Chapter III

PROCEDURE

In this chapter, the procedure adopted for the selection of subjects, selection of variables, criterion measures, collection of data, experimental design, administration of tests, statistical techniques for analysing the data and training programme are described.

Selection of Subjects

Sixty subjects from Government Lady Noyce Secondary School for Deaf, Ferozshah Kotla, New Delhi were selected for the experiment of this study, with the permission from the Director of Social Welfare, Social Welfare Department, Delhi Administration.

The requirements of the project was explained to ensure maximum cooperation from the physical education teacher, staff and subjects and convinced them so that there was no ambiguity among the authority regarding their maximum possible cooperation in the implementation of physical education programme and to get positive response from the subjects for the successful competition of the investigation.

A thorough orientation of the requirement of experimental procedure, testing, as well as training schedule were explained to them through the help of class teacher. The class teacher asked the subjects to cooperate in the project and to work hard
to their utmost limit of capacity.

According to the enrolment records the average age of the subject was 12½ years ranging between eleven to fourteen years of age.

The subjects were randomly selected and randomly divided into two different groups viz., control group and experimental group. Each group consisted of thirty subjects. The control group was left free. The experimental group was given the physical education programme for eight weeks. The programme was the combination of gymnastics, athletics and yoga.

Measurements of experimental variables were taken at the beginning and after the experimental period of eight weeks. This period commenced from 15th December, 1992 to 4th March, 1993.

**Selection of Variables**

In order to assess the motor behaviour two variables were selected:

1) Kinesthetic Perception
   
   a) Distance Perception Test
   b) Bass Kinesthetic Test
   c) Kinesthetic Obstacle Test

2) Accuracy
   
   a) Overhead Throw for Accuracy
In order to assess Selected Co-ordinative Abilities, three variables were selected:

1) Balance
   a) Bass Stick (Crosswise)
   b) Modified Bass Test for Dynamic Balance

2) Rhythm
   a) Rhythm Run Dance Test

3) Reaction
   a) Nelson Speed of Movement Test

**Reliability of Data**

The reliability of data was ensured by establishing the tester competency and reliability of test and subjects.

**Tester Competency and Reliability of Tests**

The tester's competency was evaluated together with the reliability of the tests. To determine the reliability of tests, the performance of ten subjects selected at random on the selected variables were recorded twice under identical conditions by the scholar.

A Pearson's Product Moment Correlation was computed between the two measures of each variable and reliability of co-efficient ascertained have been shown in Table 1.
## TABLE 1

**RELIABILITY CO-EFFICIENT OF TEST - RETEST SCORES**

<table>
<thead>
<tr>
<th>Components</th>
<th>Co-efficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Perception</td>
<td>.87</td>
</tr>
<tr>
<td>Bass Kinesthetic</td>
<td>.82</td>
</tr>
<tr>
<td>Kinesthetic Obstacle</td>
<td>.89</td>
</tr>
<tr>
<td>Overhead Throw for Accuracy</td>
<td>.80</td>
</tr>
<tr>
<td>Bass Stick (Crosswise)</td>
<td>.90</td>
</tr>
<tr>
<td>Modified Test for Dynamic Balance</td>
<td>.84</td>
</tr>
<tr>
<td>Rhythm Run Dance Test</td>
<td>.86</td>
</tr>
<tr>
<td>Speed of Movement</td>
<td>.82</td>
</tr>
</tbody>
</table>

From the test - retest co-efficient of correlation (Table 1) it was obvious that the tester's reliability was significantly high in establishing the competency of the scholar to administer the tests.

The co-efficient correlation also indicated the reliability of the tests selected, as a very high correlation were obtained when tests were repeated.

**Subjects Reliability**

The above test - retest co-efficient of correlation also established that the reliability of subjects was significant at .01 level of
confidence, as the same subjects were used under similar condition by the same tester and no motivational techniques were used during testing and training.

**Criterion Measures**

1. For the distance perception test, each jump, the distance to the nearest ¼ inch from the target line to the farthest heel was measured and recorded. The score was total of ten jumps.

2. In case of bass kinesthetic stick test, the score was recorded to the nearest ¼ second, the score constituted of total time taken for the ten trials.

3. In case of kinesthetic obstacle test, which was to measure the ability to predict the position during movement without the use of eyes, the performer would score ten points for each station she successfully cleared without touching. There were ten stations for the maximum of 100 points.

4. The score for accuracy test was calculated on the basis of ball hit on the marked zone. Each subject had ten chances. The maximum point that she could score was 30 and minimum of zero.

5. To measure the static balance, bass stick (crosswise) was conducted. It was to measure the ability to maintain on a small narrow surface on the ball of the foot for maximum of
sixty seconds. Six trials were given, three times on the right leg and three times on the left leg. The score was the sum of times for all six trials.

6. In case of dynamic balance test, it was calculated on the basis of taking correct leaps and balancing for required amount of time. The maximum point that one could score was 100 and minimum 0.

7. In case of rhythm run dance test, it was calculated on the basis of subject’s coordination and control in running a given distance at one level. The maximum point which could be scored was 100 and minimum 0.

8. The distance score obtained by using Nelson Speed of Movement of the hands test, was converted into time scores using the following formula, measured the speed of movement.

\[
\text{Time} = \frac{2 \times \text{Distance Stick Falls}}{\text{Acceleration due to gravity}}
\]

Collection of Data

The required data was collected by administrating the test in the sports room.

Before administration of tests, all the subjects were briefed on the objectives and the requirements of the variables that were to be tested. All the subjects were given enough time and practice to get well conversant with desired test. The procedure was
explained to each subject prior to the administration of pre and post test.

**Experimental Design**

A random group design was adopted in this study. Equal number of subjects were assigned randomly to two groups of thirty subjects each. One group served as control group and other as experimental group. The control group was called as (C) and experimental group as (E). The control group was left free and were asked to participate in their own activity. And experimental group E was given physical education programme for a period of eight weeks. Each session lasted for 45.

**Procedure for Administration of Tests**

The detailed procedure followed for the administration of test is given below:

**Motor Behaviour**

1. **Kinesthetic Perception**:

   a) Distance Perception Test.

      **Objective**: To measure the ability, to perceive a distance by concentrating on the effort involved in a jump.

      **Equipment**: Yardsticks or tape measure, blindfold and chalk.
Description : The performer was instructed to sense the distance between the two lines without a practice trial. The blindfold was then put on the subject and was asked to jump from behind the starting line trying to land as close to the target line as possible. She was allowed to see where she landed on each trial.

Ten trials were given.

Scoring : For each jump, the distance to the nearest ½ inch from the target line to the farthest heel was measured and recorded. The score was the total of ten jumps.

b) Bass Kinesthetic Stick Test.

Objective : To measure kinesthetic ability to maintain a balance on a small narrow surface.

Equipment and Material : Stop watches, several sticks cut into 1 x 3 x 3 inches, tape and blindfold.

Description : The subject was instructed to place her dominant foot lengthwise on a balance stick and to raise her opposite foot from the floor to see how long she could maintain her balance. Each subject was given one preliminary trial and then blindfolded for the test.

The subject was timed from the moment she raised her opposite foot from the floor until her balance was lost.

Ten trials were given.
Scoring: The score was recorded to the nearest ½ second for each trial. The final score was total time taken for ten trials.

c) Kinesthetic Obstacle Test:

Objective: To measure the ability to predict position during movement without the use of eyes.

Equipment and Material: Twelve chairs, material for blindfold, chalk markers, tape markers and tape measure.

Description: Twelve chairs were arranged as shown in Figure 2. One practice trial to walk through the chairs without a blindfold and one walk blindfolded was given.

Scoring: The performer scored ten points for each station, she successfully cleared without touching. There were ten stations for the maximum score of 100 points.

Penalty: There was 10 point penalty for touching any part of the body against any part of the chair. When such penalty occurred the performer was directed to the centre line and one step ahead of the station where the penalty occurred. There was a 5 point penalty for each occurrence of getting out of the line or patterns of chairs. Upon such occurrences the performer was directed back into the centre of pattern at the nearest point from which she went astray.
Fig. 2: KINESTHETIC OBSTACLE TEST
2) Accuracy:

a) Overhand Throw for Accuracy.

**Objective**: To measure the general ability of the subjects' accuracy to throw a ball at the target.

**Equipment**: Smooth wall on which target could be placed, or target marked on the wall, softballs, measuring tape and chalk.

**Description**: The target consists of three concentric circles, marked by one inch wide. The centre circle was two feet in diameter, middle circle four feet in diameter, and the outer circle six feet in diameter. The bottom of the outer circle was three feet above the floor. The throw was made from behind a line parallel to and forty feet from the target. (Figure 3)

After one or two practice throws, the player threw ten times. Both the feet were behind the line at the time of throw, but the player could make one or two steps before making the throw.

Ten trials were given.

**Scoring**: Ball hitting the centre circle counted three points, middle circle two points and the outer circle one point. The score was the sum of ten throws. The maximum score, which could be scored was thirty points. Ball hitting a line are given the higher point value.
Fig. 3: OVERHAND THROW FOR ACCURACY
Coordinative Abilities

1) Balance:
   a) Bass Stick (Crosswise).

   **Objective**: To measure the static balance of the performer while supported on a narrow surface on the ball of the foot.

   **Equipment and Material**: Several sticks cut into 1 x 1 x 12 inches, stop watch and adhesive tape.

   **Description**: Stick was tapped to the floor with the help of adhesive tape.

   Subjects were asked to place the ball of the foot crosswise on the stick and upon a given signal would lift the opposite foot from the floor holding the balance as long as possible for the maximum of 60 seconds.

   Total of six trials were given. Three times on the right leg, and three times on the left leg.

   **Scoring**: The score for the test was the sum of times for all six trials.

b) Modified Bass Test for Dynamic Balance.

   **Objective**: To measure the ability, to jump accurately and maintain balance during movement and after movement.
Equipment and Material: Stop watch, 3/4 inch marking tape to tape them in proper pattern to the floor as shown in Figure 4.

Description: Standing on the right foot on starting mark the performer leaped to the first tape mark with left foot and tried to hold steady position on the ball of her left foot for as many seconds as possible for five seconds. She then leaped to the second tape mark with the right foot. She would remain on each tape mark for as many seconds as possible upto a maximum of five seconds.

Scoring: The score for each mark successfully landed was five points and in addition one point was awarded for each second, the balance was held upto five seconds per mark. Thus, a performer would earn maximum of ten points per mark or a total of 100 points for test.

2) Rhythm:

a) Rhythm Run Dance Test.

Objective: To measure the performer's co-ordination and control in running a given distance at one level.

Equipment and Material: One roll of crepe paper (2 inches wide) marking tape and two poles.

The crepe paper was tied between the two poles or standards which was 40 ft. apart. The marking tape was used to
Fig. 4 : Floor Pattern for Modified Bas Dynamic Test
mark off every ten ft. on the floor under the crepe paper.

**Description**: The crepe paper was stretched so that it was at eye level at the centre between the two poles. The performer started at one standard (pole) and performed a low run under the length of the crepe paper.

**Scoring**: There were 100 points possible on the test. A loss of points occurs as follows:

a) For each 10 ft. zone that the performer tilts her head forward while running, there was ten point penalty.

b) There was 10 point penalty for stepping rather than running for each 10 ft. dimension.

c) There was a five point penalty for each time the performer touched her head to the crepe paper.

3) **Reaction**:

a) Nelson Speed of Movement Test.

**Objective**: To measure the combined reaction and speed of movements of hands.

**Equipment and Material**: Nelson Reaction Timer, table and chair, chalk or tape and ruler.

**Description**: The subjects sits at the table with her hands resting on the edge of the table. The palm facing each other with the inside border of little fingers along the lines which
were marked on the edge of the table 12 inches apart. The tester then held the scale near its top so that it hanged midway between subject's palm. The base line was positioned in such a way that it leveled with upper border of subjects hands.

After the preparatory command "ready" the scale was released and the subject attempted to stop it as quickly as possible by clapping hands together. She was asked to concentrate on the black shaded line about 5 cms. above the base line. After a few preparatory trials, twenty trials were given.

**Scoring**: The score for the test was read from the scale at a point just above the upper edge of hands after the catch. The average of the middle ten trials after the slowest and the fastest five trials had been discarded was recorded.

**Statistical Analysis**

The pre and post test scores in each variable, that is kinesthetic perception, accuracy, balance, rhythm and reaction were compared for the control group and the experimental group separately using the mean difference method (t-test correlated data). Comparison of the two groups on pre and post tests mean differences was made using the mean difference method (t-test uncorrelated data). The level of significance was set .05 level of confidence.
Administration of Physical Education Programme

Before the commencement of the programme, subjects were assembled and they were explained the techniques of performing different physical education activities with the help of demonstrated method. With the help of the physical education teachers and a subject teacher they were explained the significance of the technique and the reasons for doing activities properly with understanding of the expected benefits to them when done in a prescribed manner.

The experimental group daily reported at 8.15 am. each day in the field. They were given the demonstration of the activity for that day. Then they were made to practice the programme of physical education as stipulated for the week. Necessary correction and detection were made to ensure proper benefits of the programme in the subjects.

The physical education programme which was designed with the help of experts in physical education, was given in a progressive manner to the students for six days in a week for a period of 45 minutes daily. The programme consisted of gymnastics, athletics, and yoga. The programme was as follows:

Gymnastics

Gymnastics programme consisted of different free hand and tumbling exercises. The programme was designed from simple to complex.
First Week:

Students had two periods of gymnastics of 45 minutes duration on Monday and on Thursday. During the first week, students were given general awareness as to what was gymnastics.

Free hand exercises and all stretching exercises, like neck rotation, hand rotation, forward and backward bending, 't' balance, pick-up jumps, split jumps, leap jumps, scissors, 360° turn etc. were given to them.

Second Week:

All the free hand exercises plus rocking roll, forward roll and lying roll (legs together) were taught to them.

Third Week:

Repetition of previous exercises and inclusion of backward roll.

Fourth Week:

Repetition of all the previously learnt skills and inclusion of roll with jump.

Fifth Week:

Repetition of all the previously learnt skills and inclusion of side roll (standing position).

Sixth Week:

Repetition of all previously learnt skills and inclusion of scales (side and front).
Seventh Week:

Repetition of all the learnt skills and inclusion of back roll split (with legs straight and standing position).

Eighth Week:

Repetition of previously learnt skills plus hand stand with support.

45 minutes was split into:

- 10 minutes of warm-up.
- 15 minutes of old skill perfection.
- 20 minutes for new skill.

Athletics

Two periods were allotted for athletics i.e. on Tuesday and Friday for 45 minutes. During these eight weeks, they were taught broad jump, shot-put, high jump, and sprints. Two weeks were devoted to each event.

First Week (Tuesday).

Broad Jump.

1. Started practicing with jogging 50 yards, running 50 yards twice, developmental exercises like upward spring from the body bend position and high kicking both forward and backward.

2. Ran through the approach six to seven times.

3. Took 4 to 5 trials of standing broad jump chiefly
for emphasizing the arm swing and leg drive.

4. Ran through 30 yards and executed broad jump stressing height, not distance.

(Friday)

2. Strengthening exercises.
3. Took four or five trials using short approach applying vigorous foot stamp emphasizing height and learning form.
4. Finished work with 250 yards jog.

Second Week (Tuesday).

1. Warm-up.
2. Strengthening exercises.
3. 30 seconds of inverted running.
4. Took three or four trials to adjust checkmarks.
5. Checkmarks were correct, took six jumps with run emphasizing the approach.
6. Completed the workout with 2 dashes of 150 yards each.

(Friday).

1. Warm-up with vigorous exercises.
2. Three trials on approach.
3. Ran through the approach for checkmarks adjustments.

Took one jump at the conclusion of the last run.
4. Set target and jumped.
5. Finished off by 200 yards jog and limbering down.

Third Week (Tuesday).

Shot-put:

1. Warm-up.
2. 10 to 15 minutes of resistance exercises.
3. Masters of technique of holding the shot.
4. Held the shot in palm at the initial stages and from standing position, put the shot for 12 to 15 times obtaining limited force from leg, shoulder, arm and wrist.
5. Held the shot high in the air with arm fully extended, grasped firmly the forearm with opposite arm. And snapped the wrist while holding the forearm rigid.
6. Ended the day with 100 yards jog.

(Friday).

1. Warm-up.
2. Rope Skipping.
3. Exercises like handstand.
4. Set the stop board, assumes standing position with left foot against it and right leg in the centre of the circle using moderate knee-bend, put the shot eight to ten times.
5. Putting of the shot with moderate effort.
6. Concluded with limbering down.
Fourth Week (Tuesday).

1. Practiced with a jog 150 yards, walk of 50 yards, sprint 25 yards.
2. Resistance exercises for 10 to 15 minutes.
3. Grasped shot so that its weight rested partially on fingers and put the shot 10 to 12 times.
4. Assumed the initial position at the back of the circle.
5. Concluded with limbering down.

(Friday).

1. Began the day's practice by jogging 200 yards.
2. 10 minutes of stretching exercises like high kicking and trunk bending.
3. Prepared the fingers, wrists, arms, and trunk for moderate shot-putting trials.
4. Placed the shot further up towards fingertips, and then put the shot 10 to 12 times.
5. Terminated the day's work with jog of 100 yards and limbering down exercises.

Fifth Week (Tuesday).

High Jump:

1. Started by jogging 150 yards.
2. Executed five minutes of exercises including half squat, forward leg swings and high kick.
3. Ran 50 yards at 3/4 effort.
4. Brushed the approach so that spikes marks were visible and jumped five to six times.
5. Analyzed the approach for direction, number of strides, placement of check marks and length of each stride.
6. Finished off days work with 200 yards jog and limbering down exercises.

(Friday).

1. Jogged 100 yards followed by 50 yards of hopping and bounding with alternate effort from the right foot to the left.
2. Sprinted 25 yards, rest for two to three minutes and repeated once.
4. Sat on the ground with legs extended forward, feet together, execute forward and backward body bends for one or two minutes.

4. Brushed the runway, bar was set at a sufficient height and jumped five to six times.
5. Took three or four trials of sprinting vigorously.
6. Completion of workout with 100 yards running.

Sixth Week (Tuesday).

1. Began with jog of 200 yards, walk of 25 yards and run of 25 yards.
2. Skipped rope for two or three minutes.
3. Executed gymnastic stunts like chinning, walking, tumbling.
4. Set the crossbar at a height slightly below, jumped four to five times concentrating on technique.
5. Terminated the day's activity by limbering down exercises.

(Friday).

1. Initiated the workout with a jog of 150 yards and sprint of 50 yards.
2. Executed seven or eight trials of standing broad jump to develop sprint action.
3. Crossed the bar lying emphasis on technique.
4. Performed five minutes of hopping and bounding exercises of the left leg and then the right.
5. Finished off the practice by a jog of 150 yards.

Seventh Week (Tuesday and Friday).

Sprints:
1. Started the workout by jogging 50 yards.
2. Execution of five to six times of exercises designed to strengthen the arm and shoulder girdle such as pull-ups, and push-ups.
3. Four to five minutes on stretching exercises such as forward trunk bending, touching the ground with fingers while keeping the knees straight, vigorous leg swinging backward and forward, high kicking, alternately pulling the left and then the
right bent knee against the chest.

4. Took the position of bunch start, on the command 'go' took off 15 to 20 yards.

5. Passed the batton 3 to 4 times.

6. Finished the practice with 150 yards jog and limbering down exercises.

Eighth Week (Tuesday and Friday).

1. Warmed-up

2. Practiced inverted running for 20 seconds, rest for 2 to 3 minutes and repeated twice.

3. Took position, and paid emphasis on body relaxation, body weight distribution, position of hands on the starting line, spread of arms, relation of right hip to the right knee, the height at which hips were elevated.

4. Took three or four starts.

5. Ended practice with jogging and limbering down exercises.

Yoga

In a week (Wednesday and Saturday) two periods were devoted for practice of yoga asanas. The asanas which were learnt during the eighth week of physical education programme are given below:
First Week:
1. Normal breathing
2. Tadasana (the heevenly strech pose)
3. Ulthanasana (the squat raise pose)
4. Trikhonasana (the triangle stretch pose)
5. Garudasana (the eagle pose)
6. Shavasana (the crospe pose).

Second Week:
1. Revision of all the previously learnt asanas and its variations.

Third Week:
1. Revision of entire asanas
2. Padmasana (the lotus pose)
3. Vajrasana (the thunderbolt pose)
4. Gomukhasana (the cow face pose)
5. Paschimothanasana (the back stretching pose)
6. Shashankasana (the pose of moon)

Fourth Week:
Revision of all the previously learnt asanas paying special emphasis on newly learnt asanas of third week and its variations.

Fifth Week:
1. Revision
2. Shalabhasana (the locust pose)
3. Halasana (the plough pose)
4. Bhujangasana (the cobra pose)
5. Naukasana (the boat pose)
6. Matsyasana (the fish pose)

**Sixth Week:**

Revision of asanas, and the variations of the asanas learned on the fifth week.

**Seventh Week:**

1. Revision.
2. Ustrasana (the camel pose)
3. Sumeruasana (the sumit pose)
4. Dhanurasana (the bow pose)
5. Chakrasana (the wheel pose)
6. Marichyasana (Marichi son of Brahma)

**Eighth Week:**

Revision of selected asanas paying more emphasis on the newly learnt asanas of seventh week and practising its various variations.