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CHAPTER – III

METHODOLOGY

This chapter comprises of the procedure followed in selection of subjects, selection of parameters, instrument and tools used for collecting data, establishing reliability of data, procedure for administering the tests for collection of data and the use of statistical techniques for analyzing the data.

3.1 THE SUBJECT

Sixty two male footballers, age ranging between 20 years to 25 years volunteered to participate as the subjects of this study. These footballers were represented West Bengal in Inter-State Football Championship and other such tournaments. They were born and brought up in West Bengal and played the game of football from very beginning. The subjects had the experience of competitive football for 9-10 years. They were from different districts of West Bengal and regular players of different Football Clubs of Kolkata. The name and affiliation of the players along with other personal data have been presented in Appendix section.

3.2 CRITERION MEASURE

The researcher reviewed literature from various sources available in library and internet to collect information regarding influencing factors of football performance. On the basis of knowledge available from literature, experts’ opinion and the experience of the researcher the measuring criteria of the study of performance
structure of the footballers were finalized. Performance Structure of football game is multi-dimensional structure. So, the criteria were selected from different groups of factors.

![Diagram of Football Game Performance (Competitive Football Matches)](image)

Fig. 2: Selected Different Group of Factors Criterion as Measure of Football Game Performance
3.3 INSTRUMENT AND TOOLS USED

For testing the selected parameters to obtain data for research work following instruments and tools were used.

A) Anthropometric Measurements:

i) Stadiometer was used to measure standing height.

ii) Weighing machine was used to measure body weight.

iii) Flexible steel tape was used to measure leg length and arm length.

   The reliability of these instruments was guaranteed by their manufactures.

B) Motor Fitness Components:

i) Locomotion speed was measured by 50 m dash test.

ii) Agility was measured by 4 × 10 m shuttle run test.

iii) Cardiovascular Endurance was measured by 1.61 km. run test.

iv) Leg power was measured by vertical jump test.

v) Trunk Flexibility was measured by Bend and Reach test.

vi) Static Balance was measured by Stork Stand test.

   All these tests were having content validity and establish reliability.

C) Football Technique:

   It was measured by Manchester United Soccer Skill Test Battery. This test battery has reported validity of 0.70 and establishes reliability of 0.90.
D) Football Game Performance:

Football game performance of the subjects was rated out of 100 points by a panel of three qualified coaches during actual competition and the average of three scores was considered as game performance.

E) Personality Factors:

Personality factors were measured by Cattell 16 Personality Factors Questionnaire Form–C.

3.4 RELIABILITY OF DATA

The reliability of data was ensured by establishing the instrumental reliability, tester’s competency and reliability of test and the subject reliability before collection of data.

3.4.1 Instrument Reliability:

Stop watches, measuring tape, stadiometer, weighing machine and flexible steel tape were manufactured by renowned companies with adequate reliability.

The Cattell’s 16 P. F. questionnaire was a standardized test for assessing personality.

3.4.2 Tester’s Competency and Reliability:

To ensure that the investigator become well versed with the technique of conducting the tests. The investigator had a number of practice sessions with the
experts. All the measurements of selected parameters were correlated with those investigators and an expert on the same fifteen subjects for testing reliability.

3.5 PROCEDURE FOR COLLECTION OF DATA

At the beginning of the collection of the data, the investigator gathered all the subjects in hall room to explain them the purpose of the present investigation. Necessary instructions and demonstrations were given to the subjects before the conduct of each of the test. All the necessary equipments were presented before administering the test. The procedure of tests and use of equipments were explained to the subjects. The subjects were allowed to practices the tests so that they could be familiar with all the test items. In order to ensure uniform conditions for conducting the test the data were collected in morning session between 7.00 a.m. to 9.30 a.m. in a standard football ground. The anthropometric and psychological tests were conducted in the indoor hall adjacent to the ground.

3.5.1 Anthropometric Measurements :

i) Standing Height :

**Purpose** : To measure the standing height of the subject.

**Equipment** : Stadiometer.

**Procedure** : The subject in bare feet, stood erect with their heels touching each other. The heels, buttocks, upper part of the back and back of the head were in contact with the vertical face of stadiometer. The head of the subject was held upright and eyes looked straight ahead and arms were to hang to the side in a natural manner. The
subjects were asked to take a deep breath, while the head piece of the stadiometer was moved down to the vertex of the head firmly. The subject then stepped away from stadiometer.

**Measurements** : The vertical distance from the platform to the headpiece was recorded. The measurement was recorded to the nearest half of a centimeter.

**ii) Body Weight :**

**Purpose** : To measure the body mass of the subject.

**Equipment** : Weighing machine.

**Procedure** : The subject was to stand erect in bare foot on the centre of the platform of the weighing machine with shorts only.

**Score** : The weight was recorded in kilograms to the nearest one tenth of a kilogram from the digital display.

**iii) B. M. I. :**

Body Mass Index was calculated by the following formula

\[
\text{Body Mass Index} = \frac{\text{Weight in kg}}{\text{Height in m}^2}
\]

**iv) Leg Length :**

**Purpose** : To measure the length of the leg of the subject.

**Equipment** : Flexible steel tape.

**Procedure** : Leg length of the subject was measured from the bottom side edge of the center of foot to the upper edge of the greater trochanter.

**Score** : Leg length was recorded correct to the nearest half of a centimeter.
v) Arm Length:

**Purpose:** To measure the arm length of the subject.

**Equipment:** Flexible steel tape.

**Procedure:** The subject stood in a side view and arm length was measured putting the steel tape from acromion process above the shoulder joint to the tip of the middle finger.

**Score:** The length of the arm was recorded correct to the nearest half of a centimeter.

3.5.2 Motor Fitness Components:

i) 50 Meter Dash for Speed:

**Purpose:** To measure the locomotion speed.

**Equipments:** Stop watches, measuring tape and clapper.

**Procedure:** Subjects were with jersey, shorts, shin guard and football spike. They were asked to stand together just behind the standing line with standing position. The starter stood behind the subjects in such a position so that the ‘V’ of the clapper was visible to the time keepers. Time keepers stood at a lateral distance of 2 m at finish line of 50 m running course. The starter clapped after caution ‘Ready’ the time keepers started their stop watches at finish line with starting signal. The subjects ran fast as they could and watches were stopped as subjects crossed the finish line.

**Measurements:** The time was taken between the starting signal and subjects crossing the finishing line to the nearest $\frac{1}{100}$th of a second.
ii) Cardiovascular Endurance:

1.61 km. Runs for Endurance

**Purpose**: To measure the cardiovascular endurance of the subject.

**Equipments**: Measuring tape, stop watches.

**Procedure**: The test was conducted on a 200 meter turf track. The subjects ran eight rounds and 10 meters. Subjects were given a common curved line.

**Score**: The score was recorded in minute and seconds.

iii) Agility:

4 × 10 Meter Shuttle Run

**Purpose**: To measure changing direction of the players.

**Equipments**: Measuring tape, stop watches and two wooden batons.

**Procedure**: The subjects were asked to start behind the starting line together after signal ‘go’. The subjects ran from starting line with a baton which placed at marked distance of 10 meters from starting line and pick another baton and returned to the starting line and placed the baton just behind the starting line. The same process was repeated in the second time.

**Score**: The score of each subject was taken to complete the distance of 4 × 10 meter shuttle run and measured in $\frac{1}{100}$th of a second.

iv) Leg Power:

**Vertical Jump**

**Purpose**: To measure the power of legs.

**Equipments**: Smooth wall surface, measuring tape and chalk.
**Procedure** : The subject stood with one side of the wall with heels together with a piece of chalk in the hand nearest to the wall, subject was extended arm upward as high as possible without raising heels and a mark made on the wall. The subject then jumped as high as possible and marked another mark on the wall.

**Score** : The distance between standing reach mark to the maximum jump mark and measured to the nearest half of centimeter as score.

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v) **Trunk Flexibility** :

**Bend and Reach Test** : The test was designed by Kraus and Hirschland (1954) to measure the trunk flexibility.

**Purpose** : To measure the flexibility of trunk.

**Equipments** : Measuring tape, 30” height bench.

**Procedure** : The subject stood straight with bare feet together on the edge of the bench. The arms hanged by the side. The subject was slowly down the waist and attempting to touch the floor with finger tips. The subject holds the position at his maximum reach. The knees were kept straight throughout the test.

**Score** : The score of each subject was measured from metatarsal to tip of middle finger to the nearest half of a centimeter.

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vi) **Balance** :

**Stork Stand Test**

**Purpose**: To measure the balance of the players.

**Equipment**: Stop watches.
**Procedure**: Subject was asked to stand on the bare feet and placed one foot on the inside of the supporting knee. The hands were placed on the hip. Upon a given signal subject raised the heel from the ground and maintain balance as long as possible without moving the ball of the supporting leg.

**Score**: Score was the duration between heel raise and the balance lost and measured to the nearest $\frac{1}{100}$th of a second.

### 3.5.3 Football Techniques:

Performance in football technique was tested by using Manchester United Soccer Skill Test Battery. This test battery consisted of i) dribbling, ii) finishing, iii) lofted pass and iv) short passes. Description of the tests along its scoring system has been described below.

i) **Dribbling**:

**Purpose**: To measure the dribbling ability of the players.

**Equipments**: Stop watch, flexible sticks, measuring tape, football.

**Procedure**: The distance from the starting line to first stick was 1 meter then another four sticks were placed at every 1 meter distance diagonally towards end line. The sixth stick was placed at 25 meters distance from the fifth stick. Next four sticks were placed at every 1 meter distance from the sixth flexible stick.

The subjects were asked to start the dribbling from starting line with a ball. After finishing fifth challenge they were asked to run with ball in the free space and dribble the next five challenges and returned in the same manner. The subject gets 10
points for each successful dribbling in 20 seconds time limit. Maximum score of this test was 200.

![Fig. 3: Field Marking for Dribbling Test](image)

**Score**: Sum of points of successful dribbling was the score of each subject.

**ii) Finishing**:

**Purpose**: To measure the goal shooting ability of the players.

**Equipments**: Two flexible sticks, stopwatch, measuring tape, four footballs, two cones.

**Procedure**: Scoring zone was marked by placed two flexible sticks on goal line at 2 meters distance from each post. Cones were placed diagonally at 14 meters distance from each flexible stick. A starting line was marked out at 16 meters away from goal line and placed four balls along the starting line.

Subjects were asked to dribble with ball outside of the each cone and immediately strike across goal to the far post scoring zone. Two shots were given for the right foot and another two shots were for left foot.

Subject gets 50 points for each successful shot in 10 seconds. Maximum score of this test was 200.
iii) Lofted Pass:

**Purpose**: To measure the passing ability for distance.

**Equipments**: Four footballs, stop watch, cone, flexible stick.

**Procedure**: Target zone was marked out by radius of 6 meter circle. Another 2 meters and 4 meters circles were marked inside from the center. A cone was placed on the center point of the target zone. Starting line was marked at 40 meters distance from the center of target zone. A flexible stick was placed at 2 meters distance from starting line diagonally to the center point. Further a end line was drawn at 4 meters from starting line toward the target zone. Four balls were placed along side of the starting line. Subjects were asked to move forward with a ball and after past the flexible stick struck the ball to the target zone on the air before the ball crossed the end line. Next three strikes were made by the subjects in same manner. Only one strike was made by the subjects in weak foot. Total 10 seconds time limit for this test.
100 points was given for landing the ball at center of the target zone and 50 points, 40 points and 30 points were given to the subjects as the ball land into 2 meters, 4 meters and 6 meters. Maximum score of this test was 400.

**Fig. 5 : Field Marking for Lofted Passing Test**

**Score** : Sum of points of four passes in 10 seconds.

**iv) Short Pass :**

**Purpose** : To measure the short passing ability of the players.

**Equipments** : Four balls, cones, flexible stick, stop watch.

**Procedure** : 25 square meters was marked out on the field. Four balls were placed at each corner of the square. 2 meters passing gate was marked by two cones in the middle of each side of the square. A flexible stick was placed into the center of the square. Subjects were to start from any corner with the ball and come into the center of the square then turn the stick and pass the ball on ground through the corresponding passing gate. Same manner was repeated for next three balls simultaneously. Subjects get 50 points for every successful pass through the passing gate in 20 seconds. Maximum score of this test was 200.
**Fig. 6 : Field Markings for Short Passing Test**

**Score** : Sum of points of successful pass in 20 seconds.

Finally the each test score were converted out of 100 and the average of the four test items were considered as the final score of the test battery for soccer skills.

### 3.5.4 Personality Factors

**Cattell 16 P. F. Questionnaire**

**Purpose** : To determine the personality of the players.

**Equipment** : The Bengali version Cattle sixteen Personality Factor Questionnaire Form – C.

**Procedure** : A copy of questionnaire along with the answer sheet had been provided to each of the subjects. The questionnaires provided to the subjects was the Bengali translation of Cattell’s16 P.F Questionnaire (Form C), standardized by Prof. Sukumar Ghosh and Dr. A. K. Chatterjee (Department of Applied Psychology, University of Calcutta). In the questionnaire there were one hundred five questions and each
question had three alternatives. Before giving answers the subjects were instructed to answer the questions as frankly and truly as possible and don’t skip any question. After the completion of instructions, the subjects started to answer the questions. The answer sheets were collected from the subjects when they finished their input of information.

**Scoring** : After checking the answers marks were given according to the chosen options and adding points for marked choices factor by factor using norm given in Annexure – E. Raw scores were transformed to standard scores (STENS) by a look up table given in Annexure – E.

### 3.6 STATISTICAL ANALYTIC PROCEDURE

The collected data were analyzed for results using statistical procedures. Mean and standard deviation were calculated as the measures of central tendency and variability respectively. Co-efficient of correlation was calculated as the measure of relationship between independent and dependent variables. Finally, regression equation was developed as the tool for prediction of independent variables using dependent variable.