.

3.13.3 Ardhamati Chakrasana (Lateral Arc Posture)

**Meaning:** Ardha-half, Kati-waist chakra- wheel in the final position of the Asana, the body looks laterally likes a half wheel.

- Start with Tadasana position.
- While inhale rise the right arm sideways up to the shoulder level twist your palms upward and raise the hand above the head.
- Exhale and bend slowly on the side. Left palm touching the left thigh. Maintain the posture.
• Inhale and slowly come back to straight position, keeping the hand up, with the biceps touching the ear.

• Exhale and bring the right hand sideways down to shoulder level. Twists the palms downward. Come back to starting position.

• Repeat the same on the left side.

**Breathing pattern**

Exhale when bend sideward and inhale while coming up. Normal breathing in the final position.

3.13.4 **Ardha Chakrasana (Half-Wheel Posture)**

**Meaning:** Ardha–half Chakra–wheel. In the final position it looks like a half wheel.

• Start with Tadasana position.

• Slowly slide up the palms and support the back at the waist. Exhale.

• Bend backwards from lumbar region. Neck bends backwards, stretching the muscles of the neck. Inhale while bending. This is the final position of the asana. Breathe normally.

• Exhale come back to straight position, keeping the support at the back at the waist by the palms.

• Release the hands from the support of the waist while exhaling.

**Breathing pattern**

Inhale when bend backward and exhale while coming up. Normal breathing in the final position.

3.13.5 **Trikonasna**

**Meaning:** Triangle pose
• In Tadasan keep the legs apart for one meter. Hands hanging loosely, eyes closed observe the breathing. Relax.

• While Inhaling raise the arm sideways up to the shoulder level, keep the legs apart for one meter. Right leg turn to 90 degree.

• Exhale and bend slowly on the right side. Keep right palm side of right foot. Maintain the posture.

• Inhale and slowly come back to straight position, keeping the hand up.

• Exhale and bring the hand sideways down. Come back to starting Position.

• Repeat the same on the left side.

**Breathing pattern**

Exhale when bending sideward and inhale while coming up. Normal breathing in the final position.

**SITTING ASANAS**

**Starting Position (Dandasana) for Sitting Asanas**

Sit erect with legs stretched, heels together, and palms pressing on the floor by the side of the buttocks. Legs apart hands keeping the back and whole body should be loose and relaxed. This is called Dandasana.

**3.13.6 Vajrasana**

**Meaning:** Diamond

• Start with Dandasana position

• Fold right leg at the knee and place the heel under the right buttock. Fold the left leg at the knee and place the heel under the left buttock.

• Hands in chin mudra keep it above the knee, trunk vertical.

• Slowly release the palms.
• Unfold the left leg and keep it straight. Unfold the right leg and keep it straight.

**Breathing pattern**

• Normal breathing in the final position.

### 3.13.7 Paschimottanasana (Posterior Stretching Posture)

**Meaning:** Pascima – posterior; Tana - Stretch. In the final position the entire posterior parts from the toes to the neck are stretched.

• Start with Dandasana position

• Partial Inhale raises both the hands sideways up to the shoulder level without bending the elbows; and palms facing downwards.

• Full Inhale raises the arms up so that the biceps touch the ears palms facing forward.

• Partial Exhale bend forward from the lumbar region along with the hands and keep them parallel to the ground. Let the wrist come above the toes.

• Full Exhale with the index fingers forms the hooks and catches the big toes respectively. And bend further forward, then rest the face on the knees.

• Partial Inhale release the fingers, then come back parallel to the ground.

• Full Inhale comes to straight, that the biceps touch the ears palms facing forward.

• Partial Exhale brings the hands down to sideways come back to first position.

• Full Exhale rest the palms on the floor, then bring the hands back to starting position.
Breathing pattern
Exhale when bending forward and inhale while coming up. Normal breathing in the final position.

3.13.8 Ustrasana
Meaning: Ustra means camel. Final position looks like a camel.
- Start with Dandasana position
- Fold right leg at the knee and place the heel under the right buttock
- Fold left leg at the knee and place the heel under the left buttock.
- Stand on the knees making the trunk vertical.
- Inhale. Bend the body backwards and keep the palms on the soles.
- Exhale slowly release the palms and stand on the knees making the trunk vertical.
- Slowly sit on the heels.
- Unfold the left leg and keep it straight.
- Unfold the right leg and keep it to the side of the left leg.

Breathing pattern
Inhale when bending backward and exhale while coming up. Normal breathing in the final position.

3.13.9 Gomukhasana
Meaning: Cow’s face pose
- Start with Dandasana position
- Bend the left leg underneath the right leg so that the left heel is touching the right buttock
• Bring the right leg over the top of the bent left leg so that the right heel touches the left buttock adjust the right knee so that it is above the left knee.

• Place the left arm behind the back.

• The right arm over the right shoulder. The back of the left hand should lie in contact with the spine while the palm of the right hand rests against the spine while inhaling.

• Try to clasp the fingers of both hands behind the back. Exhale. Bring the raised elbow behind the head. The spine should be erect. Close the eyes.

• Release the right arm with inhale and bring down to exhale.

• Release the left hand.

• Release the right leg.

• Release the left leg and keep it to the side of the right leg.

PRONE POSITION ASANAS (ABDOMINAL)

Starting Position for Prone Asanas

Lie down on the prone with the hands above the head keeping straight alongside the head resting the palms on the ground, touching the chin on the floor and legs together soles facing up. Keep the body, from toes to head in a straight line.

3.13.10 Makarasana (Crocodile Posture)

Meaning: Makara means crocodile. In the final position of the Posture, looks like a crocodile.

• Starting position of prone asana.

• Keep the legs apart; heels facing each other, toes facing outwards.
• Fold the right hand and place the right palm on the left shoulder. Then similarly keep the left palm on the right shoulder.

• Keep the chin on the point where the two arms cross. (Rest and relax in this posture)

• Remove the left palm and unfold the left hand, similarly the right palm and right hand. Keep the legs apart; heels facing each other, toes facing outwards. Bring the legs together come back to the starting position.

3.13.11 Bhujangasana (Serpent Posture)

**Meaning:** Bhujanga - Serpent. In the final position of the posture, the body looks like a serpent when it raises its hood.

• Starting position of prone asana.

• Bend both the elbows and place the palms on the floor by the side of the last rib bone.

• Inhale slowly lifts the head and then raises the chest. Feel the weight of the body at the lumbar region maintain the position.

• Exhale bring the chest and head down, touching the floor with the chin

• Release the hands and place them above the head region on the floor come back to the position.

**Breathing pattern**

Exhale when come downwards and inhale while raising up. Normal breathing in the final position.

3.13.12 Salabhasana (Locust Posture)

**Meaning:** Salabha is a name of the insect called locust. In the final position it looks like a locust.
• Start in prone position.
• Make the fists and place it under the root of the thigh.
• Inhale; raise both legs together up from the waist.
• Exhale and return to first stage of this asana.
• Return to starting position.

**Breathing pattern**

Exhale when come downwards and inhale while raising up. Normal breathing in the final position.

**3.13.13 Dhanurasana (Bow Posture)**

**Meaning:** Dhanur means bow, in the final position of the posture, the body looks like a bow.

• Start in prone position.
• Fold the knees and hold the respective feet.
• Inhale raises the head, chest and also thighs by tugging the hands and legs, so that the spine is arched backwards like a bow. Look up.
• Exhale and return to first stage of this asana.
• Return to starting position.

**Breathing pattern**

Exhale when coming downwards and inhale while coming up. Normal breathing in the final position.

**SUPINE POSITION ASANAS (LYING ON BACK)**

**Starting Position for Supine Asanas**
Lie down on the supine position. Keeping the legs together and stretch the hands straight above the head region. i.e., from toes to head, the entire body in a straight line.

3.13.14 Pavana Muktasana (Wind Releasing Posture)

- Starting with supine position.
- Take both legs to 45° position; keep the knees straight. Inhale slowly.
- Bring the legs perpendicular to ground; complete inhalation
- Bend the knees; press them on the chest by the hands with interlocked fingers. Exhale.
- Roll the body to the right until the right elbow touches the ground. Roll back to the left till the left elbow touches the ground.
- Then rock the body forward and backward. Normal breathing.

Breathing pattern

Exhale when coming downwards and inhale while coming up.

3.13.15 Navasana (Boat Posture)

**Meaning:** Nava – mean boat. The body looks like a boat.

- Starting with supine position.
- Partial Inhale raises the both leg 45 degree level.
- Full Inhale slowly lifts the body upward. Hand should be in the shoulder level.
- Exhale. Slowly bring the head downwards.
- Full Exhale slowly brings the legs downwards.
**Breathing pattern**

Exhale when bending downwards and inhale while coming up. Normal breathing in final position.

### 3.13.16 Matsyasana (Fish Posture)

**Meaning:** Matsya means fish. In the final position of the posture it looks like a fish.

- Starting with supine position.
- Bend the right leg and keep the right foot on the left thigh.
- Bend the left leg then keep the left foot on the right thigh; thus assuming Padmasana.
- Place the palms on the floor above the shoulders, on either side of the head, fingers pointing to the shoulders.
- Then press the palms on the floor, Inhale, lift the head and chest off the floor. Keep the centre of the crown of the head on the floor by bending the dorsal and cervical spine backwards. Remove the hands lock the big toes with the index fingers. Maintaining position is normal breathing.
- Release the palms then place them on the floor above the shoulders.
- Press the palms and remove the centre of the crown of the head on the floor, then keep it properly on the floor. Exhale.
- Unfold the left leg.
- Unfold the right leg; come back to the starting position.

**Breathing pattern**

Exhale when bending downwards and inhale while coming up. Normal breathing in final position.
3.13.17 Sarvangasana

**Meaning:** By the practice of this asana, the health of all parts of the body (Sarvanga) is maintained well.

- Start with supine position. Partial inhale. Raise both the legs together up to 45 degrees from the ground.
- Fully inhale. Further raise the legs up to 90 degrees and place the hands by the side of the body.
- Exhale, raise further, the buttocks and the trunk taking the support of the arms and the elbows by firmly placing the elbows on the ground and support the back with both the palms. Keep the legs parallel to the ground.
- Inhale keeps the truck and legs in a straight line by supporting the truck on the shoulders. Keep the head on the floor. Normal breathing.
- Partial Inhale returns to stage three.
- Full Inhale return to stage two.
- Partial Exhale returns to stage one.
- Full Exhale return to starting position.

**Breathing pattern**

Exhale when bend downwards and inhale while coming up. Normal breathing in final position.

3.14 DESCRIPTION OF PRANAYAMA

3.14.1 Sectional Breathing

This is preparatory breathing practice for doing pranayama. It chiefly corrects the breathing pattern and increases the vital capacity of the lungs. It has 3 sections
(i) Abdominal breathing (or) diaphragmatic breathing (Adhama)

Sit erect in Vajrasana. Exhale. Inhale completely, slowly and continuously. This is called puraka. The abdomen is made to bulge continuously with the air entering especially into the lower sections of the lungs. Before exhaling stop the breath (Antarya kumbhaka) for a second. While exhaling (Rechaka) the abdomen is drawn inwards continuously and slowly. Before the breath is reversed, stop the breath (Bahya kumbhaka) for a second and inhale. Repeat the breathing cycle. There should be no jerks in the whole process. It should be smooth, continuous and relaxing. The diaphragm separating the thorax from the abdomen descends during inhalation with the bulging of the abdomen. This increases the air-flow into the lower sections of the lungs. The rhythmic movement of the diaphragm massages the contents of the abdomen gently, and helps the organs to function normally. It promotes the general circulation also.

(ii) Thoracic (chest) breathing (or) intercostals breathing (Madhyama)

In this sectional breathing performed while sitting erect in vajrasana, inhalation and exhalation are performed by expanding and contracting the chest only. Air flows through both nostrils, slowly and continuously. The abdomen is controlled to avoid its bulging. The middle lobes are opened up fully by this type of breathing.

(iii) Upper lobe breathing (or) clavicular breathing (Adya)

Sit erect in vajrasana. Raise the collar bones while inhaling. Keep the abdominal muscles contracted. The air is forced into the uppermost regions of the lungs thus ventilating the upper lobes. The sparingly used upper lobes of the
lungs will be properly aerated by this breathing. The whole process should be relaxing and comfortable, without any tension in the face.

3.14.2 Kapalabhati

- Sit comfortably in padmasana or vajrasana with an erect spine.
- Exhale forcibly using abdominal muscles.
- Inhale passively by relaxing the abdominal muscles.
- Repeat as quickly as possible starting with 60 strokes per minute and increasing gradually up to 120 per minute.
- There is no holding of the breath.
- The rapid active exhalations with passive effortless inhalations are accomplished by flapping movements of the abdomen. At the end of the minute there is an automatic suspension of breath. Enjoy the deep silence of mind associated with this.

3.14.3 Bhastrika

- Sit erect in Padmasana or Vajrasana (any meditative posture) with head and spine in a straight line.
- Gently close the eyes.
- The mouth should remain closed throughout the practice.
- Inhale slowly and deeply through both the nostrils. Then begin rapid exhalation and inhalation like the bellows of the blacksmith through both the nostrils as per the capacity.
- The rapid and forceful exhalation should contract the abdominal muscles and the rapid and forceful inhalation should expand the abdominal muscles.
• Make sure that the exhalation and inhalation are equal duration and rhythmic.

3.14.4 Anuloma-Viloma (Simple Inhalation-Exhalation)

• Sit erect in Padmasana or Vajrasana (any meditative posture) with head, trunk and buttocks in a straight line. Close the eyes and exhale completely.
• Inhale through both the nostrils slowly and steadily without making any sound.
• Exhale slowly, continuously and silently.
• Have inhalation and exhalation for the same duration (e.g 20 seconds each). During exhalation the chest goes down and the abdomen is taken in. Both the chest and the abdomen expand during inhalation; rhythmic breathing.
• There is no holding of the breath (kumbhaka). It is good to practice this at dawn and sunset (though not mandatory) in empty stomach.
• The whole practice is to be done in a very relaxed way, with least exhaustion.

3.14.5 Nadi Suddhi Pranayama

(Purification Of Subtle Perception Paths)

• The Nadi Suddhi is similar to Anuloma-Viloma, with the difference that inhalation and exhalation are done through alternate nostrils.
• Sit erect in Padmasana (or any other meditative posture). Exhale completely.
• Close the right nostril with the thumb of the right hand. Inhale slowly, steadily and deeply as long as possible. Follow the entire course of the breath by feeling the movement of the air. Do not hold the breath inside.
• Release the right and close the left nostril with the little and ring fingers of the right hand, and breath out through the right nostril. Again breathe in through the right nostril and then breath out through the left nostril. This forms one round of Nadi Suddhi.

• Inhalation and exhalation from each side should be of the same duration. (In the beginning the duration may be unequal).

• Early morning and late evening are good for this practice.

3.14.6 Surya Bedhana Pranayama

• Sit comfortably in an erect spine position.

• Inhale through right nostril by closing the left nostril.

• Exhale through left nostril by closing the right nostril.

• There is no holding of the breath.

• Repeat the same

• Inhalation and exhalation should be as slow, deep and as long as possible.

3.14.7 Brhamari Pranayama (Bee –Sounding Pranayama)

• Sit in any comfortable meditative pose preferably in siddhasana or padmasana. Keep the head and spine straight but not stiff.

• Eyes are gently closed. The lips should remain gently closed with teeth slightly separated throughout the practice to hear the vibration of the sound in the brain more distinctly.

• Plug the flaps or middle outer part of the ear ligament with the index finger. The elbows pointing sideways.

• Inhale slowly and deeply through the nose.
• Exhale slowly while making a deep, steady humming sound like a bee.
• The humming sound should be smooth, continuous, and pleasant. Do not make the humming sound very loud.
• At the end of the exhalation stop the humming sound and again inhale deeply, and make the same humming sound while exhaling.

3.15 YOGIC RELAXATION (WARM DOWN) FOR ASANAS AND PRANAYAMA

Savasana (The Corpse Pose)

Meaning: Sava means Corpse. The final position of the body resembles a corpse.

Lie down on the floor like a dead body. Spread your feet apart and hands apart from the body. Adjust the parts of the body in their most comfortable position, which may differ for different practitioners. Keep the eyes gently closed. The aim of the practice of the asana is to systematically relax all the body parts and internal organs.

Think of your feet and start relaxing. While relaxing, give this auto-suggestion: “My feet are relaxed. Blood-circulation is good; Air-circulation is good; I am getting sufficient strength in my feet. Let them take rest. The feet are relaxing. Relax, Relax, Relax”.

NOTE: This should be repeated while relax the other parts of the body mentioned below, by substituting the particular part as “legs”, “thighs”, “Stomach”, etc.

• Next relax the legs (calf-muscles).
• Relax the knees.
• Relax the thighs.
• Relax the abdomen.
• Relax the stomach.
• Relax the chest.
• Relax the shoulder and arms.
• Relax the neck.
• Finally relax the head and face.

Then, think of each part from the head down to the feet, making sure all parts are relaxed. (i.e.) The head is relaxed. The neck is relaxed. The shoulders and arms are relaxed. The chest is relaxed. The stomach is relaxed. The abdomen is relaxed. The thighs are relaxed. The knees are relaxed. The calf muscles are relaxed. The feet are relaxed. “The whole body is completely relaxed”. Do not think of any particular thing. Think only of the breath going in and out (Maharishi, 1987).

3.16 COLLECTION OF DATA

The data on selected dependent variables for pre and post tests were collected two days before and after the training programme respectively. On the first day dexterity and body composition variables of bodyweight, percent body fat, lean body mass and BMR were tested, whereas the HDL, LDL, TG and HCT were tested on the second day.

3.17 EXPERIMENTAL DESIGN AND STATISTICAL TECHNIQUE

The collected data when in number, though it is valid and reliable, would not give us useful meaning in terms of what we need. The data has to be processed with the help of statistics, analysed scientifically, interpreted and intelligently
concluded. In this study the data have been collected on variables such as dexterity, body composition variables of bodyweight, percent body fat, lean body mass and basal metabolic rate, and biochemical variables of high density lipoprotein and low density lipoprotein, triglycerides and hematocrit.

Experimental design is a blueprint of the procedure that enables the researcher to test his hypothesis by reaching valid conclusions in testing the relationship between Independent variables and Dependent variables. The investigator used pre and post test random group design in this study. This procedure involves dividing a sample into two or more groups based on random selection. The investigator did not make any attempt to equate the groups in this study. The selected 120 subjects were divided into four equal groups consisting of 30 each such as Experimental Group I, Experimental Group II, Experimental Group III and a Control Group. The treatment was administered to all the experimental groups for a period of twelve weeks. At the end of twelveth week the post test were administered to all the groups.

The collected data were analysed with application of ‘t’ test to find out the individual effect from base line to post test if any. Further Analysis of Covariance (ANCOVA) was used to determine the significant difference between the treatment means. Whenever the ‘F’ ratios for adjusted post test means were found to be significant, scheffe’s post hoc test was applied to test the significant difference between the paired adjusted means. 0.05 level of confidence was fixed for dexterity, body composition and bio chemical variables to test the level of significance.