3.0 INTRODUCTION

In this chapter as per objectives of the study, the modalities of the objective measurement were planned, oriented and executed. These aspects are described in this chapter.

Methodology deals with the sampling procedure, criteria measured, tools and the procedure of data collection.

3.1 Choice of investigating materials

To ascertain the physique and health status of senior citizen, as per design of the study, 200 persons were pursued to act as volunteers of the research project. Data of 100 deceased persons collected from various sources, are also considered as one of the group of subjects for the purpose of the study.

Table No. 1: Distribution of the subjects

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Subject group</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Subjects with cardiac ailments (Returned home after hospitalization). (CA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>2.</td>
<td>Subjects succumbed due to cardiac ailments at the hospital (CD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>3.</td>
<td>Normal subjects not suffering from cardiac ailments (NS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>75</td>
</tr>
</tbody>
</table>
There are three groups of subject and each group again subdivided into male and female sub-groups.

First group is marked as CA (Cardiac ailments), they had a history of cardiac ailments and were hospitalized for treatment of cardiac ailments. This group was comprised of 75 male and 25 female subjects.

The second group CD (Cardiac death or succumbed due to cardiac ailments) comprised of 75 male & 25 female subjects, who succumbed due to previous history of cardiac ailments at the hospitals. The detail information regarding the subject’s were collected from hospital record and from the subjects close relatives.

The third group was formed with the normal subjects (NS) who had no history of cardiac ailments and belong to the same age group of CA & CD groups, is actually control group. This group is also comprised of 75 male and 25 female subjects. All the subjects were mainly from two districts – Hooghly & Howrah of West Bengal, India.

Age of the subjects was recorded from the oral submission of the senior citizen. In some cases oral submission was verified from the family members of the subjects of CA & NS groups (both male and female). For CD group age was recorded from the hospital records and in some cases from the family members of deceased persons.

Mean age of the male subjects was 67.24 with SD of 5.04 years, on the other hand mean age of female subjects was 65.63
with a variation of 4.86 years. Most of the subjects were from low to middle income group family.

3.2 Criteria measured:
Physique, health status and life-style were the criteria of the study.

(1) Physique
Physique was measured by height, weight, body composition variables and body mass index (BMI).

(2) Health status
Health status was assessed by ascertaining
(i) Case history
(ii) Personal health (visual, oral, and skin).
(iii) Physiological health; measured by resting heart rate, blood pressure and blood sugar level.
(iv) Psychological health: by measuring anxiety (State & Trait) level.
Assistance of duly qualified physician was obtained particularly in collecting data on the health status.

(3) Life-style
Life-style was assessed by collecting information related to:
(i) Habits-smoking, morning walk and work ability, food habits, salt intake, leisure pursuit
(ii) work culture-nature of occupation, nature of work
(iii) socio-economic status
(iv) nutritional status.
Actually specific questionnaire was used for collecting information on each item.
3.3 **Procedure of collecting data**

Procedures are presented criteria and variable wise.

3.3.1 **Physique**

(a) **Height & Weight**

Height and weight was measured by standard procedure. Height was measured through a stick marked according to scale. A weighting machine, Libra personal scale was used to measure body weight of the subjects of CA and NS groups. Data of CD group was collected from hospital record.

The tools used for measuring height and weight were very useful for field study. The researcher had to move from one place to other for collecting data and the procedure used was suitable.

(b) **Body composition**

Body fat %, Fat mass, Lean body mass and BMI were considered as variables of body composition.

(i) Body fat % was estimated by adopting, Girth circumference method as depicted by Mc. Ardle; Katch & Katch 1996.

**Measurement of Girths**

A plastic measuring tape was applied lightly to the skin surface so that the tape is taut but not tight. This procedure avoids skin compression that produces lower than normal scores. Duplicate measurements are taken at each site, and the average is
used. The anatomic landmarks for the various girths commonly used to assess fatness for older men and women are:

1) Abdomen – one inch above the umbilicus;
2) Buttocks – maximum protrusion with the heels together;
3) Right thigh – upper thigh just below the buttocks;
4) Right forearm – maximum girth with arm extended in front of the body with palm up;
5) Right calf-widest girth midway between the ankle and knee.

Different predictions have been developed for different genders and age groups and are depicted below:

<table>
<thead>
<tr>
<th>Sex</th>
<th>Site measured</th>
<th>Constant A</th>
<th>Constant B</th>
<th>Constant C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Buttock</td>
<td>Abdomen</td>
<td>Right for arm</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>Abdomen</td>
<td>Right thigh</td>
<td>Right calf</td>
<td></td>
</tr>
</tbody>
</table>

Percent body fat estimated by the formula as shown below (Mac Cardle et al. 1996).

For male: Percent Fat = Constant A + Constant B - Constant C - 15.0

For female: Percent Fat = Constant A + Constant B - Constant C - 18.4

**Percentage of body fat**

Percentage of body fat was computed from girth measurements. There were two different procedures in this measurement. One was for male and other for female subjects. Fat % was computed from the girth measurement and was recorded as percentage.
Fat mass (FM)
a) Purpose: To assess the fat mass in kg.
b) Required instrument: Weighting machine.
c) Procedure: After assessment of percentage of body fat, fat mass was computed by multiplying body weight with obtained percentage of body fat and divided by constant 100.
   \[ \text{Fat in Kg.} = \frac{\text{weight (kg)} \times \% \text{ of body fat}}{100} \]
d) Scoring: Score was recorded in kilograms.

Lean body mass (LBM)
a) Purpose: To access the fat free body weight of the subject.
b) Required instrument: Weighting machine

c) Procedure:
   (1) From the body-weight of each subject total amount of fat was calculated. By subtracting total fat from the body weight the LBM was estimated and recorded in Kilogram.
   (2) Lean body mass = (Total body weight - fat weight) in kg.
d) Scoring: Score was recorded in Kilogram.

Body Mass Index (BMI)

The evaluation of body composition permits quantification of the major structural components of the body muscle, bone and fat. Although the actuarial-based height-weight tables often are used to assess the extent of "over weight ness" based on sex and bony frame size. Such tables do not provide reliable information on the relative composition or quality of an individual's body.
The body mass index (BMI), derived from body mass and stature, is used frequently by clinicians and researcher's to evaluate the 'normalcy' of one's body weight. The BMI has a somewhat higher association with body fat than do estimates based simply on stature and mass. BMI is computed as follows:

\[
\text{BMI} = \frac{\text{Body mass (Kg)}}{\text{Stature (m}^2\text{)}}
\]

The importance of this easy-to-obtain index, lies in its curvilinear relationship to the all cause mortality ratio: as the BMI becomes larger, so also does the risk of a variety of diseases, such as cardiovascular complications (including hypertension), diabetes and renal disease.

The suggested desirable BMI range for women is 21.3 to 22.1; for men, it is 21.9 to 22.4. BMI values above 27.8 for men and 27.3 for women are associated with an increased incidence of high blood pressure, diabetes and coronary heart disease.

3.3.2 Health status

(a) Case history

One physician helped the researcher in taking case history of ailments / diseases suffered by the subjects specially for last 5 years and were recorded in the specific data collection sheet. For CA & NS group it was collected by direct interaction and for CD group partly from hospital record and rest from the interaction with the members of the deceased’s family.
(b) **Personal health**

A questionnaire was prepared for the purpose and relevant information on personal health was collected accordingly. The researcher took the help of a qualified physician in this regard. The questionnaire was prepared to assess –

(i) visual health  
(ii) oral health  
(iii) health of skin  
(iv) health of hair

The physician personally checked these aspect, and the researcher collected data during the interaction with the subjects of CA & NS groups. However, for CD group information collected from the members of the deceased family.

(c) **Physiological health**

Physiological health was assessed through measurement of

(i) Resting heart rate  
(ii) Blood pressure (systolic & diastolic)  
(iii) Blood sugar level.

(i) **Resting heart rate**

For CA group and NS group resting heart rate was measured by the researcher himself and the physician, from the radial artery of each subject. Data of the subjects of CD group was collected from the hospital record.

(ii) **Blood pressure**

Similarly a physician helped the researcher to acquaint himself in measuring blood pressure. For measurement of systolic and diastolic blood pressure standard sphygmomanometer and stethoscope were used.
The researcher and the physician took the blood pressure of the subjects of CA and NS groups, while they were at rest. Blood pressure of CD groups subject was obtained from hospital record.

(iii) Blood sugar

Blood sugar was measured by Glucometer Basic Plus instrument. The researcher associated himself with the instrument from a technical person and there after researcher himself collected the data from the glucometer.

Data of blood glucose level for the CD group subjects were collected from hospital record. It may be mentioned here that for few subjects, relevant record for blood glucose level was not available in the hospital.

Blood glucose

Blood glucose concentration is one of the best measurement of the presence of diabetes as well as diabetic control. Blood sugar is affected by the food eaten, the amount of time after or before eating, and activity and stress. A sample taken within two hours gives the most sensitive results after a measured glucose intake. Evaluating fasting or before glucose intake level indicates the extent to which carbohydrate from last meal have been removed from blood stream.

In the present study blood sugar was measured by Glucometer “one touch basic plus – life scan” Inc 2000. Jonson & Jonson Company; U.S.A. The one touch basic plus diabetes monitoring system is intended for in vitro diagnostic use for quantitative determination of glucose in whole blood as an aid in monitoring effectiveness of diabetes management in the home and in clinical settings.
The life Scan Blood Glucose Meter, as an electro-medical device, has been thoroughly tested and found to comply with the essential requirements of the Electro Magnetic Compatibility Directive (EMC, 89/336/EEC), 2000.

One touch test strips - the one touch basic plus diabetes monitoring system measures the amount of blood glucose in whole blood. When blood is applied to one touch test strip react with the blood to form a blue color. The one touch basic plus meter reads the color to determine the blood glucose level.

The one touch basic plus system requires only a small drop of blood. It is very important that the drop be large enough to cover the test spot completely.

The instrument was set as per instructions given. One drop of blood from a subject was placed on the strick and after 45 sec. the meter display the reading in ml/dl.

(d) Psychological health

Anxiety; state and trait anxiety were the criteria of psychological health.

For measuring the anxiety the state and trait anxiety inventory (STAI) questionnaire were adopted. This inventory was designed and developed by Spielberger, et al. (1970) not only for the assessment of the anxiety loading of the individual but also for the distinction of two aspects of anxiety viz., State anxiety (A-State) and trait anxiety (A-trait). State anxiety refers to a reaction which takes place at a certain time at a given level of intensity and trait anxiety indicates a latent disposition for a reaction of a certain
type of occur if it is triggered by appropriate stimuli, in a stable individual characteristic. The forms of this inventory have been adopted in regional language (Bengali) on our population (Chattopadhyay et al. 1986).

Administration and Scoring

Either Scale can be administered by itself. However when both forms administered together, it is recommended that the State anxiety form to be administered first (Spielberger et al. 1970). This is self-administering inventory. There is no time limit to complete the form. In both forms some items are worded in such a way that a response of 1 indicates little anxiety or absence of anxiety and a response of 4 indicates high anxiety. The rests are worded in such a way that response of 1 indicates high anxiety. For the scoring of either scale one has to add the rating given the direct items and reverse items separately and then to subtract the sum of the direct items and to add a constant. If the subject fails to response to one or more items, different procedure for scoring (which is more complicated) has been recommended (Spielberger et al. 1970). In the present study all the subjects responded all the items of both the scales.

Scoring

In trait anxiety the direct items (D.I) are the questions of 2, 3, 4, 5, 8, 9, 11, 12, 14, 15, 17, 18, 20 and reverse items (R.I) are 1, 6, 7, 10, 13, 16, 19 number questions. To calculate the trait anxiety count score of D.I. and R.I. was considered and subtract the sum of D.I. and R.I. (D.I. - R.I.) and add than it to a constant value that is 35, the trait anxiety score was obtained.
In state anxiety the direct items (D.I.) are the questions of 3, 4, 6, 7, 9, 12, 13, 14, 17, 18 and reverse items (R.I.) are 1, 2, 5, 8, 10, 11, 15, 16, 19, 20 number questions.

To calculate the state anxiety count score of D.I. and R.I. was considered and subtracting the sum of D.I. and R.I. (D.I. – R. I.) and than add it a constant value that is 50, the score obtained.

Data for CA and NS group subjects were collected according to the method mentioned above. Data of anxiety parameter could not be ascertained from CD group.

**Interpretation**

The score for either form (T-anxiety and S-anxiety) is ranged from 20 to 80, and the higher the score, the greater is the level of anxiety.

**3.3.3 Life-style**

Data relating to life style was collected through a questionnaire specifically prepared for understanding of various aspect of life style of the subjects. The aspects were –

1. Habits:
   - smoking, morning walk and work ability, food habits, salt intake, leisure pursuit
2. Work culture-nature of occupation, nature of work
3. Socio-economic status
4. Nutritional status

The researcher had a close interaction with each subject of CA and NS groups and relevant data were collected accordingly. In case of CD group subjects relevant information were collected from their family members.
3.3.4 Socio-economic status

Moreover a simple socio-economic status was also ascertained. A specific questionnaire was prepared and through interaction with the subjects relevant data were collected. In case of CD group subjects relevant information were collected from their family members.

The aspects of socio-economic status were:

(i) Community – Hindu / Muslim, SC/ST etc.
(ii) Educational background – Literate / illiterate, qualified / Non-qualified.
(iii) Engagement in cultural activity – Music / instrument / drama/dance etc.
(iv) Family size – Adult / children, Male / Female etc.
(v) Family income and economic status.

3.3.5 Statistical technique employed

Data gathered from various tests, measurements and from reply of the subjects through specific questionnaire, were statistically analyzed appropriately to arrive into definite conclusions.

The aspects of life style and socio-economic study were mainly confined to percentage analysis of the population.

Regarding physique and health status, group data were converted to Mean and SD first. Where necessary comparison of various means of group data were analyzed by analysis of variance followed by 't' test to compare composite means. Even after ANOVA and paired 't' test further statistical treatment of the data
was made by MANOVA test. When MANOVA F value was significant, post hoc test was conducted to arrive in to definite conclusion. The multivariate test takes into account the positive co-relation between the two measurement for each group- information that is unfortunately ignore by the univariate test.

**Multivariate Analysis of Variance**

In the univeriate situation of the assumptions are that, character is a random sample from normal ($\mu$, $\sigma^2$) population and the random sample are independent. Often more than two population need to be compared. Random sample collected from each 'n' populations are arranged, according to said Statistical procedure. MANOVA is used first to investigate whether the population mean vector are the same and if not which mean components differ significantly.