

# Chapter III

## METHODOLOGY

In this chapter the selection of subjects, selection of variables, selection of tests, instruments reliability, orientation to the subjects, competency of the tester, pilot study, training programme, collection of the data, tests administration, experimental design and statistical procedures used have been explained

### 3.1. SELECTION OF SUBJECTS

The purpose of the study was to find out the effect of selected yogic pre and postnatal stimulation practices on perception of speech, sound, behaviour and development among the infants. To achieve this purpose of the study, forty five healthy pregnant women with the gestation period between 32 and 42 weeks in the area of Chidambaram, Cuddalore District, Tamilnadu, India were randomly selected. The age of the mother were ranged from 20 to 35 years. They were divided in to three equal groups of fifteen women each namely pranayama practices group, auditory stimulation practices group and control group.

The pranayama practices group underwent Nadi suddhi pranayama and Nadha Anusandhana pranayama twice a day for seven days a week upto delivery. For auditory simulation practices group, the music and guided imagery relaxation have been used. The music was presented over a 12.5-cm speaker positioned 20 cm above the mother's abdomen as prenatal stimulation for two sessions per day for seven days a week upto their delivery. And Group III acted as control group in which they did not undergo any special training programme rather than their routine work.

After delivery, the infants of the selected healthy pregnant women were selected as subjects and they were assigned with the same group as their mother belongs to. All the pregnant gave a written informed consent and no compulsion was made to take part in the training programme.

### **3.2. SELECTION OF VARIABLES**

Rose describes how the human brain develops before and after birth, saying “Early brain development in the fetus and newborn is itself associated first with a massive proliferation of cells, and then by a steady drop in numbers, but the space once occupied by the lost cells is taken up by an increase in the branching and synaptic connections made by those that remain.”

The researcher reviewed the available scientific literature pertaining to the Pranayama, Music and Guided Imagery Relaxation on selected Cognitive Skills, Visual Recognition memory, Auditory Perception, Tactile Perception and Intermodal Perception variables for infants.

In the present study following variables were selected

#### **3.2.1. Independent Variables**

Studies of human infants in the prenatal period indicate that prenatal experience with the maternal voice may influence early language acquisition (Moon & Fifer, 2000) prenatal exposure to maternal speech is probably related to eventual language acquisition. De Casper et al. (1994) Thus, the fetus pays differential attention to what the mother says, and this “sensory bridge into postnatal life” (Moon & Fifer, 2000) In order to control for the effect of external factors on maternal and fetal behavior during the test sessions, the mothers listened through earphones to predetermined piano music (Winston, 1980)

The CD recording of the music presentation for 45 seconds. Thus, all fetuses received the same stimulation each time they were tested. The recording was presented to the pregnant women.

The practices are simple can perform easily by all the Pregnant women.

a. Pranayama Practices

Nadi suddhi pranayama

Nadha Anusandhana pranayama

b. Auditory Stimulation Practices

Music listening

Guided imagery relaxation

### **3.2.2. Dependent Variables**

The greatest window of opportunity to enhance your baby's intelligence is during pregnancy until the age of five (Van de Carr and Lehrer. 1997). Stimulation of the senses can cause more connections to be made and the network becomes stronger Prenatal stimulation and the 'learning' that occurs from this process can lay down the foundations for the development of your child to their optimum potential, fetus brain develops during pregnancy and infancy.

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

1. Intermodal Perception
2. Auditory Perception,
3. Visual Recognition memory,
4. Tactile Perception

The selection of independent and dependent variables were presented in Table I

**TABLE I**  
**SELECTION OF VARIABLES**

S.No	Variables
<b>Independent Variables</b>	
1.	Pranayama Practices
2.	Auditory Stimulation Practices
<b>Dependent Variables</b>	
1.	Intermodal Perception
2.	Auditory Perception
3.	Visual Recognition Memory
4.	Tactile Perception

### 3.3. SELECTION OF TESTS

The researcher had discussed with the experts, yoga professionals, educationists, psychologists, reviewed the various literatures and selected the following test items, which were standardized, ideal, apt test for the selected criterion variables. The following perception of speech, sound, behavior and developmental variables namely Intermodal Perception, Auditory Perception, Visual Recognition memory and Tactile Perception were tested by using habituation–dishabituation paradigm introduced by Fantz (1958) and it was presented in Table II.

**TABLE II**  
**TESTS SELECTION**

<b>S.No</b>	<b>Variables</b>	<b>Tests</b>	<b>Unit of Measurement</b>
1.	Intermodal Perception	Habituation–Dishabituation paradigm	Looking Time in Seconds
2.	Auditory Perception	Habituation–Dishabituation paradigm	Orienting Time in Seconds
3.	Visual Recognition Memory	Habituation–Dishabituation paradigm	Looking Times in Seconds
4.	Tactile Perception	Habituation–Dishabituation paradigm	Holding Time in Seconds

### **3.4. INSTRUMENTS RELIABILITY**

The stop watch was used as an instrument which was required to test the selected criterion variables and it was procured from the human performance laboratory of the Department of Physical Education and Sports Sciences, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu, India. All the stop watches used in this study were in good condition and purchased from reputed and reliable companies.

### **3.5. ORIENTATION TO THE SUBJECTS**

The investigator explained the purpose of the training programs to the subjects participating in the study. For the collection of data, the investigator explained the procedure of the training programme such as pranayama practices and auditory stimulation practices and also for measuring the perception of speech, sound, behavior and developmental variables to their infants namely intermodal perception, auditory perception, visual recognition memory and tactile perception respectively.

### **3.6. COMPETENCY OF THE TESTER**

The investigator was assisted with the yoga teachers. To ensure that the investigator and the yoga teachers were well versed with the techniques of conducting the test, the investigator and yoga teachers had a number of practice session to learn the correct testing procedures under the guidance of an expert after considerable practice.

### **3.7. PILOT STUDY**

A pilot study was conducted to assess the initial capacity of the subjects in order to fix the training load. For this, ten subjects were selected at random and divided into two groups of five each, in which group I underwent pranayama practices and group II underwent auditory stimulation practices under the watchful eyes of experts and the researcher. Based on the results of the pilot study, the initial load of the subjects for pranayama practices group and auditory stimulation practices group were fixed. The initial loads for all experimental groups were more or less similar.

### **3.8. TRAINING PROGRAMME**

During the training period, the pranayama practices group underwent Nadi suddhi pranayama and Nadha Anusandhana pranayama twice a day for seven days a week upto delivery. For auditory simulation practices group, the music and guided imagery relaxation have been used. The music was presented over a 12.5-cm speaker positioned 20 cm above the mother's abdomen as prenatal stimulation for two sessions per day for seven days a week upto their delivery. The subjects underwent the respective programs as per the schedules under the supervision of the investigator. All training session was conducted twice a day (morning and evening).

### **3.8.1. PRANAYAMA PRACTICES**

#### **Nadi suddhi pranayama**

- a. Sit in any comfortable posture, sit in there chair. (spine upright)
- b. Relax the whole body and close the eyes.
- c. Practice yogic breathing for some time Adopt nasiga mudra with the right hand and place the left hand on the knees in chin mudra.
- d. Close the right nostril with the thumb. Inhale and exhale through the left nostril 5 times. Be aware of each breath.
- e. After 5 breathes release the pressure of thumb on the right nostril and press the left nostril with the ring finger, blocking the flow of air.
- f. Inhale and exhale through the right nostril 5 times, keeping the respiration rate normal. Lower the hand and breathe 5 times through both nostrils together. This is one round.
- g. Practice 5 rounds or for 3 to 5 minutes, making sure that there is no sound as the air passes through the nostrils.

#### **Nadha Anusandhana Pranayama**

- a. Sit in any comfortable posture, sit in there chair. (spine upright).
- b. “Aaa” chanting
- c. Inhale slowly and completely fill lungs.
- d. Adopt Chin mudra while exhaling, chant “Aah
- e. Feel the sound resonance in the abdomen and the lower parts of body.
- f. Repeat nine times.

- g. “Ou” chanting
- h. Inhale slowly and completely fill lungs.
- i. Adopt Chinmaya mudra (tips of thumb touching the tips of the index and the middle, ring and little fingers folded to touch the palms) and while exhaling chant “OU”.
- j. Feel the sound resonance in chest and the middle part of the body.
- k. Repeat nine times.
- l. “Mmm” chanting
- m. Inhale slowly and completely fill lungs.
- n. Adopt Adi mudra (make a fist by folding thumb inside and fold the other fingers touching the palms) and while exhaling chant “mmm”.
- o. Feel the sound resonance in the head region.
- p. Repeat nine times.
- q. AUM chanting
- r. Inhale slowly and completely fill lungs.
- s. Adopt Brahma mudra (make each hand into a fist with the thumb tucked inside the fingers. Place fists on either side of the navel) and while exhaling chant: AUM”.
- t. Feel the sound resonance throughout body. Repeat nine times.

### **3.8.2. AUDITORY STIMULATION**

#### **Music and Guided Imagery Relaxation**



The Right Music Choices for Baby was With the right mix of sounds and repetition, Mother and Baby may enjoy a mix variety of music.

The guided imagery relaxation in this trial was comprised of:

(1) a standardized 10-15 minute introduction to guided imagery relaxation, provided by either the principal investigator or research assistant and an introductory guided imagery relaxation session with an audio CD scripted for the study (Guided Imagery relaxation Script, (Appendix I);

(2) Written instructions for the guided imagery relaxation intervention and;

(3) Asking women to use the technique for 15 minutes at least twice daily for their time in the study. Participants were asked to undertake their guided imagery in a quiet environment, with the study CD and headphones, while resting with their legs elevated, either lying on their side, or reclining in a chair. They could use guided imagery without the CD if they chose.

### **3.9. COLLECTION OF THE DATA**

The data were collected on Auditory Perception, Visual Recognition memory and Tactile Perception with the selected infants at the end of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> month. The data on Intermodal Perception of the selected infants was collected at the end of 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> month. The criterion variables were tested by using habituation–dishabituation paradigm introduced by Fantz (1958)..

### **3.10. TESTS ADMINISTRATION**

The administration of the tests and method of collecting data for all the criterion variables were explained here.

### **3.10.1. Intermodal perception**

#### **Stimuli**

Live models participated. A male graduate student 21 years old and a female graduate student 23 years served as models in the experiment.

#### **Procedure**

The infants were seated comfortably in an infant seat or held by their mothers or their caretakers in their lap while facing the experimental set up. The male model was made to sit in the chair facing the infant. After smiling at the infant for several seconds he began to talk softly to the infant. The time (in seconds) the infant attends to the model was recorded.

The procedure was repeated with a female model. In the third step the male model makes lip movements while the female model talks from behind the screen. Alternatively the female model makes lip movements while the male model talks from behind the screen. The dependent measure was the total amount of time the infant spends looking at the models. The presentation orders of the male and female models with and without their corresponding voice sounds were counterbalanced over the trials.

### **3.10.2. Auditory Perception**

#### **Stimuli**

- (1) A rattle,
- (2) Buzzer,
- (3) An audiocassette,
- (4) Motherese.

The stimuli were presented to the left and right ears of the infants and scored for attending time.

### **3.10.3. Visual Recognition Memory**

#### **Stimuli**

Four two dimensional visual stimuli painted on white cardboard (10x 8 inches).

- (1) Green and red circles, 15 cm. in diameter.
- (2) Two blue colored stimuli of same intensity differing in form (one cylindrical 16.7 cm in length and 7.5 cm. in breadth and another diamond shaped 13 cm in length and 10.2 cm in width).
- (3) Two checker boards, one 6 x 6 with one inch-square checks and the other 12 x 12 with half inch square checks.
- (4) Two photographs of faces of women with neutral expression.

#### **Procedure**

The procedure was kept the same for both groups of infants. All the infants were observed at their homes by means of a visual preference apparatus at a time

when they were judged to be alert and contented. The infants were held by their mothers in their laps while facing the screen at a distance of approximately 18 inches. The stimulus presentation technique was similar to that of Fagan (1971) [14] in which two identical targets are presented side by side for a familiarization period of one minute, immediately followed by two 30 seconds testing periods in which the now familiar stimulus is paired in alternate right and left positions, with the novel stimulus. The order of presentation of the stimuli was counter balanced.

### **Scoring**

Looking times on test trials were noted. On an average, infants spent five to eight seconds on familiar stimuli in test trials. Very soon they would revert their gaze to the novel stimulus and spend longer time looking at it and hence only the latter were scored. There were a total of 6 trials per task. The mean looking time of each infant for 6 trials was recorded.

#### **3.10.4. Tactile Perception**

##### **Stimuli**

- a. A small plastic ball (size 4 cm),
- b. A cylindrical plastic dowel (14 cm long and 1.5 cm wide),
- c. A soft to touch purse made of fur.

The stimuli were given to the infants to be held in their hands and scored in terms of holding times.

### **3.11. EXPERIMENTAL DESIGN AND STATISTICAL PROCEDURES**

The purpose of the study was to find out the effect of selected yogic pre and postnatal stimulation practices on perception of speech, sound, behaviour and development among the infants. To achieve this purpose of the study, forty five healthy pregnant women with the gestation period between 32 and 42 weeks in the area of Chidambaram, Cuddalore District, Tamilnadu, India were randomly selected. The age of the mother were ranged from 20 to 35 years. They were divided in to three equal groups of fifteen women each namely pranayama practices group, auditory stimulation practices group and control group. The pranayama practices group and auditory stimulation practices group underwent their respective training programme for two sessions per day for seven days a week upto their delivery. And Group III acted as control group in which they did not undergo any special training programme rather than their routine work.

After delivery, the infants of the selected healthy pregnant women were selected as subjects and they were assigned with the same group as their mother belongs to. The data were collected on Auditory Perception, Visual Recognition memory and Tactile Perception with the selected infants at the end of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> month. The data on Intermodal Perception of the selected infants was collected at the end of 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> month.

The data collected from the three groups at the end of 4<sup>th</sup> month and at the end of 6<sup>th</sup> month on Auditory Perception, Visual Recognition memory, Tactile Perception and at the end of 10<sup>th</sup> month and at the end of 12<sup>th</sup> month on Intermodal Perception were statistically examined for significant effect of the training programme, if any, applying the analysis of covariance (ANCOVA). Since three groups were involved whenever the obtained “F” ratio was found to be significant for

adjusted post mean, the Scheffe's test followed as a post hoc test to determine which of the paired means difference was significant. In all the cases, .05 level of confidence was fixed to test the level of significance which was considered as an appropriate.

Further, the collected data on auditory perception, visual recognition memory and tactile perception with the selected infants at the end of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> month and the data on intermodal perception at the end of 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> month were subjected into a statistical treatment by using 3 x 3 factorial ANOVA with last factor repeated measures to find out the significant differences between rows (groups) and columns (periods). According to Jerry R. Thomas and Jack K. Nelson, whenever the main purpose is usually lies in the interaction, it is sufficient to discuss the interaction effect only, unless some special circumstances exists, interest in testing the main effects is usually limited. Hence, whenever, the obtained "F" ratio for interaction effect was found to be significant, the simple effect test was used as a follow up test. Since, three groups and three different stages of testing periods were compared, whenever the obtained "F" ratio value in the simple effect was significant the Scheffe'S test was applied as post hoc test to determine the paired mean differences, if any. In all the cases, .05 level of confidence was used to test the level of significance.