Chapter III

PROCEDURE

In this chapter the procedure adopted for the selection of subjects, selection of variables, criterion measures, reliability of data, collection of data and statistical techniques used for analysing the data have been described.

Selection of Subjects

Five hundred and ten male students of classes 9, 10 and 11 studying in five higher secondary schools of greater Gwalior were selected at random as subjects in order to get the true sample representing the different sections of the society. The schools were Kendriya Vidyalaya No. 1, Kendriya Vidyalaya No. 2, Shri Ramakrishna Vidyalaya, J.C. Mills Higher Secondary School and Government Higher Secondary School No. 1, Morar. The students were classified into upper strata, upper middle strata, lower middle strata and upper lower strata socio-economic groups. The categories of socio-economic status were based on the data collected on occupational status of father/guardian, type of home living in possession of specific house hold materials, by administering the socio-
economic Status Scale Questionnaire prepared by Kapoor and Kochar. The scores obtained in various questions of the questionnaire, were added to get a total score, thus socio-economic status was read out from the table of norms appended to the manual of the questionnaire giving us four socio-economic groups mentioned above.

In each school, prior to the administration of tests, a meeting of all the subjects was held in which the Headmaster/Principal and physical education teachers were also present. In these meetings the requirements of the testing procedure were explained to the subjects in detail so that there was no doubt in their minds regarding the efforts required of them and the strain they had to endure. All the subjects agreed voluntarily to cooperate in the testing procedures as explained to them. The Headmaster/Principal and physical education teachers encouraged them to put in their best efforts in the interest of the scientific investigation. Though no special techniques were used to motivate the subjects to put in their best, the subjects were very enthusiastic and cooperative throughout the investigation.

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Selection of Variables

For the selection of variables to be employed in the study the following procedures were adopted:

1. Study of literature.
2. Discussion with experts.

It was observed that there are a number of physical, psychological and social variables which contribute to the wholesome development of a child’s personality. These variables are subject to influence of socio-economic division to which the child belongs and the pattern of inter-relationships of these variables may vary among different socio-economic groups. Out of the many variables physical fitness, motor ability, health status and academic achievement were selected for this study applying the criteria of administrative feasibility, availability of equipment, suitability to the subjects and the time that could be devoted for tests as well as to keep the entire study unitary and integrated.

Criterion Measures

The criterion measures chosen for testing the hypotheses were:
Health Status

Health status was measured in terms of nutritional status which was assessed by employing the Felidisi formula derived by Pirquet.²

The health status scores were recorded in percentages.

Physical Fitness

Physical fitness index of each subject was obtained by administering AAHPERD Youth Fitness Test.³

The score of physical fitness was the composite of all six items of the test.

Motor Ability

Motor ability scores were obtained by administering Barrow Motor Ability Test.⁴


The score of motor ability was composite of all three items of the test.

Academic Achievement

Academic achievement scores were obtained by calculating the percentage of marks secured by the students in their annual examination (1986-87).\(^5\)

Reliability of Data

The reliability of data was ensured by establishing the instrument reliability, tester competency and reliability of tests, and the subject reliability.

Instrument Reliability

Stop watches, measuring tapes, medicine balls, and weighing machine used in the study were obtained from standard firms which cater to the needs of various research laboratories in India and abroad. All the instruments used were available in the Research Laboratory of the Lakshmibai National College of Physical Education, Gwallor.

and their calibrations were accepted as accurate enough for the purpose of the study.

Tester Competency and Reliability of Tests

The investigator and his co-workers had a number of practice sessions in the testing procedures under the guidance of Dr. A.K. Uppal, Deputy Dean, Lakshmibai National College of Physical Education, Gwalior, to ensure that the testers were well versed in the techniques of conducting the tests. All the measurements were taken by the investigator with the assistance of Lecturers, Research Assistants and M.Phil scholars of the Lakshmibai National College of Physical Education, Gwalior. To determine the reliability of tests as per Indian conditions, the performances of 10 subjects, selected at random, were recorded twice under identical conditions on the physical fitness test, motor ability test and health status test. A Pearson's Product Moment Correlation was computed between the two measures of each variable and their reliability co-efficients have been shown in Table 1. Testers' competency was evaluated together with the reliability of tests.
### Table 1

**Reliability Coefficients of Test and Retest Scores**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Test</th>
<th>Coefficient of Reliability 'r'</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>AAHPERD Youth Fitness Test</td>
<td>0.89</td>
</tr>
<tr>
<td>2.</td>
<td>Barrow Motor Ability Test</td>
<td>0.90</td>
</tr>
<tr>
<td>3.</td>
<td>Health Status</td>
<td>0.97</td>
</tr>
</tbody>
</table>

**Collection of Data**

The necessary data was collected by administering the tests for the selected variables. Socio-economic Status Scale Questionnaire was distributed to the subjects to be answered by their parents/guardians. The sitting height and weight for Pelidesi were recorded in a class room. AAHPERD Youth Fitness Test and Barrow Motor Ability Test were administered on the track and football field of Lakshmibai National College of Physical Education, Gwalior for Kendriya Vidyalaya No.1 and Government Higher Secondary School No.1, Morar and for Kendriya Vidyalaya No.2, J.C. Mills Higher Secondary School and Shri Ramakrishna Vidyalaya on their respective fields which were marked a day
before testing. The percentage of the Academic Achievement of subjects in annual examination of 1986-87 were obtained from their school records. Scores of the subjects on the tests for the selected variables are presented in Appendices A, B, C and D.

Before the administration of tests the subjects were given a chance to practice the prescribed test items so that they became familiar with the items of the tests and knew exactly what was to be done.

**Administration of Tests**

The schedule of testing and the details of the test items of AAHPERD Youth Fitness Test and Barrow Motor Ability test were put on the notice board of each school well in advance. The cooperation of physical education teachers was sought to orient the subjects to the test procedures and to give adequate training to elicit true performance.

On the day of testing the subjects were urged to put in their best efforts. The tests were administered strictly observing the procedures specified for each test.

Stations for the conduct of the tests were set up. Two well trained professional persons were posted at each
station to record the scores.

As the classes reported for the test about 7.30 a.m. on the scheduled date, each subject was given a score card which he carried from station to station for having his scores recorded therein. The subjects were divided into small groups and the order to take the tests was fixed randomly. The test items were administered as described below:

Health Status (Pelidisi)

**Height**

**Equipment:**

Height scale, flat object.

**Description:**

Height scale was marked on the wall in centimeters. Subjects were asked to take long sitting position against the wall. Their trunk balanced over the pelvis, back absolutely straight and close to the wall, head straight, chest high, shoulders back, hips well back. Height was measured by placing the flat object with one of the ends against the scale on the wall, and the long side resting on the highest point of the head.
Scoring:

The height was recorded to the nearest centimeter.

Weight

Equipment:

Weighing machine.

Description:

The subjects were weighed wearing as little clothing as practicable which minimized the variations of clothing; wearing shoes was not allowed.

Scoring:

Weight was recorded to the nearest half-a-kilogram.

AAHPERD Youth Fitness Test

Pull-up

Equipment:

Wooden bar 1½" in diameter or piece of pipe.

Description:

The bar or pipe was high enough for the subject to
hang with his arms and legs fully extended and his feet free off the floor, using overhand grasp. After assuming the hanging position, the subject raised his body by his arms until his chin was placed over the bar and then lowered his body to a full hang as in the starting position. The exercise was repeated as many times as possible.

Rules:

One trial was allowed. The body was not allowed to swing during the execution of the movement. If the subject started swinging, it was checked by extending the arm across the front of the thighs. The knees were not allowed to be raised and kicking of the leg was not permitted.

Scoring:

Number of completed pull-ups was recorded as the score of each subject.

Sit-up (Flexed Leg)

Equipment:

Clean floor mat or turf and stop watch.

Description:

The subject assumed supine lying position with his
knees bent, feet on the floor and heels not more than 12
inches from the buttocks. The angle at the knees was less
than 90 degrees. The subject kept his hands on the back
of his neck with fingers clasped and placed his elbows
squarely on the mat, or turf. His feet were held by his
partner to keep them in touch with the surface. The
subject tightened his abdominal muscles and brought his
head and elbows forward as he curled up, finally touching
knees with elbows. This action constituted one sit up.
The subject returned to the starting position with his
elbows on the surface before he sat up again. The timer
gave the signal "ready - go" and the sit-up performance
was started on the word "go". Performance was stopped
on the word "stop". The subject continued to perform sit
ups for a period of 60 seconds.

Rules:

Only one trial was allowed unless the subject did
not perform fairly. No resting was permitted between sit-
ups. No sit-up was counted if the subject failed to do it
according to the above description.

Scoring:

Number of correctly executed sit-ups in 60 seconds
was recorded.
Shuttle Run

Equipment:

Two blocks of wood, 2 inches x 2 inches x 4 inches, and stop watch.

Description:

Two parallel lines were marked on the floor 30 feet apart. Two wooden blocks were placed behind one of the lines. The subject started from behind the other line. On the signal “Ready” “Go” the subject ran to the blocks, picked up one, ran back to the starting line, and placed the block behind the line; he then ran back and picked up the second block with which he ran back across the starting line. To eliminate the necessity of returning the blocks after each race, races were started alternately, first from behind one line and then from behind the other.

Rules:

Two trials were allowed with some rest in between.

Scoring:

Time of the better of the two trials was recorded to the nearest one tenth of a second.
Standing Long Jump

Equipment:

Outdoor jumping pit, and measuring tape.

Description:

Subject was asked to stand with feet comfortably apart and the toes just behind the take off line. Preparatory to jumping, the subject swung his arms backward and bent the knees. The jump was executed by simultaneously extending the knees, swinging forward the arms and pushing against the surface.

Rules:

Three trials were allowed. Measurement was taken from the take off line to the heel or other part of the body that touched the pit nearest the take off line.

Scoring:

Best of the three trials was recorded in feet and inches to the nearest inch as the score.

50-Yard Dash

Equipment:

Stop Watches.
Description:

Subject took starting position behind the starting line. The starter used the commands "Are you ready?" and "Go"! Simultaneously with the command 'GO', clapper was sounded for the help of the timers who stood at the finish line.

Rules:

The score was the time elapsed between the starter's signal and the instant the pupils crossed the finish line.

Scoring:

Score was recorded in seconds to the nearest one-tenth of a second.

600-Yard Run

Equipment:

Track or a marked area and stop watches.

Description:

Subject used standing start. At the signal "Ready" "Go"! subject started running the 600 yard distance. The runners were allowed to walk if they felt tired.
Rules:

Walking was permitted but the object was to cover the distance in the shortest possible time.

Scoring:

Score was recorded in minutes and seconds.

Barrow Motor Ability Test

Standing Broad Jump

The procedure adopted has already been described under AAHPERD Youth Fitness Test.

Zig Zag Run

Equipment:

Stop watch, 5 Indian clubs.

Description:

Subject was asked to take standing start behind the starting mark. The subject started on the command "Go" and was asked to run the prescribed course in a figure of eight fashion as shown in Fig.1 for 3 complete laps. The watch was stopped when the subject ran past the finish mark at the end of the third lap.
Fig. 1 Pattern for Zigzag Run in Barrow Motor Ability Test.
Rules:

Only one trial was given.

Scoring:

The final score recorded was the elapsed time to the nearest tenth of a second to run the prescribed course 3 times.

**Six Pound Medicine Ball Put**

Equipment:

Measuring tape, 6 pound medicine ball.

Description:

The subject took standing position between the two restraining lines with the side opposite the throwing arm pointing toward the throwing direction. Medicine ball was required to be put and not thrown.

Rules:

Stepping over the restraining line during the throw was not allowed. Three trials were given.

Scoring:

The final score was the distance of the best put measured to the nearest half-a-foot.
Academic Achievement

The Research Scholar collected the percentage of marks obtained by the subjects in their annual examination for year 1986-87 from the office records of their respective schools.

Statistical Technique Employed for Analysis of Data

To determine the interrelationships among physical fitness, motor ability, health status and academic achievement of subjects belonging to different socio-economic groups the product moment method of computing correlation was employed.

To determine the significance of 'r' the level of significance chosen was '.05.'