

CHAPTER - III

METHODOLOGY

Research methodology involves the systematic procedure by which the research starts from the initial identification of the problem to its final conclusions. The role of the methodology is to carry out the research work in a scientific and valid manner. In this chapter selection of subjects, selection of variables, experimental design, pilot study, criterion measures, orientation of the subjects, reliability of data, instrument's reliability, tester's reliability, administration of training schedule, administration of tests, collection of data and statistical techniques employed for analyzing the data have been discussed in this chapter.

3.1 SELECTION OF SUBJECTS

For the purpose of the study, seventy five (N=75) obese men were selected from Chennai District, Tamil Nadu as subject at random and their age ranged between 30 and 40 years. The obesity of the subjects was determined through a person's BMI by the following formula:

$$\text{Metric: BMI} = \text{kilograms} / \text{height meters}^2$$

For the purpose of this study, men with 30 kg/m² to 40kg/m² of Body Mass Index were considered as obese men. The subjects were from different family background and homogeneous in their activities. They were divided into five equal groups consisting of fifteen (n=15) subjects each. The selection of control and experimental groups was done at random. Experimental Group I underwent Tai Chi without green tea for five days per week. Experimental Group II underwent Tai Chi with green tea for five days per week. Experimental Group III underwent yoga without green tea for five days per week. Experimental Group IV underwent

yoga with green tea for five days per week and group V acted as Control Group. Subjects who were in the control group were not exposed to any experimental training for the period of 16 weeks.

The investigator explained the proposed research work, nature of the study and subject involvement, testing as well as exercise schedules so as to avoid any ambiguity. Prior to the administration of the tests, the investigator got the individual consent form each subject in black and white.

3.2 SELECTION OF VARIABLES

The investigator reviewed the available scientific literature pertaining to the Tai Chi, yogic practices and green tea supplementation by accessing books, journals, periodicals, magazines and research papers. Based on the consideration of feasibility criteria, availability of instruments and the relevance of the variables to the present study, following variables were selected:

3.2.1 DEPENDENT VARIABLES

I. HEALTH RELATED PHYSICAL FITNESS VARIABLES

1. Muscular Strength
2. Muscular Endurance
3. Flexibility
4. Cardio Respiratory Endurance
5. Body Composition

II. BIOCHEMICAL VARIABLES

1. Fasting Blood Glucose
2. Total Cholesterol
3. High Density Lipoproteins
4. Low Density Lipoproteins
5. Triglycerides

3.2.2 INDEPENDENT VARIABLES

1. Experimental Group I - Tai Chi without green tea supplementation
2. Experimental Group II - Tai Chi with green tea supplementation
3. Experimental Group III - Yoga without green tea supplementation
4. Experimental Group IV - Yoga with green tea supplementation
5. Control Group V - No training

3.3 EXPERIMENTAL DESIGN

The study was formulated as a true random group design, consisting of pre-test and post-test. The seventy five obese men subjects (N=75) were randomly assigned to five groups of fifteen subjects in each group. The groups were assigned as Experimental Groups I, II, III, IV, and group V. Experimental group I was given practice in Tai Chi without green tea supplementation (TC), experimental group II was given Tai Chi with green tea supplementation (TCwGT), experimental group III was given yogic practices without green tea supplementation (YA), experimental group IV was given yogic practices with green tea supplementation (YAwGT) and experimental group V was control group which did not undergo any special treatment. Pre-test was conducted for all seventy five (N=75) subjects on selected health related physical fitness variables such as muscular strength, muscular endurance, flexibility, cardio respiratory endurance and body composition; biochemical variables such as fasting blood glucose, total cholesterol, high density lipoproteins, low density lipoproteins and triglycerides. The experimental groups participated in their respective, Tai Chi without green tea supplementation, Tai Chi with green tea supplementation, yoga without green tea supplementation and yoga with green tea supplementation for sixteen weeks. The control group did not undergo any experimental training. Immediately after the experimental period, post test was

conducted for the above said dependent variables after a period of sixteen weeks. The pre and post test scores on selected criterion variables were tabulated and tested for statistical significance using ANACOVA. In all cases 0.05 level of significance was fixed to test the hypotheses of this study.

3.4 PILOT STUDY

A pilot study was carried out to assess the initial capacity of the subjects, in order to fix the load. For this purpose twenty subjects were selected at random and divided into four groups each. The divided groups participated in their respective Tai Chi without green tea supplementation, Tai Chi with green tea supplementation, yoga without green tea supplementation and yoga with green tea supplementation for twelve weeks.

Based on the response of the subjects in the pilot study, the training schedule for the experimental groups was constructed; however, the individual difference was considered while constructing the training programmes and the basic principles of training (progression, over load and specificity) were followed.

3.5 CRITERION MEASURES

By glancing the literature and in consultation with the professional experts, the following variables were selected as the criterion measures in this study for testing the hypotheses. Table 1 shows the variables selected, tests / tools administered to measure the variables and unit of measurements.

TABLE -I
NAMES OF VARIABLES, TESTS / TOOLS ADMINISTERED AND THE
UNIT OF MEASUREMENT

S.NO	VARIABLE	TEST/TOOL ADMINISTRATION	UNIT OF MEASURES
HEALTH RELATED PHYSICAL FITNESS VARIABLES			
1	Muscular Strength	Pull ups	Numbers
2	Muscular Endurance	Sit ups	Numbers
3	Flexibility	Sit and Reach	Centimeters
4	Cardio Respiratory Endurance	12 minutes Cooper's Run or Walk test	Meters
5	Body Composition	BMI	Weight/ Height meter ²
BIOCHEMICAL VARIABLES			
6	Fasting Blood Glucose	GOD/POD Method	mg/dl
7	Total Cholesterol	CHOD/POD Method	mg/dl
8	High Density Lipoproteins	CHOD/POD Method	mg/dl
9	Low Density Lipoproteins	CHOD/POD Method	mg/dl
10	Triglycerides	GPO Method	mg/dl

3.6 RELIABILITY OF DATA

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

3.7 INSTRUMENT'S RELIABILITY

Instruments such as stadio meter, weighing scale, measuring tape, and electronic stop watch were used for this study. All the instruments used were standard and therefore their calibrations were accepted to be accurate enough for the purpose of the study. The blood samples obtained by qualified personnel from reputed blood testing in Megha Clinical Lab, Chrompet, Chennai - 600 044, TamilNadu and analysed for accurate measurements and the same was taken as reliable.

3.8 TESTER'S RELIABILITY

The investigator learned the procedures and methods to handle and operate the instruments to administer the test. Measurements were taken by the investigator himself using stadio meter, weighing scale, electronic stop watch and measuring tape. Services of qualified assistants were used for taking measurements. A tester competency was ensured together with reliability of the test. The performance of twenty subjects were tested and retested on selected dependent variables. This was established by test retest process under the similar conditions. The biochemical variables such as fasting blood glucose, total cholesterol, high density lipoproteins, low density lipoproteins and triglycerides were measured through laboratory tests. The reliability had already been determined as highly accurate and reliable and used internationally and the same tests were adopted for this study. The intra class correlation co-efficient obtained for test retest data are presented in Table II.

TABLE II
INTRA CLASS CORRELATION COEFFICIENT OF TEST - RETEST
SCORES

S.NO	VARIABLE	COEFFICIENT OF CORRELATION
HEALTH RELATED PHYSICAL FITNESS VARIABLES		
1	Muscular Strength	0.89*
2	Muscular Endurance	0.91*
3	Flexibility	0.86*
4	Cardio Respiratory Endurance	0.72*
5	Body Composition	0.80*
BIOCHEMICAL VARIABLES		
6	Fasting Blood Glucose	0.69*
7	Total Cholesterol	0.71*
8	High Density Lipoproteins	0.76*
9	Low Density Lipoproteins	0.83*
10	Triglycerides	0.72*

* Significant at 0.05 level of confidence. Table value 0.497 with the df (N-1) = 19.

3.9 SUBJECT'S RELIABILITY

Before the collection of the data, the investigator held a meeting with the subjects prior to the administration of tests and demonstrated clearly the way of performing the test. The investigator explained the procedures of assessing health related physical fitness variables.

The investigator had given explanation to the subjects about the procedures to be adopted by them for assessing the biochemical variables such as fasting blood glucose, total cholesterol, high density lipoproteins, low density lipoproteins and triglycerides. The subjects co-operated throughout the period of training.

3.10 TRAINING PROGRAMME

Training has been recognized as one of the main modifiers of physical performance. The investigator has described the performance benefits of training and the underlying mechanisms. When planned carefully, training results in broad changes in health related physical fitness and biochemical variables.

Seventy five (N=75) obese men were selected from Chennai District and they acted as subjects and their age ranged between 30 and 40 years. They were divided into five groups each consisting of fifteen (n=15), and were called Experimental Group I, Experimental Group II, Experimental Group III, Experimental Group IV and group V acted as Control Group. All the four experimental groups were given Tai Chi without green tea supplementation, Tai Chi with green tea supplementation, yoga without green tea supplementation and yoga with green tea supplementation for sixteen weeks. After sixteen weeks of training the post test was conducted. The training programmes for three experimental groups are detailed below:

3.11 TRAINING PROGRAMME FOR EXPERIMENTAL GROUP I – TAI CHI WITHOUT GREEN TEA SUPPLEMENTATION

3.11.1 Facilities Required

Mat, chairs and stopwatches were used.

3.11.2 Instructions

The subjects were explained about the procedure of the test and need for the assessment. Also the subjects were given a chance to practise the prescribed test. The subjects were instructed to raise the hand, when they felt an undue discomfort in the chest or feeling of dizziness.

Experimental Group I underwent Tai Chi without green tea supplementation for a period of 16 weeks 5 days per week-(Monday, Tuesday, Wednesday, Thursday and Friday) at morning from 6.00am to 8.00am. The subjects worked at each exercise and had 30 to 45 seconds of rest before changing to the next exercise. During the rest periods, the subjects were engaged in breathing exercises. Standing or walking around was advised as the programme progresses. At the end of the training programme, subjects were given cool down activities.

Each day the prescribed programme lasted for a total period of 40 minutes including assembly and dispersal in first four weeks, which was increased to 60 minutes including assembly and dispersal during fifth to eighth week and 80 minutes including assembly and dispersal during ninth to twelfth week and 100 minutes including assembly and dispersal during thirteenth to sixteenth week. The training programme was given to experimental group I on 5 days in a week, for 16 weeks.

3.12 TRAINING PROGRAMME FOR EXPERIMENTAL GROUP II – TAI CHI WITH GREEN TEA SUPPLEMENTATION

3.12.1 Facilities Required

Mats, chairs and stopwatches were used.

3.12.2 Instructions

The subjects were explained about the procedure of the test and need for the assessment. Also the subjects were given a chance to practise the prescribed test. The subjects were instructed to raise the hand, when they felt an undue discomfort in the chest or feeling of dizziness.

Experimental Group II underwent Tai Chi with green tea supplementation for the period of 16 weeks (5 days per week- Monday, Tuesday, Wednesday, Thursday and Friday) at morning from 6.00am to 8.00am. The subjects worked at each exercise and had 30 to 45 seconds of rest before changing to the next exercise. During the rest periods, the subjects were engaged in breathing exercises. At the end of the training programme, subjects were given cool down activities.

Each day programme lasted for a total period of 40 minutes including assembly and dispersal in the first four weeks, which was increased to 60 minutes including assembly and dispersal during fifth to eighth week and 80 minutes including assembly and dispersal during ninth to twelfth week and 100 minutes including assembly and dispersal during thirteenth to sixteenth week. The training programme was given to experimental group II on 5 days in a week, for 16 weeks.

All subjects of experimental group II received green tea extract (Lipton, India), one pack per day in the mornings for 16 weeks. One green tea package contained 1.2gm green tea extract. All subjects were instructed to maintain an isocaloric diet and to continue their previous eating habits during the course of study.

The subjects did not change their diet during the study. The exercise and daily eating regimes were comparable in both groups.

TABLE III
TAI CHII TRAINING SCHEDULE FOR EXPERIMENTAL GROUP I AND
EXPERIMENTAL GROUP II

S. No	NAME OF THE PRACTICE	DURATION			
		1 to 4 weeks	5 to 8 weeks	9 to 12 weeks	13 to 16 weeks
1	Commencing form	2 times	4 times	6 times	8 times
2	Broadening one's chest	2 times	4 times	6 times	8 times
3	Dancing with Rainbows	2 times	4 times	6 times	8 times
4	Twisting waist and swing arms	2 times	4 times	6 times	8 times
5	Rowing the boat	2 times	4 times	6 times	8 times
6	Carrying the moon	2 times	4 times	6 times	8 times
7	Twisting waist and push palms	2 times	4 times	6 times	8 times
8	Playing with clouds	2 times	4 times	6 times	8 times
9	Scooping from the sea	2 times	4 times	6 times	8 times
10	Playing with waves	2 times	4 times	6 times	8 times
11	Spreading the wings	2 times	4 times	6 times	8 times
12	Flying like a wild goose	2 times	4 times	6 times	8 times
13	Spinning wheels	2 times	4 times	6 times	8 times

This programme consisted of the following 13 exercises. The descriptions of the training principles, warming up exercises and Tai Chi exercises performed by the subjects for Tai Chi are given below.

3.12.3 TAI CHI TRAINING PRINCIPLES

1. Keep the body erect.
2. Everything should be completely relaxed, especially the mind.
3. Maintain rigidly the heel and toes principles for all foot movements.
4. Co-ordinate the movements of the upper and lower halves of the body.

5. Harmonize the internal and external physical aspects of the body.
6. Ensure there is continuity of movement at all times.
7. Be sure that all movements follow a curved or circular form. There are no straight lines in Tai Chi.
8. Study the Chinese breathing system.
9. Learn breathing deeply into the lower abdomen and keep the tongue against the roof of the mouth.
10. Extend the Chi on all outward movements. (Even numbers)
11. Recall and relax the Chi on all inward movements. (Odd numbers)

3.12.4 WARMING UP EXERCISES

1. Simple stretching exercises
2. Head roll
3. Shoulder roll
4. Arm circle
5. Picking fruit
6. Washing machine
7. Lifting the sky
8. Hip body roll
9. Ankle flex

3.12.5 TAI CHI EXERCISES

This programme consisted of the following 18 exercises. The descriptions of the Tai Chi exercises performed by the subjects for Tai Chi are given below.

3.12.5.1 COMMENCING FORM

- The subject stood with the feet shoulder width apart and weight spread evenly across both legs. Arms remained relaxed by the side.

- Breathed in.
- Raised the arms to shoulder level or a height that felt acceptable. Kept the elbows and wrists relaxed.
- Breathed out.
- Lowered the arms and wrist in a relaxed manner.

3.12.5.2 BROADENING ONE'S CHEST

- The subject stood with feet shoulder width apart and weight spread evenly across both legs. Arms remained relaxed by the side.
- Breathed in.
- Raised the arms to shoulder level or a height that felt acceptable. Kept the elbows and wrists relaxed.
- Breathed out.
- With the hands facing together, opened the arms out and opened the chest. Allowed the shoulders to relax.
- Breathed in.
- Facing the palms towards each other and brought the arms back to the middle and shoulders relaxed.
- Breathed out.
- Lowered the arms the beginning position.

3.12.5.3 DANCING WITH RAINBOWS

- Slowly breathing in the subject lifted the right arm overhead with the elbow bent and shifted the weight to the right hand side; at the same time extended the left arm out straight (the posture resembled an archer ready to fire his bow or a tea pot).
- Breathed in and

- In a continuous movement raised the hands overhead and shifted the weight to the centre.
- Breathed out.
- Shifted the weight across to the left hand side and mirror the form held previously on the right.

3.12.5.4 TWISTING WAIST AND SWING ARMS

- The subject turned the body at the waist toward the right side and kept the knees slightly bent.
- Breathed in.
- With the right arm down at the side of the body, palm faced up, the arm back in an arc, lifted the elbow towards shoulder height (or as far as it was comfortable).
- Breathed out.
- Began to rotate the wrist so that the palm faced forward. At the same time started bringing the right arm and body weight forward until the right arm was extended in front like front crawl in swimming.
- Repeated on the left side (Those who had been practicing for a while performed the movements simultaneously with both arms but in the beginning it was acceptable to move one side at a time and easier to obtain good quality of movement).

3.12.5.5 ROWING THE BOAT

- Breathing in the subject lifted the arms back and overhead with the palms facing forward.
- Breathed out.
- Palms facing forwards pushed the arms forward and down as rowing a boat.

3.12.5.6 CARRYING THE MOON

- Breathed in and turned the body towards the left from the waist. The shoulders were relaxed with the elbows slightly bent. Now reach both the arms reached towards the left with the head focusing on the hands.
- Breathed out.
- Brought hands down. Turned to right and repeated.

3.12.5.7 TWISTING WAIST AND PUSH PALMS

- Breathing in the subject drew palms to the waist facing upwards.
- Breathed out and
- Turned the body to the left at the waist. Kept the left elbow and wrist slightly bent and brought the elbow back.
- At the same time: extended the right arm forward and pushed with the right palm facing forward.
- Breathed in and
- Returned to the middle and spread the weight evenly before turning to the right, brought the left arm back and extended the left arm with the palm facing forward.

3.12.5.8 PLAYING WITH CLOUDS

- Breathing in the subject with the arms relaxed (held out in front as if cradling a baby) and palms facing towards the turn to the left. Twisted at the waist and brought the weight onto the left foot. The gaze was directed towards the left hand throughout. The right hand followed underneath.
- Breathed out
- Rotated back to the original position.
- Breathed in

- Repeated the movement towards the right (This time the right hand would be the furthest from the middle).

3.12.5.9 SCOOPING FROM THE SEA

- Standing with the left foot forward, knee was bent and weight shifted slightly toward the left side.
- Breathing in left knee was bent down forwards and brought the hands together palms facing up.
- Bend down forwards over the left knee and brought the hands together palms facing up.
- Brought the hands up over the head (or as far as was comfortable) whilst slowly separating the arms and transferred the weight onto the right foot.
- Breathed out.
- The arms were bent and separated forward again to scoop from the sea.

3.12.5.10 PLAYING WITH WAVES

- Subject stood with the left foot forward.
- Breathed in and bent the elbows the subject brought the hands to the shoulders with the palms facing forward. The weight was on the back leg.
- Breathed out and pushed the arms forward and shifted the weight onto the front leg with palms facing forward.
- Breathed in with the hands facing down brought the weight back to the middle

3.12.5.11 SPREADING THE WINGS

- Stood with the left foot forward.
- Breathed in and reached forward with the arm extended in front of the elbows were relaxed and slightly bent. Aimed for chest height or as high as

comfortable with the arms. The hands faced each other allowed the right heel to lift off the floor as they came forward.

- Breathed out and moved backwards transferred the weight onto the right foot. As they did this separated the arms and spread them back like wings as far as they felt comfortable. Again shoulders were relaxed, elbows slightly bent and palms faced forward.

3.12.5.12 FLYING LIKEA WILD GOOSE

- Subject stood with the feet shoulder width apart and the weight spread evenly across both legs.
- Breathed in and shifted forward slightly to feel the weight of the body through the balls of the feet and lifted the arms sideways above the head. The arms remained relaxed during this movement, the palms faced down and the wrists extended until they faced away from the body and out to the sides.
- Breathed out and lower the arms down the side with wrists up and sank through the knees.

3.12.5.13 SPINNING WHEELS

- Subject stood with the feet shoulder width apart and the weight spread evenly acrossed both legs. The arms were lowered in front of the shoulders were relaxed, elbows bent and palms faced each other.
- Breathed in and twisted the body to the right and reached out the arms began making a large circle movement with the palms facing each other until they were above the head.
- Breathed out and lowered the arms on the left side of the body keeping the same distance between the hands.

3.13 TRAINING PROGRAMME FOR EXPERIMENTAL GROUP III (YOGIC PRACTICES WITHOUT GREEN TEA SUPPLEMENTATION)

The subjects were assembled in a common place, which had adequate space for training programme. The experimental group III was provided with yogic practices without green tea supplementation which consisted of four distinct phases as follows:

1. Loosening Exercises for warm up purposes
2. Surya Namaskara
3. 10 Asanas
4. Relaxation for cool down purposes

Each day programme lasted for a total period of 40 minutes including assembly and dispersal in the first four weeks, which was increased to 60 minutes including assembly and dispersal during fifth to eighth week and 80 minutes including assembly and dispersal during ninth to twelfth week and 100 minutes including assembly and dispersal during thirteenth to sixteenth week. The training programme was given to experimental group III on 5 days in a week, for 16 weeks.

3.14 TRAINING SCHEDULE FOR EXPERIMENTAL GROUP IV (YOGIC PRACTICES WITH GREEN TEA SUPPLEMENTATION)

The subjects were assembled in a common place, which had adequate space for training programme. The experimental group IV was provided with yogic practices with green tea supplementation which consisted of four distinct phases as follows:

1. Loosening Exercises for warm up purposes
2. Surya Namaskara
3. 10 Asanas
4. Relaxation for cool down purposes

Each day programme lasted for a total period of 40 minutes including assembly and dispersal in the first four weeks, which was increased to 60 minutes including assembly and dispersal during fifth to eighth week and 80 minutes including assembly and dispersal during ninth to twelfth week and 100 minutes including assembly and dispersal during thirteenth to sixteenth week. The training programme was given to experimental group III on 5 days in a week, for 16 weeks.

All subjects of experimental group IV received green tea extract (Lipton, India) at one package per day with the morning for 16 weeks. One green tea package contains 1.2g green tea extract. All subjects were instructed to maintain an isocaloric diet and to continue their previous eating habits during the study. The subjects did not change their diet during the study. The exercise and daily eating regimes were comparable in both groups.

TABLE III (a)
TRAINING SCHEDULE FOR EXPERIMENTAL GROUP III AND
EXPERIMENTAL GROUP IV

S. No	NAME OF THE PRACTICE	DURATION			
		1 to 4 weeks	5 to 8 weeks	9 to 12 weeks	13 to 16 weeks
1	Surya Namaskara	6 times	6 times	12 times	12 times
	Asanas				
2.1	Padmasana	2 times	4 times	6 times	8 times
2.2	Bhujangasana	2 times	4 times	6 times	8 times
2.3	Padahastahasana	2 times	4 times	6 times	8 times
2.4	Ardha chakkrasana	2 times	4 times	6 times	8 times
2.5	Halasana	2 times	4 times	6 times	8 times
2.6	Ardha Salabasana	2 times	4 times	6 times	8 times
2.7	Dhanurasana	2 times	4 times	6 times	8 times
2.8	Naukasana	2 times	4 times	6 times	8 times
2.9	Trikonasana	2 times	4 times	6 times	8 times
2.10	Pawana Muktasana	2 times	4 times	6 times	8 times

3.15 YOGIC PRACTICES FOR EXPERIMENTAL GROUP III AND EXPERIMENTAL GROUP IV

The following yogic practices were given to the experimental group III and experimental group IV.

3.15.1 SURYA NAMASKARA

Surya Namaskar combines yogasana and Pranayama. Yogasanas brought about the general flexibility of the body preparing it for further Asanas and Pranayama. This was usually done both at sunrise and sunset.

Each stage of Surya Namaskar was accompanied by the regulation of breath. The 12 steps of the Surya Namaskar were as follows:

Position 1: Subjects were asked to stand erect with the legs together and palms together. Take the hands above the head and bend the trunk backwards. Here, air was inhaled fully.

Position 2: Subjects were asked to bend the body to the front and touch the knees by the forehead. Kept the palms on the floor on either side of the legs. Air was exhaled fully.

Position 3: Subjects were asked to kick the right leg back, take the left knee forward, look up and inhaled. Press the buttock close to the heel.

Position 4: Subjects were asked to take the left leg also back, resting only on palms and toes; kept the body straight from head to toes inclined to the ground. Here exhaled completely were not to be stretched.

Position 5: Subjects were asked to bend at the knee and rest on the floor without altering the position of the palms and toes, rest the forehead on the ground. In this position inhaled while moving backwards and then exhaled completely. Do not stretch the ankles.

Position 6: Subjects were asked to come forward on the chest and rest the chin. In this position sastanga namaskara, forehead, chest, palms, knees and feet are the eight organs that would be touching the ground. The buttocks would be raised up. Stay in breath out condition.

Position 7: Subjects were asked to do inhalation; raise the head and trunk making the spine concave upwards without changing the position of the hands and feet. Keep the knees on the ground.

Position 8: Subjects were asked to do exhalation; raised the buttocks, push the head down and have a complete arch with the heels touching the ground and palms on the floor.

Position 9: Subjects were asked to bend at the knee and rest on the floor without altering the position of the palms and toes, rest the forehead on the ground. In this position inhaled while moving backwards and then exhaled completely. Do not stretch the ankles were not to be stretched.

Position 10: Subjects were asked to inhaled and bring the right leg in between the two hands and in line with them. Arch the back concave upwards as in position 3.

Position 11: Subjects were asked to exhaled and bring the left foot forward next to the right foot and touch the knees with forehead as in position 2.

Position 12: Subjects were asked to inhale. Come up, stand erect with hands along the body and relax.

3.15.2 ASANAS

3.15.1 PADMASANA

- Subject were in the sitting position
- Brought the legs forward and placed the right foot on the left thigh and left foot on the right thigh.

- The left hand was reset on the left knee and the right hand on the right knee.
- The tips of the thumbs of both the hands touched the tips of the index fingers.
Kept the hand and the spinal column erect, kept the eyes close or open.
- Brought the hands and then legs down, came back to position while fully exhaling.

3.15.2 BHUJANGASANA

- Prone position.
- Bend both the elbows and place the palms on the floor by the sides of the last ribs.
- Inhaling slowly lift the head and then raise the chest. Feel the weight of the body at the lumbar region, maintain the position, with normal breathing.
- 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 coming back to the position.

3.15.3 PADA HASTAHASANA

- Start with tadasana position.
- From the position raise both the hands sideways up to shoulder level, palms facing downward; inhale.
- Raise the hands up above the head with biceps touching the ears, palms facing forward. Continue the inhalation and stretch up the body upward.
- While exhalation bend the body forward, till it comes to horizontal position, parallel to the ground head above the hands.
- Bend further to touch the knees with the forehead till palms can rest on the ground, by the side of the feet, with complete exhalation. This is the final position. Breath normally.

- Slowly raise the head along with the hands from the coccyx parallel to the ground with inhalation.
- Raise the trunk along with the hands further up to vertical position of the body with continuous inhalation.
- Bring the hands down sideways up to shoulder level with partial exhalation. Bring the hands down. Come back to position while fully exhaling.

3.15.4 ARDHA CHAKRASANA

- Starte with tadasana position.
- Slowly slide up the palms and support the back at the waist and exhale.
- Bend backwards from lumbar region. Neck bend backwards, stretching the neck muscles. Inhaled while bending. This is the final position of the asana. Breath normally.
- Exhale and come back to straight position, Reste the support at the back at waist by the palms.
- Release the hands from the support of the waist while completely exhaling.

3.15.5 HALASANA

- In prone position.
- Lie flat on the back with the arms straight and besides the body, palms faced downward.
- Keeping the legs straight, slowly raise them to the vertical position above the body. Only used the stomach muscles to raise the legs. Do not use the arms.
- Simultaneously bend the trunk upward, hips first. Slowly lower the legs over the head and touch the floor with the toes of both feet.
- Keeping the legs straight, bend the arms and place the hands on the back as in sarvangasana.

- Relax the body. Retain inside while assuming and returning from the pose.

3.15.6 ARDHA SHALABHASANA

- Started with prone position.
- Make the fists and place them under the root of the thigh.
- Inhale and raise the left leg up from the waist.
- Exhale and return to the count 1.
- Return to starting position and again and perform on the opposite side.

3.15.7 DHANURASANA

- Lie down on the carpet with the face downward. Inhale deeply.
- Bend the legs and grasp ankles with hands with fingers of both the hands facing the inner side of the legs.
- Slowly raised the hind part of the body and then the chest like a bow. Bend the head backward. Retain this position for a few seconds.
- Slowly come back to the original position while exhaling. Relax later.

3.15.8 NAUKASANA

- Start with supine position.
- Partially inhale and raise the both legs at 45 degree level.
- Inhale and slowly lift the body upward. The hands should be at the shoulder level.
- Exhale slowly bring the head and downwards.
- With full exhalation and slowly brought the legs downwards.

3.15.9 TRIKONASANA

- Started with standing position.
- Stand erect with the feet about a meter apart. Raise the arms to the side to form one straight line.

- Bend the body to the right, simultaneously bending the right knee slightly.
- Placed the right hand on the right foot and keep the two arms in line with each other. Look up at the left hand.
- Return to the standing position with the arms still in one straight line. Repeat to the opposite side, bending the left knee slightly.

3.15.10 PAWAN MUKTASANA

- Lie down on back.
- Stretch the left leg on the floor. Bend the right leg at the knee.
- Inhale and press the bent leg against the chest with both the hands which should be interlocked. Retained this position for a few seconds holding the breath.
- Bring the leg back to the position. Relax for a few seconds and repeat the same with the other leg.

3.16 TEST ADMINISTRATION OF HEALTH RELATED PHYSICAL FITNESS VARIABLES

3.16.1 MUSCULAR STRENGTH (PUSH-UPS)

Purpose

To estimate the muscular strength

Equipment Used

Gymnastic Mats

Procedure

The subject being tested took prone lying position on the ground with the hands under the shoulders and fingers stretched, legs straight and parallel with comfortably apart and the toes tucked under the feet. On the command 'go' the subject performed pushups with the arms and extended it completely. The legs and the back were kept straight throughout the test. Then the subject lowered his/her body

using the arm until it came to 90 degree angle and upper arms were parallel to the ground. The action was repeated as many times as possible.

Scoring

Total number of correct pushups was recorded as the score of the test (**Yobu, 1984**).

3.16.2 MUSCULAR ENDURANCE (SIT UPS)

Purpose

To assess the muscular endurance.

Equipment Used

Stop watch and mat

Procedure

The subject was asked to clasp his hands behind their head. One foot was stepped slightly ahead of the other. For the signal 'Ready, Start', the subject performed the squat until the buttocks was in level with the patella. Switch the position of the sit ups. This constituted count one. The same was repeated continuously for one minute.

Scoring

Number of correct and continuous sit ups executed by the subject within one minute was counted and recorded (**Johnson and Nelson, 1988**).

3.16.3 FLEXIBILITY (SIT AND REACH TEST)

Purpose

To measure the muscular flexibility.

Equipment Used

Measuring stick, box and mat.

Procedure

The subject sat on the mat with both legs being extended forward; the measuring stick was placed on the floor in-between both legs. The zero end of the measuring stick was placed at proximal end. The subject bent forward and extended both the arms forward. The zero point of the measuring stick was placed to the tip of the middle finger. The subject slowly stretched forward the hip, back and the arm. The maximum distance reached was recorded with the help of measuring stick in cm. Three trials were given with adequate rest in between (**Johnson and Nelson, 1988**).

Scoring

The best of the three trials was treated as final score in centimeters.

3.16.4 CARDIORESPIRATORY ENDURANCE (COOPER'S 12 MINUTES RUN/WALK TEST)**Purpose**

To measure the cardio respiratory endurance.

Equipment Used

400 meters track, stopwatch and whistle.

Procedure

The subjects were assigned to each spotter. The subjects started behind a line and upon getting the starting signal, ran and / or walked as many laps possible around the track within 12 minutes. The spotters maintained a count of each lap. When the signal to stop was given the subject stopped walking/running. The spotter immediately ran to the subject and recorded the distance.

Scoring

The score in meters is determined by multiplying the number of laps completed, plus the number of segments of a lap, plus the meters stopped off between a particular segments (**Johnson and Nelson, 1988**).

3.16.5 BODY COMPOSITION (BMI)

Purpose

To measure the body composition of the obese men.

Equipment Used

Scales and stadiometer as for weight and height.

Procedure

BMI is calculated from body mass (Weight in kg) and height in meter. $BMI = \text{Weight in kg} / (\text{Height in meter})^2$. The higher the score usually indicates higher levels of body fat.

Scoring

Use the table below to determine the BMI rating.

BMI RATING SCALE

Body Mass Index	Weight Status
Below 18.5	Under weight
18.5-24.9	Normal
25.0-29.9	Overweight
30.0 and above	Obese

3.16.6 MEASUREMENT OF BIOCHEMICAL VARIABLES

Biochemical variables such as fasting blood glucose, total cholesterol, high density lipoproteins, low density lipoproteins and triglycerides of the subjects were determined through laboratory method based on the blood samples collected.

3.16.7 BLOOD SAMPLING TECHNIQUE

Venous blood was drawn into vacutainer tubes containing 1mg/ml disodium, EDTA as an anticoagulant. From each subject, 5ml of blood sample was taken twice (i.e. before and after the training period or programme). Posttest blood samples were

drawn 48 hours after the last exercise in an attempt to minimize the potential of acute exercise and the effects of training on the blood. The pre and post heparin blood was isolated by centrifugation at 1500g for 20 min at 4°C and 0.01% NaNO₃ solution was introduced into all plasma samples (4µl/ml plasma) for preservation. Aliquots of pre and post heparin plasma were seated separately in 2ml cryoviols and stored at 70°C for later analysis. Five (5) ml of venous blood was drawn from an antecubital vein for the determination of fasting glucose, total cholesterol, high density lipoproteins, low density lipoproteins and triglycerides.

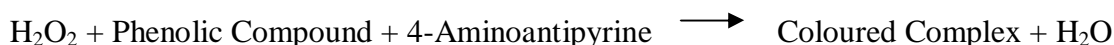
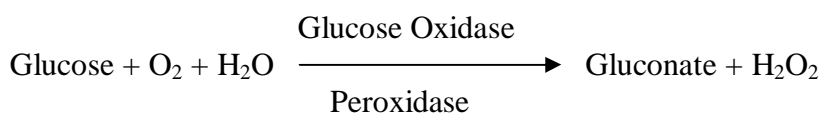
3.16.8 ESTIMATION OF FASTING BLOOD GLUCOSE (GOD/POD METHOD)

Purpose

The purpose of the test was to estimate the fasting blood glucose.

Principle

Glucose oxidase the specific substract, -D-glucose, to gluconic acid and generates hydrogen peroxide. Hydrogen-peroxide thus produced is acted upon by peroxidase which transfers oxygen to the chromogen system, 4-aminoantipyrine and phenolic compound. The chromogen system gets oxidized to a red quinoneimine dye. The intensity of colour is directly proportional to the concentration of glucose and is measured photometrically at 505nm (500-540nm or with GREEN filter).



Diagnostic Significance

Blood Glucose estimations are generally carried out for the diagnosis and follow-up of diabetes mellitus. In general terms glucose levels less than 50 mg/dl or so are termed as hypoglycemia and more than 200mg/dl levels are termed as

hyperglycemia. Hyperglycemia and hypoglycemia are also associated with various hormonal disorders e.g. Hormones from Pituitary, Thyroid etc.

Presentation

Pack Size	No. of Bottles/Pouch		
	10 X 100ml	10 X 500ml	10 X 50ml
1 Glucose (Enzyme/Chromosome)	10	10	10 Tab
2 Glucose (Buffer)-(Phenol)	1	1	1
Standard (100 mg/dl)	1	3	1
Reconstitution Bottle	1	1	1

2 Glucose Buffer/Phenol (Ready to use) is provided separately.

Precaution

ENZOPAK Glucose is for IN VITRO diagnostic use only. Reagent Contains Sodium Acid. DO NOT INGEST.

Preparation of Working Reagent: For 10 X 100ml

Transfer contents (powder mixture of Enzyme/Chromosome) of one vial of 1 Glucose to the bottle provided for reconstitution. To this add 100ml of 2 Glucose Buffer Mix well to dissolve. The reagent is now "Working Reagent" ready for use. Store at 2-8°C when not in use.

For 10 X 500 ml

Transfer contents (powder of Enzymes/Chromosome) of one bottle of 1 Glucose to the bottle provided for reconstitution. Add to this 500ml of 2 Glucose Buffer. Mix well to dissolve. The reagent is now "Working Reagent" ready for use. Store at 2-8°C when not in use.

Tor 10 x 50 ml (tablet)

Transfer one tablet of 1 Glucose into the bottle provided for reconstitution. To this add 50ml of 2 Glucose Phenol. Mix well to dissolve. The reagent is now “Working Reagent” ready for use. Store at 2-8°C when not in use.

Reagent Storage and Stability

1 GLUCOSE (Powder/tablet)	2-8°C	Until Expiry
2 GLUCOSE (Buffer) / (Phenol)	R.T	Until Expiry
GLUCOSE STD (100mg/dl)	2-8°C	Until Expiry
Working Reagent	2-8°C	7 weeks
(Protected from light)		

Specimen Collection

Blood sample collected with any one of the anticoagulants like flouride, oxalate, EDTA, heparin or without any of the anticoagulants can be used. As soon as the sample is collected, separate serum or plasma to prevent glycolysis.

Reaction Parameters: (End Point)

Type of Reaction	:	End Point
Wavelength	:	505nm. (500-540nm)
Flow cell Temperature	:	37°C
Incubation	:	10 min. at 37°C
Std. Concentration	:	100mg/dl
Sample Volume	:	10 Microlitres (0.01ml)
Reagent Volume	:	1.0ml
Zero setting with	:	Reagent Blank
Light Path	:	1.0cm.

Procedure: Procedure for 1 ml

Pipette into Test Tubes	Blank	Standard	Test
Working Reagent(ml)	1.0	1.0	1.0
Standard (ml)	-	0.01	-
Sample (ml)	-	-	0.01

Mix well and allow to stand for 10 Min. at 37°C. Mix & read absorbance of standard and test at 505nm (500-540nm or with GREEN filter) against reagent blank.

Procedure for 3 ml

Pipette into Test Tubes	Blank	Standard	Test
Working Reagent(ml)	1.5	1.5	1.5
Standard (ml)	-	0.02	-
Sample (ml)	-	-	0.02

Mix well and allow to stand for 10 Min. at 37°C

Distilled Water (ml)	1.5	1.5	1.5
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Mix & read absorbance of standard and test at 505nm (500-540nm or with GREEN filter) against reagent blank.

Stability of Final Reaction Mixture

The colour of reaction mixture is stable for 2 hours at room temperature, when protected from direct light.

Test Results

$$\text{Glucose Concentration (mg/dl)} = \frac{\text{Absorbance of Test}}{\text{Absorbance of Std}} \times 100$$

Reaction Parameters (Fix Time)

Type of Reaction	:	Fix time /two point/initial rate
Wavelength	:	505nm. (500-540)
Flow cell Temperature:		37°C

Delay Time	:	30 seconds
Interval	:	60 seconds
Measuring time	:	90 seconds
No. of readings	:	2
Standard/Sample volume:		10 μ l (0.01ml)
Std. Concentration	:	100mg/dl
Reagent Volume	:	1.0ml
Zero setting with	:	Distilled water
Light Path	:	1.0cm.

Procedure: Procedure for 1 ml

Pipette into Test Tubes	Standard (S)	Test (T)
Working Reagent(ml)	1.0	1.0
Standard (ml)	0.01	-
Sample (ml)	-	0.01

Mix and aspirate. Record the absorbance of Standard (ST) and Test (TS) at 30 seconds (ST₁, TS₁) and again at 90 seconds (ST₂, TS₂) at 505 nm, against distilled water.

Test Results

$$\text{Glucose concentration (mg/dl)} = \frac{(\text{TS}_2 - \text{TS}_1)}{(\text{ST}_2 - \text{ST}_1)} \times 100$$

To convert mg/dl to m mol / lit use the following factor.

$$1 \text{ mmol / lit} = 18 \text{ mg/dl}$$

$$1 \text{ mg/dl} = 0.056 \text{ mmol/lit}$$

Limitations for Interference: As per studies carried out for interference, following results were obtained.

No Interference from Hemoglobin up to 187.5mg/dl.

No Interference from free Bilirubin up to 25.0mg/dl.

No Interference from Lipemic (Measured as Triglycerides) up to 1000mg/dl.

Normal Values

Fasting: 70-110mg/dl (3.90-6.11mmol/lit)

Two Hours Post - Prandial: up to 140mg/dl (7.78mmol/lit)

Precaution: Enzopak Glucose is for IN VITRO diagnostic use only.

Linearity

This method is linear up to 500mg/dl. For sample value above 500mg/dl, dilute the sample suitably with 0.9% saline and repeat the assay. Apply correction due to dilution to arrive at a final result (**Tietz, 1982**).

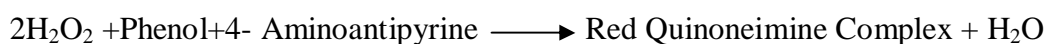
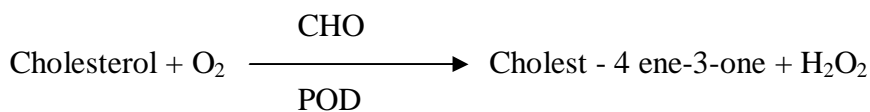
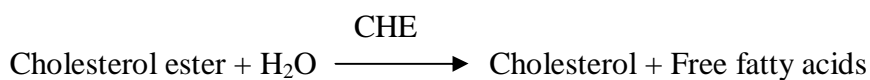
3.16.9 ESTIMATION OF TOTAL CHOLESTEROL AND HIGH DENSITY LIPOPROTEINS (CHOD/POD METHOD)

Purpose

The purpose of the test was to estimate the lipid profile.

Test Principle

The reaction sequence employed in this assay is as follows:



Cholesterol is determined after enzymatic hydrolysis and oxidation. Cholesterol esters are hydrolysed by the enzyme Cholesterol esterase to give free cholesterol and fatty acid molecules. This free cholesterol gets oxidized in the presence of Cholesterol oxidase to liberate Cholest-4 ene-3 one and peroxide. The indicator quinoneimine is formed from hydrogen peroxide and 4-aminoantipyrine in the presence of phenol and peroxidase. The intensity of this coloured complex is

measured at 505nm (500-540nm) and is directly proportional to the cholesterol concentration present in the sample. On addition of the precipitating reagent to the serum, followed by centrifugation, HDL fraction remains in the supernatant while the other Lipoproteins precipitate out.

Normal Range

Total cholesterol	:	130 - 250mg/dl (< 6.45mmol/L)
HDL cholesterol	:	Male: 30 - 70mg/dl Female: 35 - 90mg/dl

It is recommended that laboratories establish their own normal range.

Kit Contents

	Code No. KC1 (1x50ml)	Code No. KC2 (2x50ml)	Code No. KC3 (1x500ml)
Reagent 1 Enzyme Reagent	1 x 50ml	2 x 50ml	1 x 500ml
Reagent 2 Precipitating Reagent	5ml	10ml	50ml
Reagent 3 Cholesterol Standard (200mg/dl)	1ml	1ml	2 x 1ml

Specimen: Serum/Heparinised or EDTA Plasma

Working Reagent Preparation: The reagent is ready-to-use. All reagents are to be stored at 2-8°C and are stable till the expiry date mentioned on the labels.

Procedure: Step 1 - Separation of HDL Cholesterol fraction: Pipette into a centrifuge tube:

Serum / Plasma : 0.2ml

Precipitating Reagent (2) : 0.3ml

Mix well and allow to stand at R.T for 5 minutes. Centrifuge at 3000 rpm for 10 minutes to get a clear supernatant. If the supernatant is not clear (high TGL level) dilute the sample 1:1 with normal Saline and multiply the result with 2.

Step 2 - For Total and HDL Cholesterol: 1.0ml Procedure:

Pipette into 4 test tubes labeled Blank (B), Standard (S), Total Cholesterol (T_C) and HDL Cholesterol (T_H) as shown below:

Addition Sequence	B	S	T_C	T_H
Enzyme Reagent (1)	1.0ml	1.0ml	1.0ml	1.0
Cholesterol Standard(3)	-	10µl	-	-
Specimen	-	-	-	-
Supernatant (from Step 1)	-	-	10µl	100µl
Distilled Water	0.1ml	0.1ml	0.1ml	-

Mix well and incubate for 5 minutes at 37°C (or) 10 minutes at R.T. Read the absorbances of Standard (S), Total Cholesterol (T_C) and HDL Cholesterol (T_H) against Blank (B) at 505nm or with green filter (500–540nm). The final colour is stable for one hour.

Calculations

$$\text{Total Cholesterol (in mg/dl)} = \frac{\text{Abs. of T}_C}{\text{Abs of S}} \times 200$$

$$\text{HDL Cholesterol (in mg/dl)} = \frac{\text{Abs. of T}_H}{\text{Abs of S}} \times 50$$

Quality Control

It is recommended to include Assayed Quality Control Serum (Level I and II) with each assay batch to verify the performance of the procedure. Failure to obtain the proper range of values in the assay of control sera may indicate either reagent deterioration, instrument malfunction or procedural errors.

System Parameters

Mode: End Point

Std. Conc.: 200

Wave length: 505nm (500-540)

Units: mg/dl

Flow Cell Temp: 37°C

Blank: Reagent

Sample volume: 10ml

Reagent Volume: 1000ml

Low normal: 130

High normal: 250

Notes

1. The enzyme Reagent on storage at 2-8°C develops a slight pink colouration. However, this does not affect the performance of the test.
2. Hemoglobin values up to 200mg/dl, Bilirubin up to 507µmol/l and Triglycerides up to 4.64mmol/l do not interfere with the test.
3. Before the assay, bring all the reagents to room temperature.
4. Avoid contamination of the reagents during the assay process.
5. Programme for specific auto analyzers are available on request
6. As with all the diagnostic procedures, the physician should evaluate data obtained by the use of this kit in light of other clinical information.

Linearity: Linearity of the kit is up to 750mg/dl (**Richmond, 1973**).

3.16.10 ESTIMATION OF LOW DENSITY LIPOPROTEIN (LDL)

Low density lipoprotein cholesterol (LDL) was indirectly assessed using standard equation (**Friedewald, et al. 1972**).

$LDL = TC - (HDL + TG/5)$ TC (total cholesterol); HDL (high density lipoprotein cholesterol) and TG (triglyceride), All values were in mg/dl.

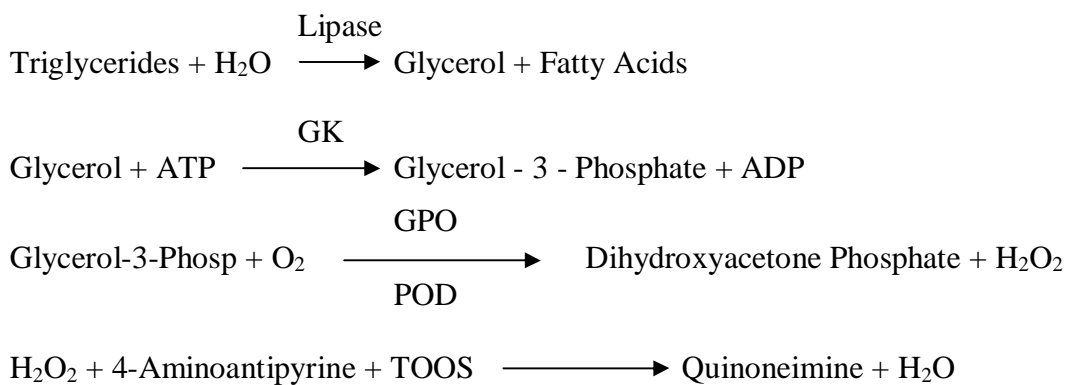
3.16.11 ESTIMATION OF TRIGLYCERIDES (GPO METHOD)

Purpose

The purpose of the test was to estimate the triglycerides.

Principle

Lipase hydrolyses triglycerides sequentially to Di and Monoglycerides and finally to glycerol. Glycerol Kinase (GK) using ATP as P₀₄ source converts Glycerol liberated to Glycerol-3-Phosphate (G-3-Phosphate). G-3-Phosphate Oxidase (GPO) oxidises G-3-Phosphate and forms Dihydroxy acetone phosphate and hydrogen peroxide. Peroxidase (POD) uses the hydrogen peroxide formed, to oxidise 4-Aminoantipyrine and TOOS (N-ethyl-N-Sulphohydroxy propyl-m Toluidine) to a purple coloured complex. The absorbance of the coloured complex is measured at 546nm (530-570nm or with yellow filter) which is proportional to Triglyceride concentration.



Diagnostic Significance

Normally, triglycerides, HDL-cholesterol, total cholesterol are estimated, and LDL-cholesterol is calculated. These parameters represent a routine practical aspect of lipid profile which is useful in the determination of risk factor or health status of a subject. Serum triglycerides estimation is an important parameter in the investigation of hyperlipoproteinaemia. Elevated levels may be found in atherosclerosis, diabetes

mellitus, and glycogen storage diseases like Von Gierke's disease, secondary hyperlipoproteinaemia, alcoholism and nephrotic syndrome.

Presentation

All reagents to be stored at 2-8°C	No. of Bottles (15 x 1.1ml)
1 Triglycerides (Enzymes, Chromosome)	15
2 Triglycerides (Buffer)	1
* Triglycerides Standard (200 mg/dl)	1

Precaution

ENZOPAK Triglycerides is for IN VITRO diagnostic use only. Reagent contains Sodium Acid. DO NOT INGEST.

Preparation of Working Reagent: for 15 x 1.1ml

Dissolve the contents of one Vial of 1 TRIGLYCERIDES with 1.1ml of 2 TRIGLYCERIDES (Buffer). Mix gently to dissolve.

Reagent Storage and Stability

ENZOPAK Triglycerides reagents are stable at 2-8°C until the expiry date indicated on the label. Working reagent is stable for 2 weeks at 2-8°C, when stored in dark coloured container.

Specimen Collection

Fresh, clear fasting serum with no hemolysis should be used. Heparin plasma may be used. No other anticoagulant is suitable. Serum levels are slightly (5mg/dl) higher than plasma levels.

Reaction Parameters

Type of Reaction	: End Point
Wavelength	: 546nm (530-570nm)
Flowcell Temperature	: 37°C
Incubation	: 15 min. at 37°C

Std. Concentration	: 200mg/dl
Sample Volume	: 10 Microlitres (0.01 ml)
Reagent Volume	: 1.0ml
Zero setting with	: Reagent Blank
Light Path	: 1.0cm

Procedure

For laboratories using instruments with 1.0ml/ 0.5ml cuvette capacity.

Pipette in to	Procedure for 1ml			Procedure for 0.5ml		
	Test Tubes	BLK	STD	TEST	BLK	STD
WRK. RGT. (ml)	1.0	1.0	1.0	0.5	0.5	0.5
STD. (ml)	-	0.01	-	-	0.05	-
SAMPLE (ml)	-	-	0.01	-	-	0.05

Mix and incubate at 37°C for 15 minutes and read absorbance of test and standard against reagent blank at 546nm (530-570 nm or yellow filter).

Procedure for Colorimeters (2.5ml)

Pipette into Test Tubes	Blank	Standard	Test
Working Reagent(ml)	1.0	1.0	1.0
Standard (ml)	-	0.02	-
Sample (ml)	-	-	0.02

Mix well and allow to stand for 20 Min. at 37°C

Distilled Water (ml)	1.5	1.5	1.5
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Mix and read absorbance of test and standard against reagent blank with yellow filter.

Test Results

$$\text{Triglycerides (mg/dl)} = \frac{\text{Absorbance of Test}}{\text{Absorbance of Std}} \times 200$$

To convert (mg/dl) to m mol / lit use the following equation $m \text{ mol/lit} = \text{mg/dl} \times 0.0114$

Normal Values of Serum Triglycerides

Male : 65 - 190mg/dl

Female : 45 - 170mg/dl

Linearity

This method is linear up to 800mg/dl. For sample values higher than 800mg/dl, dilute the samples suitably with 0.9% saline and repeat the assay. Apply proper dilution factor to calculate the final results (**McGowan, et al., 1983**).

3.17 COLLECTION OF DATA

The purpose of the study was to find the effect of Tai Chi and yogic practices with and without green tea supplementation on selected health related physical fitness and biochemical variables among obese men. For this purpose, the research scholar followed the following procedure. The data on selected dependent variables such as health related physical fitness were taken from the athletic track and gym. The biochemical variables were taken from the blood sample and analyzed through the biomedical laboratory. The pre-test and post test were collected before and after the sixteen week training programme respectively.

3.18 STATISTICAL TECHNIQUES

The Analysis of Covariance (ANCOVA) statistical technique was used to find out the effect of Tai Chi and yogic practices with and without green tea supplementation on selected health related physical fitness and biochemical variables among obese men.

If the test is significant Scheffe's post hoc test will be used to find out the paired mean significant difference (**Thirumalaiswamy, 1998**).

3.19 FLOW CHART SHOWING THE METHODOLOGY

