

## **CHAPTER – III**

### **METHODOLOGY**

This chapter aims to present the methodology used in this study to carry out the investigation right from the selection of subjects to the final level of construction of norms.

The present study involved three phases. In phase I, selection of subjects, selection of variables, the pilot study, and the selection of the test items were done to identify the skill test and by eliminating tests which were not highly reliable. In phase II, criterion measures, reliability of data, reliability of instruments, tester and subject reliability were done. In phase III, the investigation involved administration of test items and collection of data, statistical analysis of the data obtained and construction of norms.

#### **3.1 SELECTION OF SUBJECTS**

The eventual purpose of the study was to construct the norms on selected skill for engineering college men hockey players. To achieve the purpose of the study, thousand two hundred and forty (N=1240) engineering college men hockey players were selected from Tamil Nadu state as the subjects for this study. The age of the subjects ranged from 18 to 25 years. The selected players were in excellent condition and no one have injuries or recovering from the injury. All the subjects were experienced in Hockey and their training age ranged between 5 to 10 years.

### **3.2 SELECTION OF VARIABLES**

Physical ability may be optimized at any point during a player's career, but there are crucial times in the growth of each capacity when training is most beneficial to the athlete's long-term development. Since each player's genetic background is unique, these critical times differ from one another. Although the responsive times correspond to general phases of human growth and maturation, scientific evidence shows that humans' responses to various training stimuli vary greatly at all stages. Some players may have the potential to perform at a high level by age 11, whereas others may not indicate their promise until age 15 or 16. As a result, a long-term approach to athlete development is required to ensure that the development of athletes who respond slowly to training stimuli is not compromised. The final stage of preparation is called "Training to win." Athletes now have a full range of skills and abilities to succeed. All aspects of training have been developed and are now being trained to the maximum capacity. Athletes are also responsible not only for their own individual results but also for the teams. In all areas of performance, consistent mastery and execution are needed. The athlete's physical, technical, tactical, mental, and ancillary capacities should now be firmly established. The demands of international field hockey necessitate world-class training methods, equipment, and facilities for world-class athletes.

The investigator had gone through the relevant literature in the area of field hockey skills and its various aspects in association with

the guide and other experts in this area. Various journals, books, e-resources, unpublished theses & dissertations were studied thoroughly before constructing the test items. The variables were selected after considering the feasibility and availability of proper techniques and instruments. They were

1. Dribble Flick
2. Drag and Flick
3. Dribble and Drag Flick
4. Drag and Push
5. Dribble Drag and Push
6. Drag and Scoop
7. Dribble and Drag Scoop
8. Angle Shooting

The researcher himself being a hockey coach considered the feasibility, time factor & equipment availability and selected the above mentioned eight hockey skills as independent variables in this study.

### **3.2.1 JUSTIFICATION FOR TAKING UP THE VARIABLES**

In order to execute skills with a high degree of consistency under pressure of competition, players first learnt to perform the skills using correct methods. The basic skills like Dribbling, Passing, Goal Shooting, Tackling and Dodging as the framework upon which they build up more complicated and advanced aspects of game.

### 3.3 CRITERION MEASURES

As per the available literature, the following tests were used to collect relevant data on the selected criterion variables and they were presented in the Table I.

**TABLE - I**  
**TEST SELECTION**

<b>Test/Skill</b>	<b>Variables</b>	<b>Unit of Measurement</b>
<b>1</b>	Dribble Flick	In Points
<b>2</b>	Drag and Flick	In Points
<b>3</b>	Dribble and Drag Flick	In Points
<b>4</b>	Drag and Push	In Points
<b>5</b>	Dribble Drag and Push	In Points
<b>6</b>	Drag and Scoop	In Points
<b>7</b>	Dribble and Drag Scoop	In Points
<b>8</b>	Angle Shooting	In Points

### 3.4 Pilot Study

Prior to the formal study sessions, a pilot study was conducted to validate the research procedure. For this purpose after extensive discussions and critical analysis a set of 8 test items were constructed. A pilot study was conducted for 30 hockey players of age 18 to 25 years of age from Tamil Nadu. They were regular practitioners of hockey with

the consultation of the experts who were present during the pilot study, eight test items were taken for the study.

### **3.5 VALIDITY OF THE TESTS**

Test validity refers to the degree to which the test actually measures what it claims to measure. Test validity is also the extent to which inferences, conclusions, and decisions made on the basis of test scores are appropriate and meaningful. Validity is an estimate of the degree to which a test measures the factor or factors for which it was designed. Four ways of determining whether a test is valid have been employed depending upon the nature of the test, the availability of acceptable criteria and the particular use to which the test results will be subjected.

The four ways are;

- (i) Construct validity
- (ii) Content validity
- (iii) Concurrent validity
- (iv) Predictive validity

The investigator, in his study, used concurrent validity to ascertain genuinity of the test. The author had proposed the newly constructed test as a substitute for another criterion test. Concurrent validity is the degree to which a test correlates with (is related to) a criterion test, which has already been established as a valid test of the attribute of interest. **(Safrit, 1990)**. The researcher had taken eight skill

tests on the basis of the recommendations of experts, coaches, and the knowledge gained through available literature.

### 3.6 RELIABILITY

Three months before the commencement of the pilot study, the reliability of the data was established by using 30 subjects at random. To ensure reliability, test and re-test method was executed. In between the test and retest, one-day rest was given to all the subjects. The same testing personnel by using the same equipment's under identical conditions tested all the variables selected in the present investigation twice on the same subjects. The tester's competency was computed by using the Intra - Class correlation. **Baumgartner (1992)**. The results are given in table II

**TABLE II**  
**INTRA CLASS CO-EFFICIENT OF CORRELATION ON SELECTED**  
**VARIABLES**

S. No	TESTING PARAMETERS	'r' Value
1	Dribble Flick	0.88*
3	Drag and Flick	0.85*
4	Dribble and Drag Flick	0.89*
5	Drag and Push	0.90*
6	Dribble Drag and Push	0.86*
7	Drag and Scoop	0.89*
8	Dribble and Drag Scoop	0.87*
9.	Angle Shooting	0.90

\*Significant at 0.01 level. (Table value required for significance at 0.01 level of confidence is 0.40)

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

### 3.7 OBJECTIVITY

The objectivity of tests was established by correlating Intra-class correlation formula. The two sets of test scores conducted by two testers, the research scholar and the field hockey coach on the same subjects and correlations obtained have been presented in Table III.

**TABLE - III**

#### **OBJECTIVITY CO-EFFICIENT CORRELATION OF TEST ITEMS**

<b>S. No</b>	<b>TESTING PARAMETERS</b>	<b>'r' Value</b>
<b>1</b>	Dribble Flick	0.89*
<b>2</b>	Drag and Flick	0.91*
<b>3</b>	Dribble and Drag Flick	0.88*
<b>4</b>	Drag and Push	0.90*
<b>5</b>	Dribble and Drag Push	0.87*
<b>6</b>	Drag and Scoop	0.85*
<b>7</b>	Dribble and Drag Scoop	0.84*
<b>8</b>	Angle Shooting	0.89

\*Significant at 0.05 levels  $r_{0.05}(30) = 0.349$ ;

The Table IV shows that the coefficient of 'r' obtained for the skill test items was found to be very high. The subject reliability coefficients ranged between 0.87 to 0.93 for skill test, which were considered to be high for the purpose of this study.

### **3.8 INSTRUMENT RELIABILITY**

The instruments such as stop watch, measuring tape, whistle, cones, hockey sticks and balls were considered reliable as they were procured from reputed firms and were on use for research purpose. Further, these instruments had been calibrated in standard units. To determine the reliability of instruments, the measurements on each of the variable were recorded five times under similar conditions using the same instrument and scores obtained were the same. Also, the scores were compared with other scores taken from the instruments procured from other reputed firms. Thus, they were considered reliable and precise for the purpose of this study.

### **3.9 SUBJECT RELIABILITY**

In order to determine the subject reliability, thirty subjects were selected at random. The skill test items were conducted and recorded twice under similar conditions by the investigator. These tests were administered in two days. On the first day two skill tests in the morning and two skills tests in the evening were conducted. Similarly on the second day two skill tests in the morning and two skill tests in the evening were administered. These tests were repeated on the

subsequent days in the same order. The order of the tests concluded is shown in Table IV and Table V respectively

**TABLE IV**  
**SKILL TEST CONDUCTED ON FIRST DAY**

<b>S. No</b>	<b>Morning</b>	<b>Evening</b>
<b>1</b>	Dribble Flick	Dribble and Drag Flick
<b>2</b>	Drag and Flick	Drag and Push

**TABLE V**  
**SKILL TEST CONDUCTED ON SECOND DAY**

<b>S. No</b>	<b>Morning</b>	<b>Evening</b>
<b>1</b>	Dribble Drag and Push	Drag and Scoop
<b>2</b>	Dribble and Drag Scoop	Angle Shooting

### **3.9 TEST ADMINISTRATION**

The administration of skill test items and collection of data were done in two phases. In the first phase, data on skill test items were collected. A systematic random sampling device was used to select on one thousand two hundred and forty hockey men players of 18 to 25 years from various engineering colleges in Tamil Nadu.

The investigator selected appropriate measurement techniques for administering the fundamental skill test items. All the necessary equipment were collected, and regular markings and special

markings were done on the required hockey field. The score sheets were prepared for recording the scores of each of the skill test items.

The skill tests were conducted for each team separately. Hockey coaches trained in administering test items assisted in the administration of these skill tests. All the test items were explained and demonstrated to the testers. The method of scoring was explained prior to the actual administration of test items.

The data was collected during the months of October and November a period considered to be the best for the collection of data as the player's performance was expected to be at their peak level on account of the Intercollegiate Hockey Tournament. The response of the subjects to the test items was fairly good. The dates for administering the skill tests were selected well in advance in consultation with the hockey coaches and physical education teachers, working in concerned engineering colleges. To avoid fatigue and monotony, the tests were administered for two consecutive days. The tests were administered between 6.00 and 8.00 in the morning and from 4.00 to 6.00 in the evening. The purpose and significance of the study were explained to the subjects to ensure their maximum co-operation. Before administering the tests, the subjects were asked to do proper warm-up. A demonstration of each skill test item was done with adequate explanation. The subjects were allowed to practice each of the test items once. The subjects were motivated while they were performing each test item. Necessary safety precautions were taken during the entire testing period.

During the second phase, data was collected to establish percentile norms. The skill test items were administered on the subjects and the data was collected.

The details and the procedure followed for administration of the skill are given here under:

### **3.9.1 DRIBBLE FLICK**

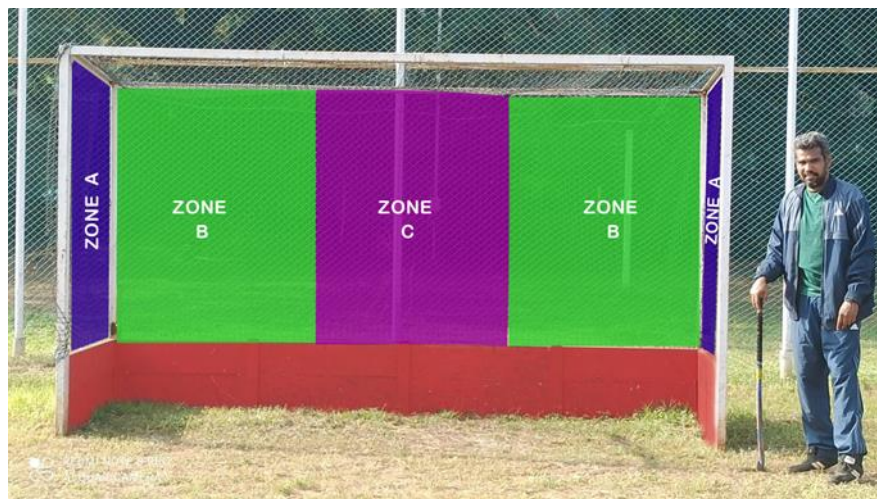
#### **Purpose**

To determine the dribble flick ability in field hockey players.

#### **Equipment**

Hockey ball, stick, marking materials .score card, regular Hockey field.

#### **Field Marking**



The length of the goal post and board of 460mm height and is 12 feet in length and divided into 5 parts. The left and right extreme marked as Zone A, left and right corner is marked as zone B, centre mode is marked as zone D.

### **Procedure**

The subject was instructed to stand behind the 16 yards circle and on the command ready start the subject executed three dribble and enter the 16 yards circle and executed the flick the ball anywhere above the 18 inch back board into the goal post. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

### **Scoring**

If the ball hits left or right extreme (A zone) of the goal, three points are given; if the ball reaches the either side of the mode point (B zone) two points are given, and for the goal at the mode point (C zone) one point is given. The following points are awarded if the ball passes through respective zone.

<b>Name of the zone</b>	<b>Points</b>
<b>A</b>	<b>3</b>
<b>B</b>	<b>2</b>
<b>C</b>	<b>1</b>

### **3.9.2 DRAG AND FLICK**

#### **Purpose**

To determine the drag flick ability in field hockey players.

#### **Equipment**

Hockey ball, stick, marking materials .score card, regular Hockey field.

## Field Marking



The length of the goal post and board of 460mm height and is 12 feet in length and divided into 5 parts. The left and right extreme marked as Zone A, left and right corner is marked as zone B, centre mode is marked as zone D.

## Procedure

The subject was instructed to stand behind the 16 yards circle and on the command ready start the subject executed the drag and flick the ball anywhere above the 18 inch back board into the goal post. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

## Scoring

If the ball hits left or right extreme (A zone) of the goal, three points are given; if the ball reaches the either side of the mode point (B zone) two points are given, and for the goal at the mode point (C zone) one point is given. The following points are awarded if the ball passes through respective zone.

Name of the zone	Points
A	3
B	2
C	1

### 3.9.3 DRIBBLE AND DRAG FLICK

#### Purpose

To determine the dribble and drag flick ability in field hockey players.

#### Equipment

Hockey ball, stick, marking materials .score card, regular Hockey field.

#### Field Marking



The length of the goal post and board of 460mm height and is 12 feet in length and divided into 5 parts. The left and right extreme marked as Zone A, left and right corner is marked as zone B, centre mode is marked as zone D.

### **Procedure**

The subject was instructed to stand behind the 16 yards circle and on the command ready start the subject executed one dribble and enter the 16 yards circle and executed the drag flick the ball anywhere above the 18 inch back board into the goal post. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

### **Scoring**

If the ball hits left or right extreme (A zone) of the goal, three points are given; if the ball reaches the either side of the mode point (B zone) two points are given, and for the goal at the mode point (C zone) one point is given. The following points are awarded if the ball passes through respective zone.

<b>Name of the zone</b>	<b>Points</b>
<b>A</b>	<b>3</b>
<b>B</b>	<b>2</b>
<b>C</b>	<b>1</b>

### **3.9.4 DRAG AND PUSH**

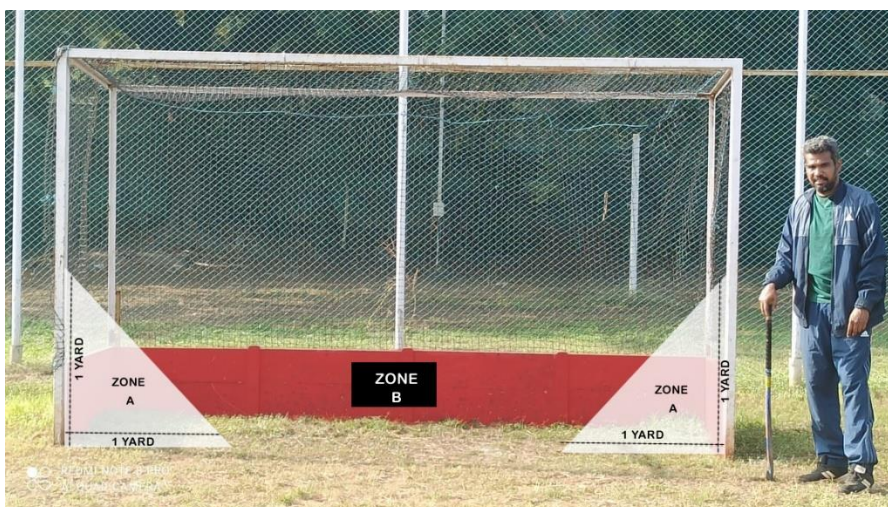
#### **Purpose**

To determine the drag push ability in field hockey players.

#### **Equipment**

Hockey ball, stick, marking materials .score card, regular Hockey field.

## Field Marking



The length of the goal post and board of 460mm height and is 12 feet in length and divided into 3 parts. The left and right extreme marked as Zone A (1 yard), centre mode is marked as zone B.

## Procedure

The subject was instructed to stand behind the 16 yards circle and on the command ready start the subject executed the drag push towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

## Scoring

3 points are awarded for two lower side targets (Zone A) and 1 point are awarded for in-between the two lower side targets (Zone B). Total of three trials are considered as the test score. The following points are awarded if the ball passes through respective zone.

Name of the Zone	Points
<b>A</b>	<b>3</b>
<b>B</b>	<b>1</b>

### 3.9.5 DRIBBLE AND DRAG PUSH

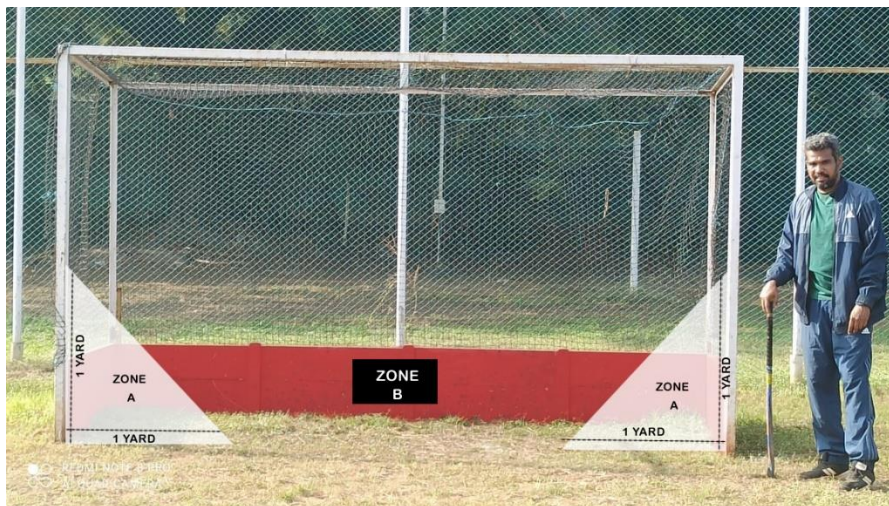
#### Purpose

To determine the dribble and drag push ability in field hockey players.

#### Equipment

Hockey ball, stick, marking materials .score card, regular Hockey field.

#### Field Marking



The length of the goal post and board of 460mm height and is 12 feet in length and divided into 3 parts. The left and right extreme marked as Zone A (1 yard), centre mode is marked as zone B.

#### Procedure

The subject was instructed to stand behind the 16 yards circle and on the command ready start the subject executed one dribble and enter the 16 yards circle and executed the drag push ability towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

## Scoring

3 points are awarded for two lower side targets (Zone A) and one point are awarded for in-between the two lower side targets (Zone B). Total of three trials are considered as the test score. The following points are awarded if the ball passes through respective zone.

Name of the Zone	Points
<b>A</b>	<b>3</b>
<b>B</b>	<b>1</b>

### 3.9.6 DRAG AND SCOOP

#### Purpose

To determine the drag and scoop ability in field hockey players.

#### Equipment

Hockey ball, stick, marking materials .score card, regular Hockey field.

#### Field Marking



The length of the goal post and board of 460mm height and is 12 feet in length and divided into 3 parts. The left and right upper extreme marked as Zone A (1 yard), centre mode is marked as zone B.

### **Procedure**

The subject was instructed to stand behind the 16 yards circle and on the command ready start the subject executed the drag and scoop the ball towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

### **Scoring**

3 points are awarded for two upper side targets (Zone A) and one point are awarded for in-between the two upper side targets (Zone B). Total of three trials are considered as the test score. The following points are awarded if the ball passes through respective zone.

<b>Name of the Zone</b>	<b>Points</b>
<b>A</b>	<b>3</b>
<b>B</b>	<b>1</b>

### **3.9.7 DRIBBLE AND DRAG SCOOP**

#### **Purpose**

To determine the dribble and drag scoop ability in field hockey players.

## Equipment

Hockey ball, stick, marking materials .score card, regular Hockey field.

## Field Marking



The length of the goal post and board of 460mm height and is 12 feet in length and divided into 3 parts. The left and right upper extreme marked as Zone A (1 yard), centre mode is marked as zone B.

## Procedure

The subject was instructed to stand behind the 16 yards circle and on the command ready start the subject executed one dribble and enter the 16 yards circle and executed the drag scoop ability towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

## Scoring

3 points are awarded for two upper side targets (Zone A) and one point are awarded for in-between the two upper side targets (Zone B). Total of three trials are considered as the test score. The following points are awarded if the ball passes through respective zone.

Name of the Zone	Points
A	3
B	1

### 3.9.8 Angle Shooting (From 30°, 60° and 90° angles)

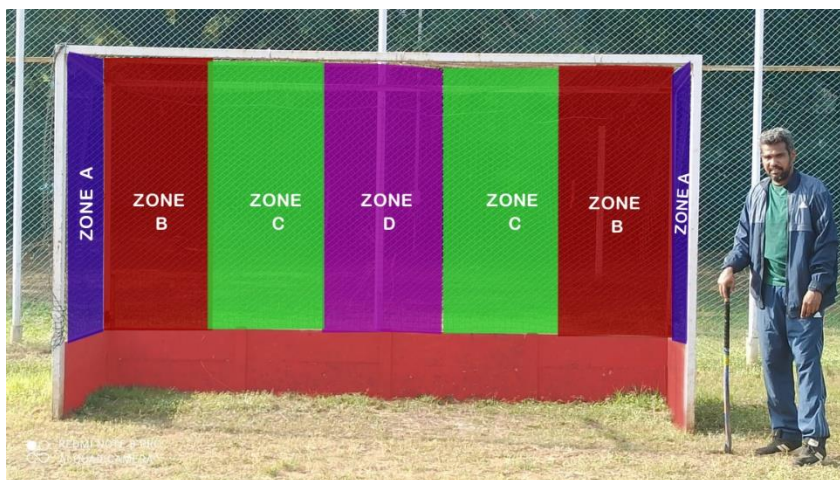
#### Objective

To determine the accuracy in shooting in field hockey players.

#### Equipment

Hockey ball, stick, marking materials .score card, regular Hockey field.

#### Field Marking



The length of the goal post and board of 460mm height and is 12 feet in length and divided into 7 parts. The left and right extreme marked as Zone A, left and right corner is marked as zone B, left and right mid mode is marked as zone C, centre mode is marked as zone D. On the top of the circle a two yard square is marked with a starting line 2yard in long which is away from the square two yards. On all the five

angles at 30°, 60°, 90° at centre 60°, 30° angles) on either side of shooting circle on either side of the shooting circle

### **Shooting Method**

The subject was instructed to shoot from within the square which marked on the top of shooting circle. Which is marked 16 yards away from the goal line. The ball will be stationary at the restraining line. The player stands two yard away from the square beyond the restraining line. On signal he moves the ball towards the square and shoots the ball from shooting circle before the ball crosses the squares

### **Scoring**

The zone A on either side carries 4 points, zone B on either side carries 3 points zone C on either side carries 2 points fourth zone is common in centre carries 1 points. The following points are awarded if the ball passes through respective zone.

<b>Name of the zone</b>	<b>Points</b>
<b>A</b>	<b>4</b>
<b>B</b>	<b>3</b>
<b>C</b>	<b>2</b>
<b>D</b>	<b>1</b>

### **3.10 COLLECTION OF DATA**

The data for the selected variables to construct norms were collected by administering the appropriate standard tests. Validity, reliability and objectivity were established for the newly constructed

tests. There after norms were compiled. The procedure for administering the test is explained well in this chapter. Before administering the test, the purpose and procedure were explained to the subjects in detail. The data was assessed during competition period.

### **3.11 STATISTICAL TECHNIQUE**

The Statistical Package for Social Sciences (SPSS, Version 20.0 for Windows XP) was used to construct the norm. An alpha level of 0.05 was used to determine statistical significance. The data collected were analyzed with the following statistical techniques.

1. Descriptive statistics was used to find out the mean and standard deviation of selected variables among Engineering College Men Hockey Players.
2. After collecting the raw scores mean and standard deviation were computed by the formula suggested by Donald Mathews.
3. After calculating the mean and the standard deviation(s) the scores were converted into percentile scale and 6- sigma scale for developing final grade.

**FLOW CHART SHOWING METHODOLOGY OF THIS STUDY**