CHAPTER - III
METHODOLOGY
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This chapter describes the selection of subjects, selection of variables, selection of tests, procedure of scoring the questionnaire, tester competency, reliability of instruments, reliability of data, orientation to the subjects, validity of the questionnaire, procedure of scoring collection of data, administration of tests and statistical technique for analyzing the data.

Selection of Subjects

The purpose of this study was to analyse the various factors correlated with playing ability of soccer players of different achievement levels. To achieve the purpose of the study, 90 male state levels inter collegiate soccer players were selected randomly from various college who participated in the Tamil Nadu State Level Inter Collegiate Men Soccer Tournament conducted by Alumni Association of Alagappa University College of Physical Education, Karaikudi, Tamil Nadu, India during the year 2003-2004. The subjects were drawn from the 1. Jamal Mohammed College, Tiruchirappalli, 2. St. Joseph’s College, Tiruchirappalli, 3. Alagappa University College of Physical Education, Karaikudi and 4. Loyola College, Chennai,
5. S.N. College, Madurai and 6. H. H. The Rajah's College, Pudukkottai. The age of the subjects ranged from 17 to 25 years.

The selected subjects were divided into three groups namely high, middle and low achievers in based on their performance in the above tournament. Two final qualifiers that is Jamal Mohammed College, Tiruchirappalli and St. Joseph's College, Tiruchirappalli players were grouped as high achievers in the tournament, two losers of the semifinal that is Alagappa University College of Physical Education, Karaikudi and Loyola College, Chennai grouped as middle achievers in the tournament and two losers of the quarter final that is S.N College, Madurai and H.H. The Rajah's College, Pudukkottai grouped as low achievers in the tournament.

Selection ofVariables

Players who are going to win medals at any standard were neither simply born nor made. Natural ability is no longer enough at any level for an essential basis upon which the carefully nurtured product is moulded. Strangely enough, natural talent is very readily recognized, but the "stuff" which goes to make up the talent is most difficult to analyse.

In all sports, speed and strength are important qualities. Generally it requires developing performance in sports and
games. Speed is a magic work in sports. The person who can run faster, throw harder and move quickly is likely to be a better athlete and win more contests. Power is an essential quality in many sports, for it represents the effective combination of strength and speed. Increase in strength or speed will increase power, and when power increases, more work can be done in less time.

Many psychological factors have direct relation with sport competitions whether success or failure. Modern man lives in a mental world in which the important skills and success based on his psychological make up. Various factors have been isolated which are responsible for the excellence in sports. Apart from better training, good equipment, proper atmosphere, some other factors which play an important role at the time of competition at any level in all sports are psychological factors such as Competition anxiety, Achievement Motivation, aggression, sports stress, and Group cohesion.

Anthropometrical measurements have been a part of physical education programme since its inception in this country. The earliest research was in the area of anthropometry with the emphasis on changes in muscle size brought about through exercises. The modern physical education is often
assigned the task of measuring the age, weight, height, leg length and body composition of students. It is indeed true that growth does not constitute a valid criterion up on which a student is graded. However age, weight, height, leg length, body composition and certain anthropometrical measures, used in conjunction with other pertinent data do present potentially valuable information.

Through intensive study of literature of sport and on the basis of the experience oriented observation and a number of factors affecting sports performance were identified. Some of these factors were found to be intrinsic while some extrinsic. The intrinsic factors were found to be internal whereas that of the extrinsic factors was found to be external. Internal factors are related to the player's own "interest, will, ability, inherited or acquired qualities" through genetics and environment while external factors are related to socio-cultural mile in which the players operates.

Anthropometrical, bio-motor, psychological, and performance parameters are the ideal indicators of sports performance status of an individual. Even the slightest imbalance due to circadian variations may influence the level of performance. Anthropometrics, motor fitness and physiological
parameters play an important role in almost all games and sports. Hence, the following variables were selected for this study.

**Anthropometric variables**

- Weight
- Height
- Leg length
- Arm length

**Bio-motor variables**

- Cardio respiratory endurance
- Speed
- Explosive power
- Flexibility
- Agility

**Psychological Variables**

- Aggression
- Sports Competition Anxiety
- Achievement Motivation

**Performance variables**

- Dribbling
- Passing
- Shooting
- Playing Ability
Selection of Tests

The present study was undertaken primarily to determine the playing ability of Soccer players of different achievement levels from selected Anthropometrical, Bio-motor, Psychological, and Performance variables among Tamil Nadu State Inter Collegiate Men Soccer players. As per the available literatures, the following standardized tests were used to collect relevant data on the selected variables and they are presented in the Table I.

**TABLE I**

**TESTS SELECTION**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Criterion Variables</th>
<th>Test items/Instruments</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weight</td>
<td>Clinical Weighing Machine</td>
<td>In kilograms</td>
</tr>
<tr>
<td>2</td>
<td>Height</td>
<td>Stadiometer</td>
<td>In centimeters</td>
</tr>
<tr>
<td>3</td>
<td>Leg Length</td>
<td>Measuring Tape</td>
<td>In centimeters</td>
</tr>
<tr>
<td>4</td>
<td>Arm Length</td>
<td>Measuring Tape</td>
<td>In centimeters</td>
</tr>
<tr>
<td>5</td>
<td>Cardio Respiratory Endurance</td>
<td>12 minutes Run/Walk</td>
<td>In metres</td>
</tr>
<tr>
<td>6</td>
<td>Speed</td>
<td>50 Mts Run</td>
<td>In seconds</td>
</tr>
<tr>
<td>7</td>
<td>Explosive Power</td>
<td>Vertical Jump</td>
<td>In centimeters</td>
</tr>
<tr>
<td>8</td>
<td>Flexibility</td>
<td>Sit and reach</td>
<td>In centimeters</td>
</tr>
<tr>
<td>9</td>
<td>Agility</td>
<td>Shuttle Run</td>
<td>In seconds</td>
</tr>
<tr>
<td>10</td>
<td>Aggression</td>
<td>Smith’s Aggressive Questionnaire</td>
<td>In numbers</td>
</tr>
<tr>
<td>11</td>
<td>Sports Competition Anxiety</td>
<td>SCAT Questionnaire</td>
<td>In numbers</td>
</tr>
<tr>
<td>12</td>
<td>Achievement Motivation</td>
<td>SAMT Questionnaire</td>
<td>In numbers</td>
</tr>
<tr>
<td>13</td>
<td>Dribbling</td>
<td>Mor- Christian General Soccer Ability Test</td>
<td>In seconds</td>
</tr>
<tr>
<td>14</td>
<td>Shooting</td>
<td>Mor- Christian General Soccer Ability Test</td>
<td>In numbers</td>
</tr>
<tr>
<td>15</td>
<td>Passing</td>
<td>Mor- Christian General Soccer Ability Test</td>
<td>In numbers</td>
</tr>
<tr>
<td>16</td>
<td>Playing Ability</td>
<td>Judges rating</td>
<td>In numbers</td>
</tr>
</tbody>
</table>
Competency of the Tester

The investigator took all the measurements in this study with the assistance of coaches/Managers of concerned college/university. To ensure that the investigator was well versed with the technique of conducting tests, they had a number of practice sessions in the correct testing procedure. The tester's reliability was established by test and re-test method.

Instruments Reliability

The clinical weighing machine, stadiometer, stopwatches, measuring tape, Sergent jump board and sit and reach box used in this study were availed from Alagappa University College of Physical Education, Karaikudi, Tamil Nadu. The other instruments were purchased from reliable and standardized companies and were considered accurate enough for the purpose of the study.

Reliability of the Data

Test and retest method was followed in order to establish the reliability of data by using ten subjects at random. The same personnel under similar conditions tested all the dependent variables selected in the present study twice for the subjects. The intra class co-efficient of correlation was used to find out the reliability of the data and the results are presented in Table II.
TABLE II
INTRA CLASS CO-EFFICIENT OF CORRELATION ON
SELECTED DEPENDENT VARIABLES

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Variables</th>
<th>'R' Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weight</td>
<td>0.97*</td>
</tr>
<tr>
<td>2</td>
<td>Height</td>
<td>0.92*</td>
</tr>
<tr>
<td>3</td>
<td>Leg Length</td>
<td>0.95*</td>
</tr>
<tr>
<td>4</td>
<td>Arm Length</td>
<td>0.97*</td>
</tr>
<tr>
<td>5</td>
<td>Cardio Respiratory endurance</td>
<td>0.95*</td>
</tr>
<tr>
<td>6</td>
<td>Speed</td>
<td>0.99*</td>
</tr>
<tr>
<td>7</td>
<td>Explosive Power</td>
<td>0.94*</td>
</tr>
<tr>
<td>8</td>
<td>Agility</td>
<td>0.91*</td>
</tr>
<tr>
<td>9</td>
<td>Flexibility</td>
<td>0.93*</td>
</tr>
<tr>
<td>10</td>
<td>Aggression</td>
<td>0.97*</td>
</tr>
<tr>
<td>11</td>
<td>Sports Competition Anxiety</td>
<td>0.96*</td>
</tr>
<tr>
<td>12</td>
<td>Sports Achievement Motivation</td>
<td>0.93*</td>
</tr>
<tr>
<td>13</td>
<td>Dribbling</td>
<td>0.91*</td>
</tr>
<tr>
<td>14</td>
<td>Shooting</td>
<td>0.89*</td>
</tr>
<tr>
<td>15</td>
<td>Passing</td>
<td>0.92*</td>
</tr>
</tbody>
</table>

*Significant at 0.01 level of confidence.
(Table value required for significance at 0.01 level of confidence is 0.77).

Since the obtained 'R' values were much higher than the required value, the data are accepted as reliable in terms of instrument, tester and the subjects.
Orientations to the Subjects

The investigator explained the purpose of the study to the subjects and their part in the study. For the collection of data, the investigator explained the procedure of testing on selected dependent variables and gave instructions about the procedure to be adopted by them for measuring. The subjects of all the groups were sufficiently motivated to perform their maximal level during testing periods.

Validity of the Questionnaires

Many researchers have used these questionnaires for research. The questionnaire used by them was Smith's Aggressive Questionnaire, Sports Competition Anxiety Test (SCAT) and Sports Achievement Motivation Test (SMAT). There can be no better evidence to prove the validity of the questionnaire than this.

Procedure of Scoring

Aggression

Standardized Smith's questionnaire for sporting aggression was used to scale the aggressiveness. The test consists of four questions with five levels of responses. The level changes from strongly disagree to strongly agree. The respondents were made to encircle the approximate number, which suited their attitude.
The inventory was scored with the help of the scoring key given below. The range of score was from 4 to 20. The higher the score, the more aggressive the player is.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
</tr>
<tr>
<td>3</td>
<td>Undecided</td>
</tr>
<tr>
<td>4</td>
<td>Agree</td>
</tr>
<tr>
<td>5</td>
<td>Strongly agree</td>
</tr>
</tbody>
</table>

**Sports Competition Anxiety Test (SCAT)**

These questions are constructed on a three point scale, such as hardly ever, sometimes and often. Each scale bore points from one to three. According to the subject’s respondence in scale, the points were credited. There are five questions which do not carry weight for scoring purpose.

**Sports Achievement Motivation Test (SAMT)**

In the SAMT questionnaire there are twenty test items. Among them, for questions 1, 3, 4, 9, 10, 11, 12, 13, 15, 16, 17 and 20, the expected answer is 'a'. For the questions 2, 5, 6, 7, 8, 14, 18 and 19 the expected answer is 'b'. For correct statement 2 marks and for incorrect zero mark are awarded.
Collection of Data

The investigator administered the questionnaire and other tests to measure the criterion variables to 90 male subjects. The investigator collected the data from the subjects before their matches during their rest time. The purpose of the study was clearly explained. The investigator explained the subjects about the uses of the question and meaning of each questions and how to fill the questionnaire. Care was taken to see that the subjects answered the entire questions. The filled up questionnaires from respondents were collected after checking all the items were responded and using the scoring key the total scores obtained by each subjects were tabulated.

Administration of Tests

1. Height

Purpose

To measure the height of the subject

Equipment

Stadiometer, scale, piece of chalk, pencil and score sheet.

Procedure

The subject stood on the stadiometer with barefoot. At the time of measuring, the heels were on the platform without
elevating it. The scale was brought down firmly in contact with
vertex. A mark was made with chalk piece on the side of scale in
the stadiometer after that the subject stepped away from the
stadiometer stand board.

**Scoring**

The vertical distance from the stadiometer stand board to
chalk piece mark was measured. The measurement was taken to
the nearest one centimeter.

**2. Weight**

**Test objective**

To measure weight of the subject

**Equipment**

Clinical Weighing machine, pencil and score sheet were
used.

**Procedure**

The subject stood on the weighing machine with barefoot
and with ideal clothes. At the time of measuring, the heels were
on the weighing scale without elevating it, and the body was
erect in position after the stop of the scale vibration, the reading
was taken and the subjects stepped away from the weighing
machine.
Scoring

The reading was taken nearest to the one kilogram.

3. Leg Length

Objective

To assess the length of the leg

Equipment

Measuring tape, paper and pencil

Procedure

The subjects stand erect and do not bend the knee and measured the length of leg from the greater trochanter of the femur bone to the floor.

4. Arm length

Objective

To assess the length of the arm

Equipment

Measuring tape, paper and pen

Procedure

The subjects were asked to stand erectly; the hand must be kept straight. The length of the arm from the acromion process to the tip of the middle finger was measured.
5. Cardio Respiratory Endurance
(Copper's 12 Minutes Run/Walk Test)

Purpose

To purpose of this test was to assess the Cardio respiratory
endurance of the subjects.

Facilities and Equipment

The test was administered in 400 meters track. A stop
watch with calibration of 1/10 seconds, a whistle, score sheets
and pencils were used to administer the test.

Procedure

Cooper's twelve minutes run /walk test was administered
with the help of qualified testers. For this test, a 400 meters
track was prepared with marking at every tenth meter. The
investigator and the testers served as the lap scorers. The
subjects were asked to stand on the starting arc drawn at the
finish line of the 400 meters track and they were given
instructions to cover as much distance as possible by running /
walking. They were instructed to continue the run / walk till the
final whistle. The race was started with a whistle and at the end
of the twelfth minute again the whistle was blown. The number
of minutes left was announced to the subjects every minute. At
the twelfth minute a whistle was blown and the subjects sopped instantly and stood on that spot.

**Scoring**

The distance covered by each in twelve minutes was recorded to the nearest tenth meter. The distance covered by the subjects was used as a measure of Cardio respiratory endurance.

**6. Speed (50 mts Run)**

**Purpose**

The purpose of the test was to measure the speed of the subject.

**Equipment**

Stopwatch, chunnam, Scorecard

**Procedure**

The subject took a position behind the starting line. The starter used the command, “ready” and “go”. The starter was accompanied by a downward sweep of the arm as a signal to the timer. The subjects ran across the finish line. The standing start method was adopted for this purpose. The stopwatch was started on the command “Go” and stopped when the runner crosses the finish line.
**Scoring**

The score was the elapsed time to the nearest one tenth of a second between the starting signal and the instant the subject crossed the finished line. The fractions were rounded to the next largest one tenth of a second. One trial was permitted.

**7. Explosive Power (Vertical Jump Test)**

**Purpose**

The purpose of the vertical jump was to measure the ability to exert maximum energy in one explosive act projecting the body through space.

**Equipment**

The Sargent Jump Board, Chalk, Tape and Rope.

**Procedure**

The subject was asked to stand next to the concrete pillar on the floor and the side his dominant hand holding a piece of chalk. The sargent board was fixed at the concrete pillar with 2 mts height. From this position the subject reached upward as high as possible and mark on the board. To execute the jump, the subject was asked to squat next to the board and jump as high as possible and make a mark on the board. Once in the starting position, the subject was not allowed to move his feet, that is, to walk in or step in to the jump.
Scoring

The height of the jump was measured from the distance between standing and jumping heights. Measurement was taken to the nearest centimeter. Three trials were given and best trials were taken for the final score.

8. Flexibility (Sit and Reach Test)

Purpose

The sit and reach test is designed to ensure the Flexibility of the low back and posterior thigh.

Equipment

Sit and reach box, Scorecard and pencil

Procedure

The subjects were asked to remove their shoes to test. To begin the test, the subject sits in front of the test apparatus with feet flat against the end board. The knees should be fully extended and the feet shoulder width apart. To perform the test, the subject extends the arms forward with one hand placed on top of the other. The reach was repeated 3 consecutive thus, and on the fourth trial the maximum reach was held. The distance of the maximum reach was recorded as the test score.
Scoring

Three trials were given and the distance of the maximum reach was recorded as the test score.

9. Agility (Shuttle Run)

Purpose

To measure the agility of the performer in running and changing direction

Equipment and Field Marking

Marking tape, stop watch and two blocks of wood (2"x2"x 4") and a marked area of 10 yards

Procedure

The performer stands behind the starting line on the signal "go" and runs to the blocks, pick up one, return to the starting line, and places the block behind the line; He then repeats the process with the second block allow some rest between the two trails. Total distance covered in one repetition was 40 yards.

Scoring

The score of each performer was the length of time require (to the nearest tenth of second) to complete the course. Recorded only the best trial.
10. Dribbling

Purpose

To measure dribbling ability

Field markings

A round course with a 20 yards diameter was measured and marked. Twelve 18 inches cones are located around the circle at 5 yards intervals. A 3 feet starting line was marked perpendicular to the outside of the circle.

Procedure

On the “go” signal, the subjects dribbles a ball, which has been placed on the starting line, around the course. The subject dribbles between the cones as quickly as possible and back to the starting line. Three trials were allowed; the first clockwise, the second counterclockwise, and the third in the direction of the subject’s choice.

Scoring

The final test score was the combined time of the two best trials.

11. Shooting

Purpose

To measure overall soccer playing ability
Filed Markings

Two ropes suspended from the goal crossbar 4 feet from each goal post divide the soccer goal into two scoring areas. Each scoring area was further divided into two circular targets by two hoops 4 feet in diameter. A restraining line was marked 16 yards from the parallel to the goal.

Procedure

From behind the restraining line, the subject shoots stationary balls towards the target. The preferred foot may be used, and the ball was placed anywhere behind the restraining line. Four practice trials were allowed followed by four consecutive attempts at each of the four target areas [a total of 16 shot trials].

Scoring

Ten points were awarded for shots going through a proper target, and 4 points were awarded for shots going through a wrong target. The final score was the total of 16 trials.

12. Passing

Purpose

To measure passing ability
Field Marking

A goal 1 yard wide and 18 inches high was prepared by placing two cones 1 yard apart with a 4 foot rope used a crossbar. Two cones were placed at a 45 degree angle from the goal line, and one cone was placed at a 90 degree angle from the goal line. All three cones were located 15 yards from the goal.

Procedure

From each of the three cones subjects execute four passes into the goal [12 passes total]. Subjects were used their preferred foot when passing. Two practice passes were allowed from each spot.

Scoring

One point was awarded for each successful pass. Ball that hit the goal cones were considered successful. The final score was the total 12 pass trials.

13. Playing Ability

Playing ability was subjectively rated during the 16th State Level Inter collegiate Soccer Tournament held at Alagappa University College of Physical Education, Karaikudi, Tamil Nadu, India by three experts with ten points scale on the selected game
of Soccer. The average of the three experts rating was taken as a score.

**Statistical Technique**

The mode of analysis of data on the selected independent variables and playing ability among the selected players of different achievement levels have been statistically analyzed in two parts. In part I relationship and regression equation was found between playing ability and selected independent variables and in part II the significant difference was found by using one way analysis of variance among the different achievement levels, such as high, middle and low achievers in soccer on selected variables were discussed. In all the cases 0.05 level of significance was fixed to test the hypothesis.