Chapter 3

Procedure
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The review of related literature in the preceding chapter has given direction in explicitly explaining the objectives of the study and in selecting the methods to be adopted for carrying out the research. In this chapter the selection of subjects, criterion measures and methods employed for collecting them, experimental design, preparation of yogic and aerobic programmes, administration of these programmes, collection of pre and post data and statistical techniques used for its analysis have been described.

Selection of Subjects:

For the purpose of this study 60 subjects (male and female) of each psychosomatic disorder (coronary heart disease, hypertension, diabetes mellitus, peptic ulcer, insomnia) undertaken in the study were selected from various parts of Aligarh and particularly from Adarsh swastha kendra Aligarh and Yoga and naturopathy centre Aligarh. The age group of subjects ranged between 20 to 50 years. Majority of the subjects were educated and employed in different kinds of jobs or were in their private professions.
Criterion Measures and methods employed for collecting them:

Keeping in view the objectives of the study following criterion measure were set of the psychosomatic disorders under taken in the study and collected in the following way.

1. **Coronary Heart Disease:** The pre disposing factors of CHD are mainly increased LDL and decreased HDL levels in blood cholesterol. Increased LDL levels in the blood serum initiates the chances of CHD. In contrary to this increase in HDL levels in the blood serum decreases CHD occurrence. Fasting blood was collected in the morning and analysed in the laboratory for determining serum HDL and LDL levels in mg%.

2. **Hypertension:** For measuring hypertension systolic and diastolic blood pressures in mmHg of the subjects were measured in the morning with sphygmomanometer and stethoscope. Subject was made to sit in resting position and the cuff of the sphygmomanometer was wrapped around the upper arm. The stethoscope was placed lightly over the bronchial artery in the cubital fossa. The pressure was increased in the cuff up to 30 mmHg above the level at which radial pulsation can no long be felt. Then, the pressure was lowered in the cuff.
to 5-mmHg at a time until the first sound of beat was heard. This was the systolic blood pressure, which was recorded. The pressure was lowered further in the cuff, until the sound became suddenly faint or inaudible. This was diastolic pressure, which was recorded.

3. **Diabetes Mellitus**: It was determined by taking into account the fasting blood glucose levels in mg %. Subject's blood in the morning was collected and analysed in the laboratory for blood glucose levels.

4. **Peptic Ulcer**: Responses related to peptic ulcer were collected through two methods:
   a. **Clinical diagnosis** (for 36 subjects suffering from less than two years)
   b. **Endoscopic diagnosis** (for 24 subjects suffering from more than two years)

   a. **Clinical Diagnosis**

   To objectively evaluate the clinical features associated with peptic ulcer, a questionnaire was constructed under the expert guidance of Dr. Ritanjay Sharma MBBS M.D Pathology with utmost care. The minute clinical details related to peptic ulcer were taken into consideration in order to get maximum worth
while responses from the subjects. Their responses in relation to intensity were graded from 0 to 2. Questionnaire containing following questions along with ratings is given below.

1. What is the intensity of epigastric pain?
   (a) Nil (b) Moderate (c) Severe
   0       1       2

2. Pain after taking food.
   (a) Nil (b) Decrease (c) Increase
   0       1       2

3. Feeling of nausea or vomiting.
   (a) Nil (b) Moderate (c) Severe
   0       1       2

   (a) Nil (b) Moderate (c) Severe
   0       1       2

5. Pain after spicy food.
   (a) Nil (b) Moderate (c) Severe
   0       1       2

   (a) Nil (b) Moderate (c) Severe
   0       1       2

7. Weight loss.
   (a) Nil (b) Moderate (c) Severe
   0       1       2

8. Hemostasis (coffee coloured vomiting)
   (a) Nil (b) Moderate (c) Severe
   0       1       2
9 Melena (black coloured stool)
   (a) Nil   (b) Moderate   (c) Severe
       0     1        2

10 In physical examination the epigastric tenderness
   (a) Nil   (b) Moderate   (c) Severe
       0     1        2

The total of clinical ratings on 10 questions was the intensity of peptic ulcer with which the subject was suffering.

b Endoscopic Diagnosis

Subjects with chronic persistent symptoms from more than two years, were subjected to fibroblastic endoscopic examination under local anesthesia. The findings in relation to the disintegration of mucous membrane of oesophagus, stomach and duodenum were rated in the following manner:

1 Oesophagus
   Integrity of mucous membrane
   (a) Normal   (b) erosion   (c) Ulcerated   (d) Stricture
        0      2       4        6

2 Stomach
   Integrity of mucous membrane
   (a) Normal   (b) erosion   (c) Ulcerated   (d) Stricture
        0      2       4        6
3. **Duodenum**

Mucosal integrity of any part

(a) Normal  (b) erosion  (c) Ulcerated  (d) Stricture

0  2  4  6

The total of these ratings on integrity of mucous membrane of oesophagus, stomach and duodenum was the intensity of peptic ulcer with which the subject was suffering.

3. **Insomnia:**

In the case of patients suffering from insomnia the extent of sleep was measured. For this they were asked to note the number of times they heard the half-hourly sounds of a wall clock from 10 p.m. to 6 a.m. These half-hourly counts were set as the measuring standard of sleep (K.S. Joshi, 1991). The reliability of this test was determined by test-retest method on a group of 15 subjects and the coefficient was 0.86.

**Reliability of Data:**

The instruments and apparatus used for collecting the relevant data were of high scientific standard. All recent methods were used in drawing out the data. The reliability of the apparatus was
determined by test-retest method and the average coefficient was 0.93.

**Collection of Pre-experimental Data:**

Prior to the administration of the programme a pretest was conducted where two sets of responses were taken for blood pressures, fasting blood glucose, HDL, LDL and insomnia with in a gap of one day and the means of the two responses were deemed as final score. For peptic ulcer only one set of responses was taken as the clinical and endoscopic findings were subjective, which were objectively graded.

**Experimental Design:**

Except peptic ulcer, each psychosomatic disorder group of 60 subjects on the basis of pre-test data were divided into three almost equated sub groups of 20 subjects each. Peptic ulcer’s 36 clinically rated subjects were divided into three sub groups of 12 subjects each and 24 endoscopic rated subjects into three sub groups of 8 subjects each. All sub groups one were assigned Aerobic exercise programme, subgroups two were assigned Yogic programme and subgroups three were assigned a Combined Aerobic-Yogic programme.

**Preparation of experimental programmes:**

**Aerobic Exercise Programme:** Consisted of exercises that included major muscles of the body like slow and fast walking, slow and fast jogging, cycling, calisthenics exercise and stretching exercises. The
Intensity of the programme was set on a point, where the heart rate of the subject was between 50-60% of his maximum heart rate. The programme was individualised, depending upon the age, sex and physical status of the individual. The intensity and duration of the programme was gradually increased. The time duration of the programme varied between 35 to 60 minutes.

**Yogic programme:** Yogic programme for each psycho-somatic disorder was prepared separately after taking into consideration the physiological implications of various yogic asanas and kriyas. The time limit of the programme ranged from 1 to 1 and 1/2 hours.

1) **Yogic Programme for Hypertension:**

(a) Selected asanas

1. Shavasana
2. Bhujang asana
3. Shalbhasana
4. Dhanur asana
5. Vajrasana
6. Suptavajra asana
7. Ardhamatsyendra asana
8. Paschimottan asana
9. Pawanmukt asana
10. Gomukh asana
11. Siddhasana
12. Tada asana
13. Makar asana

(b) Pranayam

1. Nadi Shodhan
2. Shitali
3. Sheetkari
4. Chandra bhaden

With out kumbhak
(c) Yognidra

(d) Transcendental meditation

**Yogic Programme for Coronary Heart Disease:**

(a) Selected asanas

13. Makar asana

(b) Pranayam

1. Nadi Shodhan  
2. Sheetali  
3. Sheetkari  
4. Ujjai  
5. Chandra Bhaden  

(b) Pranayam

1. Nadi Shodhan  
2. Sheetali  
3. Sheetkari  
4. Ujjai  
5. Chandra Bhaden

(c) Yognidra

(d) Transcendental Meditation Technique

**Yogic programme for diabetes mellitus:**

(a) Selected asana

(10) Matsya asana (11) Pawanmukt asana
(12) Ardhmatsyendra asana (13) Makar asana

(b) Pranayam

1. Nadi Shodhan
2. Bhastrika
3. Ujjai
4. Bhramari

In first three months these pranayams were performed without kumbhaka, thereafter kumbhaka was introduced as per the improvement in the condition of the subject.

(c) Transcendental Meditation

Yogic Programme for Peptic Ulcer:

(a) Selected asanas

(1) Shava asana (2) Shalbha asana (3) Uttanpad asana
(4) Vajra asana (5) Gomukh asana (6) Siddha asana (7) Tada asana (8) Makar asana

(b) Pranayam

1. Nadi Shodhan (Anulam-vilom)
2. Sheetali
3. Sheetkari
4. Ujjai
5. Chandra Bhaden

(c) Transcendental Meditation

(d) Kunjal With normal cold water, without salt.
**Yogic programme for Insomnia:**

(a) Selected asanas

1. Shav asana
2. Bhujang asana
3. Sarvang asana
4. Shalbh asana
5. Hala asana
6. Paschimottan asana
7. Dhanur asana
8. Matsya asana
9. Suptavajra asana
10. Chakra asana
11. Trikon asana
12. Pawanmukt asana
13. Shashank asana
14. Makar asana

(b) Pranayam

1. Nadi Shodhan (Anulom-vilom)
2. Bhramari
3. Ujjai
4. Chandra khaden

(c) Yognidra

(d) Transcendental Meditation

**Combined Aerobic-Yogic programme** was prepared in which Yogic programme for respected disorder was mixed with Aerobic programme

1. **Hypertension:** Aerobic programme + Yogic programme for hypertension

2. **Coronary Heart Disease:** Aerobic programme + Yogic programme for CHD
3. **Diabetes Mellitus:** Aerobic programme + Yogic programme for diabetes mellitus.

4. **Peptic Ulcer:** Aerobic programme + Yogic programme for peptic ulcer.

5. **Insomnia:** Aerobic programme + Yogic programme for insomnia.

The time duration of Combined Aerobic-Yogic programme ranged between 1 to 2 hours.

**Administration of the Programme:**

The three programme were administered to the respective three sub groups of each psychosomatic disorder in the two shifts of morning and evening for a period of six months with all wednesdays off in between. The frequency, intensity and time duration of various yogic and aerobic exercises were set after taking into consideration the subject's age, sex and physical status. The intensity and duration of the programme was gradually increased. The subjects were advised to take satvic-bhojan i.e. a normal diet devoid of excess fats and spices. The diet of diabetes and peptic ulcer, subjects was specially monitored during the course of programme in relation to excess sugar, oils and spices. The intake of usual medicines was gradually decreased to finish within two to three months from the starting of
programme, for the subjects who were showing improvement and could maintain without medicines

**Collection of Post experimental Data:**

After the administration of the programmes a post test was conducted. Two sets of responses were collected for blood pressure, fasting blood glucose, HDL, LDL, and insomnia with in a gap of one day and the means of two responses were deemed as final scores for the respective psychosomatic disorders. For peptic ulcer only one set of response was collected, as the clinical and endoscopic findings were subjective which were graded objectively.

**Statistical Techniques applied for the Analysis of Data:**

In order to study the effects of three programmes on the psychosomatic disorders Paired-t test, Analysis of variance and covariance were used. Where F-ratio was significant, LSD test was used to find out which of the groups means differences were most significant.

In analysis of variance the total amount of variation in a set of data is broken down into two types, that amount which can be attributed to chance and that amount which can be attributed to specified causes. There may be variation between samples and also
within sample items. ANOVA consist in splitting the variance for analytical purpose. Hence it is a method of analysing the variance to which a response is subject into its various components corresponding to various sources of variation.

While applying the covariance technique, the influence of uncontrolled variables is usually remove by simple linear regression method and the residual sums of squares are used to provide variance estimates, which in turn are used to make tests of significance. In other words, covariance analysis consists in subtracting from each individual score \( Y_i \) that portion of it \( Y_i \) that is predictable from uncontrolled variable \( Z_i \) and then computing the usual analysis of variance on the resulting \( Y-Y_i \)'s, of course making the due adjustment to degrees of freedom because of the fact that estimation using regression method required loss of degrees of freedom.

**Level of Significance:** The significance of differences between and among the means was tested at 0.05 level of significance.