CHAPTER : III

PROCEDURE
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The present study is an attempt to find out the status of health related physical fitness, measured through cardio-vascular endurance, agility, flexibility, skinfold thickness, physical fitness index and psycho-social aspects measurement through personality, intelligence and social maturity among hearing impaired, visually impaired and normal boys.

The procedure adopted for selection of study area, selection of subjects, selection of criteria, variables, collection of data, reliability of data, administration of tests and the statistical procedure have been presented in this chapter.

3.1 Study Area:

In order to collect valid and reliable data of hearing impaired, visually impaired and normal boys in West Bengal, the researcher identified five districts representing the Kolkata, North 24 parganas, Malda, Coochbehar and Alipurduar, where schools for such boys are available.

3.2 Selection of Subjects:

Two hundred hearing impaired, two hundred visually impaired and two hundred normal school boys from various institution in West Bengal were randomly selected as subjects of the study. The age of the subjects were ranging between ten to twelve years. Followings are the distribution of the subjects:
Table 3.1: Area wise distribution of the subjects

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of District</th>
<th>Name of School</th>
<th>Category</th>
<th>No.s of subjects available</th>
<th>No.s of subjects participated in the study as voluntarily</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Alipuduar</td>
<td>Sukanta Nazarul Deaf Residential School</td>
<td>HI</td>
<td>39</td>
<td>26</td>
</tr>
<tr>
<td>2.</td>
<td>Alipuduar</td>
<td>Subodh Sen Smriti Drishtiheen Vidyalaya</td>
<td>VI</td>
<td>20</td>
<td>17</td>
</tr>
<tr>
<td>3.</td>
<td>Alipuduar</td>
<td>Rabikanta Higher Secondary School</td>
<td>Normal</td>
<td>140</td>
<td>91</td>
</tr>
<tr>
<td>4.</td>
<td>Coochbehar</td>
<td>Jnandwip Handicapped School &amp; Training Centre</td>
<td>HI</td>
<td>48</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VI</td>
<td>56</td>
<td>55</td>
</tr>
<tr>
<td>5.</td>
<td>Coochbehar</td>
<td>Akrahant Dishari Handicapped School</td>
<td>HI</td>
<td>49</td>
<td>44</td>
</tr>
<tr>
<td>6.</td>
<td>Malda</td>
<td>Pipla Residential Deaf &amp; Dumb School</td>
<td>HI</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>7.</td>
<td>Malda</td>
<td>Subodh Kumar Misra Memorial Residential Blind School</td>
<td>VI</td>
<td>41</td>
<td>39</td>
</tr>
<tr>
<td>8.</td>
<td>Malda</td>
<td>R.P.Roy Memorial Blind School</td>
<td>VI</td>
<td>46</td>
<td>45</td>
</tr>
<tr>
<td>9.</td>
<td>Kolkata</td>
<td>Light House for the Blind</td>
<td>VI</td>
<td>45</td>
<td>44</td>
</tr>
<tr>
<td>10.</td>
<td>Kolkata</td>
<td>Calcutta Deaf &amp; Dumb School</td>
<td>HI</td>
<td>84</td>
<td>74</td>
</tr>
<tr>
<td>11.</td>
<td>North 24 parganas</td>
<td>Sukantanagar Vidyapeeth</td>
<td>Normal</td>
<td>160</td>
<td>109</td>
</tr>
</tbody>
</table>
3.3 Selection of criteria:

a) Physical fitness, b) physical efficiency and c) psycho-social aspects were criteria of this study.

a) Physical fitness was assessed by:

The AAHPER(1980) health related physical fitness test, these were:

i) Endurance - One mile run-walk test

ii) Muscular strength and endurance- Sit-ups test

iii) Flexibility - Sit and reach test

iv) Body composition -Sum of triceps skin fold and Subscapular skin fold measurement.

b) Physical Efficiency Index (PEI) - The modified Harvard step test.

c) Psycho-social status was assessed through:

i) Personality - Children’s Personality Questionnaire (CPQ) adopted by RB Porter, RB Cattell and IPAT Staff.

ii) Intelligence – The Culture Fair Intelligence Tests was made by Cattell and Cattell and the test is adopted by Kapoor, Rao and singh.

iii) Social Maturity – Rao’s Social Maturity Scale in adopted by Nalini Rao.

3.4 Collection of Data:

In order to substantiate the researcher data collected from the stakeholders of the hearing impaired, visually impaired and normal boys from various special schools and general schools in west Bengal.

In this study, the investigator was in used the test method to collect the relevant data regarding the health related physical fitness and the modified Harvard step test.
3.5 Reliability of Data:

The reliability of data was established by ensuring instrument's reliability and the tester's competency.

3.5.1 Instruments Reliability :

Standard equipment were used for this study. Instruments were manufactured and supplied by recognized firms and the calibrations of the instruments were considered to be accurate and reliable for the purpose of this study.

3.5.2 Tester Competency:

All the tests and questionnaire were taken by the research scholar and other expert colleagues of the researcher who were well acquainted with tests and the testing procedures and also well acquainted with hearing impaired and visually impaired children. Tester competency was also evaluated together by reliability of tests.

Tester’s competency was established by test re-test method. In a pilot study tests were conducted by the researchers himself once and same tests by an expert. Two sets of data were found highly correlated and thereby tester’s competency was established.

3.6 Administration of Tests:

The subjects for the present study were selected from the Special schools and general school in West Bengal. The authorities of the concerned institutions were approached and the objectivity and utility of the study were explained to them. With their permission and kind co-operation of the Physical Education Teachers, Assistant Teachers and office administration the test, were conducted on selected samples.

3.6.1 For Physical Fitness following tests were conducted:

(i) One mile run-walk(Endurance):

Objective: To measure the cardiovascular endurance.

Equipment: Athletic Field/ground, stopwatches, paper, pencil, etc.

Description: The tester gives the signal 'On your marks' and all the subjects stand with one foot behind the starting line. When ready, the tester gives the command 'Go' and subjects start running the One mile run-walk distance. Subjects are asked to keep a steady speed and finish the run-walk as fast as possible(Photograph 3.1).
Scoring:

The time taken to complete the distance of One mile run-walk record in minutes and seconds (later converted to seconds for analysis purpose) was the score of the subjects.

(ii) Sit-Ups(Muscular strength and endurance):

**Objective:** To measure the strength and endurance of the abdominal muscles.

**Equipment:** Clean floor mat, stop watches, paper, pencil, etc.

**Description:**

The subject was instructed to lie on the back with the position knees flexed, feet on the floor and heels not more than twelve inches away from the buttocks. The angle at the knee less than 90 degree. Then he was asked to put his hands on the back of his neck clasping fingers and placing his elbows squarely on the mat. A partner was asked to hold his feet to keep them in touch with the floor surface. Then by tightening his abdominal muscles and bringing his head and elbows forward he curled up and touched the knees with elbows. After touching the knees he returned back to starting position and repeated the same (Photograph 3.2).

**Photograph 3.1: One mile run-walk test**
Photograph 3.2: Sit-Ups test

Scoring:

The total number of correctly performed sit ups in 60 seconds was recorded as the score of the subjects.

(iii) Sit and Reach (Flexibility):

Objective: To measure the flexibility of the hip and back as well as the extension of the hamstring muscles.

Equipment: Flexomeasure case, centimetre stick, paper, pencil, etc.

Description: The 30 centimetre mark of the centimetre stick was lined up with a line on the floor and the stick was taped ro the floor. The subject was directed to sit down and to line up his heels with the near edge of the 30 centimetre mark and to slide his seat back beyond the zero end of the centimetre stick. With the subject's heel not more than 12 centimetre apart, he was asked to stretch forward slowly with knee locked and touch the finger tips of both hands as many centimetres down the stick as possible(Photograph 3.3).

Scoring: The best of three trials measured to the nearest centimetre was the test score.

(iv) Skinfolds (Sum of Triceps and Subscapular skinfold ):

Objective: To assess the fat component at specified sites, on the body.
**Equipment:** Skinfold caliper, recording materials, paper, pencil, etc.

**Description:** The skinfold of the following sites were measured:

(i) Triceps skinfold

(iii) Subscapular skinfold

Photograph 3.3: Sit and Reach Test

Photograph 3.4: Triceps Skinfold measurement
The dominant side of the body was used to determine the percentage of fat. The thickness of the skin fat was grasped between the thumb and index finger and measurement was taken to the nearest half millimetre and recorded.

(i) Triceps Skinfold:

The skinfold thickness was taken over the triceps muscle at a point half away between the tip of the shoulder (acromial process) and the tip of the elbow (olceranon process). The point was located with forearm flexed to 90 degree. While taking the measurement the arm was kept hanging free. The fold was lifted parallel to the long axis of the arm.(Photograph 3.4).

(ii) Subscapular skinfold:

The skinfold thickness was taken at the tip the inferior angle of the scapula with the subject in a relaxed standing position. The fold was lifted in the diagonal plane at about 45 degree from vertical and horizontal planes.(Photograph 3.5).

Scoring: Sum of Triceps skinfold and Subscapular skinfold measurements recorded in millimetres. Percentage of body fat was calculated as per Lohman(1982) equation.

(v) The Modified Harvard Step test(Physical Efficiency Index):

Objective: To measure the cardio vascular endurance.

Equipment: Stop watch,14 inches high bench, stethoscope, paper, pencil, etc..

Description:

Modified Harvard Step test shows the capacity of the heart and lungs to work during exercise. The test is stepping up and down on 14 inches high platform for a period of three minutes for the subjects. The subject steps up and down 30 times a minute on a bench of 14 inches high. The researcher was maintained time with sound up-up down-down. Each time the subject should step all the way on the bench with the body erect.
Photograph 3.5: Subscapular skinfold measurement

Photograph 3.6: Modified Harvard Step test

The stepping process was performed in four counts, as follows: (i) up - right foot was placed on the bench; (ii) up - left foot was placed on the bench; (iii) down - right foot was placed on the floor and (iv) down - left foot was placed on the floor. The same foot must start the step-up each time. A stopwatch was used to record the
minutes and seconds that the subject was able to perform the step test. Exactly one minute after the exercise, researcher started counting the pulse rate by stethoscope and records the same. Three time pulse rate counts after exercise (Photograph 3.6).

**Scoring:** Physical efficiency Index was measured by pulse rate recovery. Pulse rates was counted for 30 seconds duration each after one minute of completion of the stepping. Pulse rate was counted for 1 to 1½, 2 to 2½ and 3 to 3½ minutes of recovery. Fitness Index was calculated by the following formula:

\[
\text{Physical Efficiency Index (PEI)} = \frac{\text{Duration of exercise period in seconds} \times 100}{2 \times \text{sum of three pulse counts after exercise}}
\]

3.6.2 For psycho-social aspects questionnaires were administered individually by the research scholar to all subjects. The forms were distributed and the subjects were requested to follow the printed instructions. After clearing their doubts, if any, they were asked to 'start' responding. The subjects were asked to verify whether they answered all items. The subjects answered the questionnaire separately and without the help of other. At the same time researcher assured the responders that the information given by them would be kept confidential. This was checked while collecting back response sheets.

The questionnaire method was employed to collect the relevant data regarding the Personality, Intelligence and Social Maturity.

On the basis of the evaluation guideline the necessary translation from English to Bengali and English to Brail system were made in the construction of the questionnaire and were finally formulated after the approval by the subject experts and supervisor.

(i) **Personality:**

The Children’s Personality questionnaire under the study was adopted by R.B. Porter, R.B. Cattell and IPAT Staff. Personality questionnaire consists of two parts i.e. A1 and A2, each part 70 statements and each statement two responses. The subjects were answered the questionnaire in separate answer sheet (Photograph 3.7).
Scoring: Scores awarded to responses as per keyed in scoring stencil. For scoring the stencil was perfectly placed on answer sheet and 1 score was recorded to response circle that concides with stencil's circle.

(ii) Intelligence:

The Culture Fair Intelligence Tests under the study was made by Cattell and Cattell and the test in adopted by Kapoor, Rao and singh. The test consists of four parts i.e. Test-I, Test-II, Test-III, and Test-IV. The number of questions were 12, 14, 12 and 8 respectively and each question five responses. The subjects were answered the question in separate answer sheet (Photograph 3.8).

Scoring: Scores awarded to responses as per keyed in scoring stencil. For scoring the stencil was perfectly placed on answer sheet and 1 score was recorded to response circle that concides with stencil's circle.

Photograph 3.7: Personality
(iii) Social Maturity:

The RAO’s Social Maturity Scale under the study was adopted by Nalini Rao. The test consists of three parts i.e. Personal Adequacy, Inter-personal Adequacy and Social Adequacy. Total number of statements were 90 and statements into two parts i.e. positive items and negative items. There were four responses against each statement i.e. Strongly Agree, Agree, Disagree and Strongly Disagree. The subjects were answered the question in separate answer sheet (Photograph 3.9).

**Scoring:** Scores awarded to responses as per keyed in scoring stencil. The weightage assigned for each response category is given below:

**Scoring for Positive Items:**

<table>
<thead>
<tr>
<th>Responses</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>4</td>
</tr>
<tr>
<td>Agree</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1</td>
</tr>
</tbody>
</table>
Scoring for Negative Items:

<table>
<thead>
<tr>
<th>Responses</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree-</td>
<td>1</td>
</tr>
<tr>
<td>Agree -</td>
<td>2</td>
</tr>
<tr>
<td>Disagree -</td>
<td>3</td>
</tr>
<tr>
<td>Strongly Disagree -</td>
<td>4</td>
</tr>
</tbody>
</table>

Photograph 3.9: Social Maturity

3.7 Statistical Technique (Analytical Procedure):

The nature of the study and specific hypothesis indicated the statistical techniques used for analysing data. The main statistical techniques used for analysis were ANOVA (analysis of variance) tests and t test for comparison between two paired groups.

ANOVA is employed to test the differences among the means of three groups of students by examining the variation within each of the test, relative to the variations between the test. There are variation between the tests and there are variations between within test items. The technique of ANOVA consists in splitting
the variance for analytical purpose in to various components. Normally the variance split into variance between groups and variance within groups.

The p-value for the test statistic F is less than alpha (0.05). ANOVA test suggests statistically significant difference if any, among hearing impaired, visually impaired and normal boys for all tests.

t test is used to find the difference between two paired means.

Analysis made by using Statistical Analysis System (SAS) computer package.