CHAPTER-4
RESEARCH METHOD

The investigator, while making an appropriate plan for his/her research selects the methods and techniques most studied for his/her study. The end of high quality research can only be achieved by employing adequate research design and selecting accurate instruments of measurement. The present chapter enumerates the method/methodology employed for this investigation i.e. the design of research, method and process for selection of sample, different measures or instruments used to assess the variables of study, procedure for data collection and scoring etc. and statistical techniques used for analysis of research data.

The function of the research method/methodology is also to inform the reader as to what was done to solve the problem. Meticulous care has been in reporting the investigation in such a manner with utmost accuracy, that the criterion of replicability is satisfied. It should be possible for other investigators to reproduce the work reanalyze the research data, or to enable to draw conclusions with the adequate procedure of data collection. So the method of the research has a very important role to play.

The present study is divided into two parts. Part-I of the study deals with the assessment of contribution of psychological variables in the determination of Thyroid Stimulating Hormone (TSH) among hypothyroid patients and the comparison between hypothyroid patients and normal subjects on the psychological aspects (or variables) of hypothyroidism. Part-II of the study deals with the management of psychological determinants of hypothyroidism with the psychological intervention programme consisted of bio-feedback measures, muscle relaxation and counselling techniques.
PART-I

OBJECTIVES

The objectives of the present study framed as:

1. To determine the contribution of the psychological variables viz. life style, Stress, personality traits, and brain dysfunction in the determination of hypothyroidism.

2. To compare the Life Style, Level of Stress, Personality Traits and Brain Dysfunction of hypothyroid patients with their normal counterparts.

HYPOTHESIS

Hypothesis refers to the tentative solution of the problem which is generally framed when experimental or correlation type of studies are planned to be carried out. Since the present endeavour was designed as exploratory or survey type of research, there was no need to formulate hypothesis in this regard.

VARIABLES

In the present study while the Hypothyroidism acted as Criterion Variable, the other variables viz. Life-style, Stress, Personality and Brain Dysfunction as predictor variables. Life Style consists of five domain viz. (i) Dietary Habits (Life Style Domain-I or LSD-I), (ii) Sleeping Behavior (LSD-II), (iii) Social Support Network (LSD-IV), (iv) Spiritual Behavior (LSD-IV), and (v) Physical Activity (LSD-V). Personality consists of five domain viz. (i) Neuroticism, (ii) Extraversion, (iii) Openness, (iv) Agreeableness, and (v) Concesiousness.
Correlational research design was employed. A double matched group design was also made to compare the Life style, Levels of Stress, Personality traits and Brain dysfunction of group-I (Hypothyroid patients group) and Group-II (Non-hypothyroid subjects group).

OPERATIONAL DEFINITION OF THE TERMS USED

- **Hypothyroidism** is a medical condition whereby not enough thyroid hormone is being produced by thyroid gland for the body to function properly. It is also known as Underactive thyroid.
- **Life Style** refers “to engaging in a characteristic bundle of behaviours that makes sense to both others and the self in different times and places”.

- **Stress** refers as a negative or adverse emotional experience accompanied by predictable physiological, biochemical, behavioural and cognitive changes that are directed either towards altering the stressful event or adjusting with its effects.

- **Personality Traits** are the elements that constitute the psycho-physical system of an individual.
  
  To define operationally, personality traits are individual’s unique style of living, i.e. his feelings, emotions, attitudes, perceptions, needs, cognitions, drives, ways of responding, anxieties, conflicts, integration of ego and superego, thought processes etc.

- **Brain Dysfunctions** is the global term indicating a range of ‘Cognitive impairment’ or ‘Cognitive malfunctioning’.

**SAMPLE**

The total sample of the study consisted of 200 females, divided into two groups. Group-I, consisted of 100 female hypothyroid patients, diagnosed by doctor to have thyroid problem and under treatment of a doctor for hypothyroidism at least for last one year. These patients were selected from the clinics of physicians and S.N. Medical College, Agra. 100 non-hypothyroid females were taken in the Group-II. All these subjects were between the age range of 30-50 years. Only those subjects were selected in the sample who were married and had education at least up to the first degree level. Subjects having any other psychological or physical medical conditions were not included in the sample.
1. **Hypothyroidism** was diagnosed by the doctor on the basis of pathologist’s reports obtained during the last one year. TSH (Thyroid Stimulating Hormone) values above the normal/reference range i.e. 0.35 mU/L to 5.50 mU/L (milliunits per liter) were taken as measure for hypothyroidism.
2. ‘Life Style Scale’ constructed by the investigator (Khatoon & Mona, 2010) was used for measuring life style. This scale consists of 68 items with maximum score =340 and minimum score =68. It has five domains (1) Dietary Habits, (2) Sleeping Behaviour, (3) Social Support Network (4) Spiritual Behaviour and, (5) Physical Activity.

Instructions and Scoring: Instructions were given as in the manual and scoring was done according to the scoring procedure contained in manual.

Reliability: The reliability of the scale was established by Split-half method. The obtained indices of reliability for five domains are as follows.

<table>
<thead>
<tr>
<th>Method</th>
<th>Dietary Habits</th>
<th>Sleeping Behavior</th>
<th>Social Support Network</th>
<th>Spiritual Behavior</th>
<th>Physical Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split-half Reliability</td>
<td>r = 0.84</td>
<td>r = 0.86</td>
<td>r = 0.81</td>
<td>r = 0.89</td>
<td>r = 0.80</td>
</tr>
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</table>

Validity: As the scale was checked for its internal consistency, it can be said that the face validity and content validity (r = 0.779) of the scale is high.

3. ICMR Psychological Stress Questionnaire developed by Srivastava (1992; Indian Council of Medical Research, ICMR, New Delhi) was used to measuring level of stress among subjects. This test assess the extent of the basic components of psychological stress situation (i.e. conflicting roles, hardship, afflictions, failure, adversities, threat, constraints, excessive demands etc.) in various spheres of his/her personal and social life, the first section of this questionnaire Consists of 40 items and second section of this questionnaire consists of 14 stressful life events.
**Instructions and Scoring:** Instructions were given as per mentioned in the manual and scoring was done according to the scoring procedure contained in manual.

**Reliability:** Reliability of the instrument was established through Cronbach-Alpha correlations, Split-half (odd-even items), Test-retest and Inter-rater consistency method. The obtained indices of reliability through different method are as follows:

<table>
<thead>
<tr>
<th>Method of Reliability</th>
<th>Reliability Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach-Alpha</td>
<td>$r = .88$</td>
</tr>
<tr>
<td>Split-half (odd-even items)</td>
<td>$r = .88$</td>
</tr>
<tr>
<td>Test-retest</td>
<td>$r = .72$</td>
</tr>
<tr>
<td>Inter-rater consistency</td>
<td>$r = .65$</td>
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</table>

**Validity:** Validity of the stress questionnaire was examined through different methods of validity estimation ‘Content’ and ‘Predictive’, ‘Concurrent’ and ‘Congruent validity’. All the methods yielded high validity for the test.

Thus it was found that the ICMR psychological stress questionnaire is a highly reliable test to measure level of stress.

4. For measuring **Personality Traits**, NEO-Five Factor Inventory (NEO-FFI), ‘Form S’ (Adult) developed by Costa & McCrae (1985) was used. It consists of five 12 items scales that measure five domain of personality viz. Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C).

**Instructions and Scoring:** Instructions were given as per mentioned in the manual and scoring was done according to procedure contained in the manual.

**Reliability:** Internal consistency coefficients for the five personality domain found to be .86, .77, .73, .68 and .81 for Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness,
respectively. Chronback alpha coefficients for the five domain were .90 (N), .78 (E), .76 (O), .86 (A), and .90 (C). Three-month test-retest reliabilities coefficients found to be .79, .79, .80, .75, and .83 for N, E, O, A and C, respectively.

Validity: Costa and McCrae reported the convergent and discriminate validity of the inventory, convergent correlations were found to be in the range of .62, .60, .56, .57, and .61 for N, E, O, A and C, respectively. Divergent correlations were range from .00 to .20 for the five domain of the personality.

Thus the NEO-FFI is a highly reliable and valid tool for measuring personality traits.

5. For measuring Brain dysfunction, the PGI Battery of Brain Dysfunction developed by Pershad and Verma (1989) was used. This test consists of five subtests.

i. PGI-Memory Scale (PGIMS) contain ten subtests including verbal and nonverbal material. It measures remote, recent and immediate short term, very short term, intermediate term and long term memories. The test-retest reliability was found to be .69 to .85 for the ten subtests and for the total test was .90 (test retest and split-half reliability).

ii. Revised Bhatia’s Short Battery of Performance Test of Intelligence (BSB-R) is an adaption of Bhatia’s Intelligence Test Battery (Bhatia, 1955). Short scale consisting of Koh’s Block and Pass-a-long test. It is a performance test of Intelligence.

iii. Verbal Adult Intelligence Scale (VAIS) includes four subtests (i) Information, (ii) Digit Span, (iii) Arithmetic, and (iv) Comprehension. These subtests were adopted from the Wechsler’s Adult Intelligence scale. Test-retest reliability of test was found to be .87 to .98 and split-half reliability was .59 to .85 for four subtests.

iv. Nahor-Benson Test (developed by Pershad and Verma, 1978) consists of 8 cards. Five cards (No.1 to 5) contain a design each, based on developmental pattern. Remaining three cards (No.6 to 8) contain the instructions to be followed, i.e., subjects are required to draw shape of objects.
v. **Bender Visual-Motor Gestalt Test** (BVMGT) of visuo-motor coordination (developed by Bender, 1938) consists of 9 figures based on Wartheimer’s classical work in the field of perception. It measures visual activity and motor functioning.

**Instructions and Scoring:** Instructions were given as per mentioned in the manual and scoring was done according to the scoring procedure outlined in the manual.

**Validity:** PGI memory scale had satisfactory cross-validity and provides quintile norms and profile. Scores of subjects suffering from organic brain pathology, functional psychosis and neurosis, fall in the lowest 2nd and middle quintiles respectively (Verma, Pershad, Singh & Singh, 1982).

**DATA COLLECTION**

In the beginning of the data collection the researcher established rapport with subjects. Subjects enquired many questions regarding the administration of the test, e.g. ‘what is the use of this testing and why the investigator selected those women only for research work? From this point of view rapport formation was an essential part of the research work, although it proved to be difficult and very time consuming process. In some of the cases women totally refused to become testee. They thought if they give answers to these questions, their weaknesses would be known to others. Respondents were not ready to give their personal information as related to health, socioeconomic status and relation with family members. Some of the subject criticized the questions by saying that the some questions are technically wrong and inapplicable. During the course of the testing investigator was required to boost up the confidence of the respondents to enhance the quality of the responses. The consent of the subjects was procured in a performa that they have no objection on being psychologically tested and they are willing to do so. The anonymity of identity was emphasized. They were assured beforehand that the information gathered through the tests will be kept strictly confidential. Then subjects were given to test booklets to fill up. A Performa to get the health related issues of females was also filled by the subjects. It was seen that many of the
respondents were much cooperative and showed their enthusiasm to fill the questionnaires and willing to know their personal results. The questionnaires duly filled up by subjects were scored and thereafter, the results were told to the each subject. They were intimated regarding their high level of stress, unhealthy or poor lifestyle, poor cognitive functioning and health related issues due to hypothyroidism. All the subjects were curious to know causes, symptoms and treatment of hypothyroidism. Subjects asked to the investigator that how they can manage or cope-up with their hypothyroid disorder. Subjects were made aware about the fact that all the psycho-somatic symptoms or problems due to hypothyroidism can be manage with psychological treatment programme along with medicines. The patients were surprise to know that apart from medications hypothyroidism can also be treated with psychological treatment plan. Then, the investigator informed patients that she is conducting an intervention programme for treatment of hypothyroidism, as it is also a part of her investigation. The patients who showed keen interest to participate in treatment programme were selected for the further investigation.

STATISTICAL ANALYSES OF DATA

Data were analyzed in three ways:

1. To find out the relationship among TSH, Life style, Stress, Personality traits, and Brain dysfunction of group I (hypothyroid patients) and group II (normal subjects), Product Moment Coefficient of Correlation was used.

2. To determine the contribution of the predictor (psychological) variables in the determination of hypothyroidism, the criterion variable, Stepwise Multiple Regression Analysis was employed.

3. To study the difference between mean scores of Life style, Personality traits, Levels of Stress and Brain Dysfunction of group I (hypothyroid patients) and group II (Non-hypothyroid subjects), Mann Whitney U test was used.

These statistical analyses were done with the help of the SPSS programme.
PART-II

OBJECTIVES

- To manage level of stress among patients of hypothyroidism with the help of Progressive Muscles Relaxation (with bio-feedback) technique.
- To modify sedentary life style of hypothyroid patients with the help of cognitive behavioural counselling.

OPERATIONAL DEFINITION OF THE TERMS USED

1. **Bio-feedback:** It is a psycho-physiological procedure for directly modifying specific physiological dysfunction. It helps the individual to understand the underlying effect of stress on body function.

2. **Progressive Muscle Relaxation:** PMR (Progressive Muscle Relaxation) is a procedure given by Jacobson (1938) for reducing stress and tension by drawing attention of the individual to the sensations produced by gradual minimal contradiction and relaxation of small groups of muscle. It is also known as Jacobson’s Progressive Muscle Relaxation (JPMR).

3. **Counselling:** It is a discussion of a problem that usually has emotional content with a client in order to help the client to cope with it better.

SAMPLE

Ten female hypothyroid patients with sedentary life style whose level of stress was found high or very high, and who were willing to learn to manage their stress, and co-operate in the intervention program were randomly selected from the sample of Part-I for this part of the study.

TOOLS AND TECHNIQUES

**CASE STUDY:** It is an in-depth investigation of a particular situation rather than a statistical survey. It allows a researcher to investigate a topic in far more detail. It uses descriptive process to obtain an
in-depth analysis of the subject (object or situation) under study. The following outline suggests the major areas, and some of the specific questions, which were considered in a clinical case study of the subjects (women) with hypothyroidism:

I. Present Status

   A. Adaptation in life situation
      
      i. What are the major tanks in the patient’s life and how well is she functioning? Does she seem to be at or below optimum?

   B. Symptomatic behaviors e.g.
      
      From Patients’ standpoint, what is troubling her? What are her “presenting symptoms”? As viewed by concerned others, family or relatives, what deviant or disturbed behaviors does the patient show? What bothers them? From the perspective of the assessing clinician, what evidence is there of hypothyroidism? Appearance and behavior during interview.

II. The Manifest Personality

   A. Biological features e.g.
      
      Is the patient healthy, robust? What is her medical history? Physical appearance?

   B. Temperament
      
      Is the patient energetic, lethargic active? Are emotions intense, controlled, and impulsive? Are emotions appropriate to her age and life circumstances? Do negative or positive emotions dominate? Do they think negatively or they have negative cognitions towards life?

   C. Manifest personality traits.
      
      How might the patient describe himself? How might others who know her well? What kind of person she is?

   D. Interpersonal Behavior
      
      What are his primary relationships? Is she isolated, gregarious? What kind of friends does she have and how many?
III. Personality Dynamics and Structure

A. Motive and affects

What are her major conscious and unconscious motives? Where do they conflict? How are they related? What gives pleasure? What are her wishes, concealed as well as revealed?

IV. Social Determinants and Current Life Situation

A. Family

What are the relationship between patients and her spouse, children and other family members? How does the present family system work?

B. Social Ecology

In what kind of community does the patient live? Dose she identify her welfare with community goals?

V. Major Stresses and Coping Potential.

What are the major stresses in the patient’s current life? Do they consist of social problems, realistically beyond her control? Are there excessive demands in her family situation, long term, and too heavy work load? Do strains result from interpersonal marital or family relationship? To what extent can the person reduce or avoid stress through her own efforts.

VI. Life Style.

A. Daily Routine

Do they always remain busy? How many hours they sleep? Do they do physical work like exercise?

B. Dietary Habits

Do they take complete diet? How much quantity of food they have in lunch and dinner.
2. **COUNSELLING:** Cognitive and behavioural strategies were followed in counselling. Cognitive strategies involved changing subject’s thoughts or beliefs about a particular behavior. Behavioural strategies involved changing the antecedents and consequences of a behavior.

3. **BIO-FEEDBACK:** Medicare Bio-feedback System (Model No. XLII) was used to measure GSR of subjects.

4. **JACOBSON’S PROGRESSIVE MUSCLE RELAXATION (JPMR):** JPMR is a systematic technique for achieving a deep state of relaxation. This relaxation approach involves tightening and then relaxing various muscle groups throughout the body, a little bit at a time. One group of muscle is worked on and then, slowly, the next. In muscle relaxation training, the subjects are asked to tense and relax their group of muscles of figures, proceeding to arms, shoulders, forehead, eyes, cheeks, jaws, tongue, neck, chest, abdomen, thighs, heels and toes. It does work best when patient can coordinate inhale of breath with the tightening of the muscle phase and then controlled exhalation with the relaxation phase.

5. **APPROACH:** Multiple assessment approach has been used pre, mid and post intervention measures of GSR with the help of bio-feedback system.

**METHOD AND PROCEDURE**

For detailed analysis of the psychological determinants of hypothyroidism, case study was conducted on the basis of case study outlines. An interview schedule was developed on the basis of fundamental outlines to collect the information about each subject. Each subject was interviewed individually to elicit the required information. Interview schedules for family members and friends/relatives/neighbor (anyone) were also prepared to gather detailed information about subjects (Appendices-4, 5, 6). They were taken in confidence and told that the success of treatment of the patient’s problem will depend on the accuracy of the required data pointed by them during interview. Further, they were assured that the data will be used strictly for treatment and research purpose only. It was seen that patients have
positive attitude towards intervention and were more interested in sharing their problems and issues of personal life. Length and frequency of interviews were determined as per the requirements of each subject. The responses during interviews were and audio taped. Qualitative analysis of case studies was done to analyze the information regarding patient's personality structure and dynamics; functioning; weakness and strengths; the development at antecedents and possible future course of the patient’s conditions; and for further psychological intervention. Further, on the basis of fetched information the intervention programme was designed.

**INTERVENTION PROGRAMME**

Psychological intervention was given to modify the sedentary life style of subjects (hypothyroid patient) with high level of stress. Life style and stress scores of subjects in part ‘A’ of the study served as baseline measures for this part of the study. Intervention consisted of GSR measures cognitive behavioural counselling, and JPMR.

1. **BASELINE MEASURE:** The changes in skin resistance or skin potential due to sweat gland activity are variously known as Galvanic Skin Reflex (GSR) or skin resistance, which is indicative of person’s level of stress. To confirm the stress level of the subjects, the GSR activity detected for 7 consecutive days by a Bio-electrical Feedback System Model No. XLII. It displays subject’s momentary fluctuation in Galvanic Skin Reflex (GSR) i.e. higher reading in positive (+) side indicates high level of stress and higher reading in negative (-) side reveals high relaxation. These changes in the GSR served as feedback to the subject. The GSR was measured with the help of two silver electrodes provided with velcro straps. The silver electrode were placed on the volar surface of two different figures and strapped tightly. The subject was allowed to settle down and stabilize for a few minutes and was asked to remain still and avoid any physical movement as this would increase the strength of feedback signals and become source of false feedback indications.
2. **COUNSELLING:** Daily, individual counselling sessions for about 30 minutes each was run in order to provide a regular time and space for subjects to talk about their sedentary lifestyle and explore the reasons for unhealthy dietary habits, weak social support network, poor sleeping behaviour and physical activities. Regular counselling sessions provided the investigator a better opportunity of finding out the changes in lifestyle or daily routine and habits which were detrimental to health and play an important role in causing hypothyroid condition. Behavioural and Cognitive strategies were followed in counselling. Behavioural strategies involved changing the antecedents and/or consequences of a behavior. Cognitive strategies involved changing and controlling subject’s emotions, arousal, and thoughts or beliefs about a particular behavior. During the counselling sessions the researcher discussed the negative effects of sedentary life style with subjects e.g. how poor or unhealthy eating habits, sleeping problems, inactivity of muscles affect the physical and mental health of an individual and can causes severity of illness (hypothyroidism). If they adopt a healthy and active life style they may achieve a better physical and mental health.

**STEPS FOLLOWED IN COUNSELLING**

(1) In the **First step** towards to modify poor and unhealthy food intake behavior all the subjects (hypothyroid women) were made aware about a ‘balance diet’. A balanced diet includes all the food groups in the accurate quantity and proportion to achieve good health and physique; free from diseases and deficiencies. Protein, carbohydrates, fibre, vitamins, minerals and fat are the main food groups which should be included in diet every day. These different food groups contain different vitamins and minerals which are important for our body to maintain vitality, stamina and resistant power.

(2) **Second step:** they were provided to follow a healthy diet plan with whole grain products, natural meals, lots of fruits and vegetables along with an eating plan including small foods-intake
throughout the day instead of three large meals i.e. breakfast, lunch and dinner. They were made aware about the fact that by eating 5 or 6 times a day in small quantities can help balance the slow metabolic process that is a part of thyroid problem. They were guided to use salt, sugar and processed food i.e. bakery products and ready to eat food in minimum quantity. Instead of this, advised to include protein rich foods, pulses (dal) milk and milk products in daily meal; consume higher quantity of different variety of fresh fruits and vegetables per day to get fibre, vitamins, antioxidants and phytochemicals minerals. Fats and oils are another important factor in a diet, so they also take walnut, almonds, olive oil, fish, fish oil, (as per nature of their diet) flax seeds, etc for essential fatty acids. Because of hypothyroidism patients suffer with weight gain, so most of the time ‘Fat’ consider as unhealthy or bad but it is an important food group for absorption of fat soluble vitamins A, D, E and K. Therefore, it should not be avoided but should be used in moderation. A diet plan also requires consuming plenty of water which is always neglected. Approximately 60-70% of human body is made up of water and it is the most important to stay hydrated always. Dehydration leads to tiredness, bad breath, headache, fatigue. Good hydration will keep them fresh and energetic and they should drink at least two liters of water per day. There is no restriction on water intake except some medical conditions like kidney disorder, cardiac disorder, etc.

(3) **Third Step:** they were instructed to try to get a good quality sleep; as sleep affects mood, physical and mental health more than most people realise. Subjects were also asked not to use/consume sleeping pills as these act as depressant in the long run, and destruct one’s self-control over sleep and person becomes addicted. They were advised to cut in the intake coffee, tea and other soft drinks and practice deep muscle relaxation.

(4) **Fourth Step:** an ample amount of physical exercise is also emphasized by researcher to reduce lethargy or inactivity and enhance mood, muscular activity as well as mental health. Exercise causes tissues to be more sensitive to thyroid hormone and increases the amount of hormone that
is secreted from the thyroid gland. Subjects were guided that exercise is a natural mood elevator and antidepressant that is helpful in depression that often accompanies an under-active thyroid. Subjects were guided that they can carried out some activities i.e. cycling, walking, gardening, at least 20 to 30 minute daily, these regular exercise helps to reduce overweight, fatigue, depression, risk of severe hypothyroidism symptoms moreover, improves long term health and promotes better quality of life. Most of the subjects reported that they were facing problem of knee joint pain, a particular exercise training called ‘Leg Lunges’ and ‘Leg Raise’ they were trained.

Following instructions were given for ‘Leg Lunges’:

i. Stand on your foot expanding, shoulder extend, putting hands at your side. Take a deep and long breath and step backward with the right leg so that your right knee is a few inches above the floor.

ii. Ensure that your right does not extend beyond the toes of right foot. Put your hand at your sides and look straight frontal point. Exhale and return the right leg to starting position, standing feet apart and hands at side.

iii. Repeat again as many times as per your suitability. Further do the same exercise within your left leg. Do it repeatedly over and over as you can easily.

Following instructions were given for ‘Leg Raise’:

i. Lay down on your back on a carpet keeping legs straight and placing hands under your hips, to keep the pelvis properly tilted.

ii. At the time of exhale, bring your knees towards your chest and head off the floor. Don’t curl the neck and try to bring close the chin to chest. Instead, select a point on the top surface of room (i.e. ceiling).

iii. Take breath while lowering your head and straitening your legs, but do not bring your legs on the floor. It should be done repeatedly as per your convenience.
iv. If you feel any difficulty at any point, you can stop and take a rest for 1-3 minutes, then repeat again. These two exercises are beneficial for strength and firm of legs; abdominals and lower back. If you keep these suggested physical activities in practice in your daily routine as a part of your life style, no other extra physical exercise are needed.

(5) Fifth Step: subject’s negative thoughts or beliefs about herself were changed through Cognitive Restructuring Strategies. With the help of cognitive restructuring the researcher replaced the cognitive distortions with thoughts that are more accurate and useful. It involved two basic steps: (1) Identifying the thoughts or beliefs that are initiating and maintaining depression; (2) Evaluating them for their accuracy and usefulness by using logic and evidence, and then modifying or replacing the thoughts with ones that are more accurate and useful. Firstly, subjects were asked to identify depression-causing thoughts contain any negative emotion (i.e. nervous, afraid, anger, sadness, anxiety, guilt etc.) or cognitive distortions for e.g., filtering, overgeneralization, jumping to conclusions, personalization, blaming, emotional reasoning etc. and they were helped to evaluate the accuracy and usefulness of the thoughts, and modify it towards a new perspective that is more accurate and useful. Once they are done with this process of evaluating and modifying their thoughts, they were given an assignment of summarizing their new perspective and to highlight the key points they discovered as a result of the work they have done and to note the changes in their emotions.

(6) Sixth Step: They were believed that researcher was available to help them. If they face any problem, they may ask for assistance and co-operation from the researcher. For the purpose of modifying sedentary life style and to create self awareness about their daily activities, subjects were asked to maintain a routine chart/diary for self-monitoring as well as to make them self motivated and realize that they are most responsible for their active life style and health related behavior. This daily routine chart/diary was regularly monitored by the researcher. Self-monitoring was continued throughout intervention period.
(7) **Sixth Step:** Social and family support for subjects was increased. All the family members were made aware about underactive thyroid functioning affects patients not only physically but psychologically also. Due to which patients showed anxiety, depression, stress, and irritation in their behaviour; all these psychological characteristics might have adversely affected their behaviour and made them un-cooperative. It was suggested to family members, especially husband to give extra attention, love and care to their patient, to keep the friendly atmosphere of the family so that patient may express her problems, tensions and anxieties freely. It was also suggested to family members that they should listen patient’s problems carefully and try to solve their problems. Subjects and family members of the subjects were assured/ascertain the benefit and stability of gains that resulted from intervention.

3. **Jacobson's Progressive Muscle Relaxation:** After 7 days of baseline recording, the intervention was started. Biofeedback-assisted JPMR training was given to each subject individually for 40-45 minutes daily for 35 days. Progressive muscular relaxation training was carried out in a properly illuminated and peaceful room. No extra person was permitted inside the room. The subject was provided a hard bed to lie down without pillow.

**Following instructions were given:**

“Now take a comfortable position on the bed.....to lie down on the bed.....loose your body.....light.....and free. Be calm and comfortable; keep your eyes closed tightly. Avoid thoughts as best.....as you can and be calm and quite. Now make your body completely loose.....light.....and free.”

Subjects were asked to tense and relax their groups of muscles sequentially starting from the muscles of fingers proceedings to arms, shoulders, forehead, eyes, cheeks, jaws, tongue, neck, chest, abdomen, thighs, heels, and toes. As a part of intervention **Cognitive Guided Imagery** was also used in combination with JPMR, to recreate a positive experience in the mind through imagination to deal with arousal and control emotions. This procedure was also extended in subject’s daily life. The aim
was to have the subjects learn to relax quickly in everyday situation. They were advised that whenever they have stress or tension, they can control themselves by constantly relaxing the muscles not in use e.g. relaxing arms and legs while talking which Jacobson termed as Differential Relaxation. Differential relaxation means (the presence of) a minimum of tension in the muscles requisite for an act along with the relaxation of other muscles (Jacobson, 1938). Based on this principle the differential relaxation procedure was elaborated to help the subjects for adequate functioning in her daily life, being relaxed even when in full swing of activities. Subjects were also recommended to practice at least one relaxation session every day as home task. After 15 days of intervention GSR (mid/during intervention measure) was taken to see whether the subjects have learned to relax by progressive relaxation and their stress level has reduced. Biofeedback-assisted relaxation training was continued on these days of mid/during GSR measure. The intervention was continued further for another 15 days. Again at the end of the interaction GSR (post measure) was also taken for 5 consecutive days while intervention was continued. Subjects were informed about their GSR reading i.e. level of stress, which served as feedback to the subject after each measure.

FOLLOW-UP

4 weekly follow-ups, followed by 2 fortnightly, 2 monthly, and 2 quarterly follow-ups were done to ascertain the maintenance of the gains from intervention.