Chapter-III

METHODOLOGY

In this study the physical, psychological and performance variables of Southern Region men hockey teams were assessed in different playfields. The procedure adopted for the selection of subjects, selection of variables, reliability of data, instrument reliability, testers competency, subject’s reliability, orientation of subjects, collection of data and statistical techniques employed for analysing the data have been described in this chapter.

The investigation should be done with every possible care in administering the above steps to get the best results through this study.

3.1. SELECTION OF SUBJECTS

The subjects selected for this study were twenty men hockey players from each Southern Regions namely Puducherry, Tamilnadu, Karnataka, Kerala, Andrapradesh and Hyderabad, who had participated in the Senior South Zone and Senior National hockey championships during the years 2006 –2007 and 2007 –2008. The age of the senior region men hockey players were between 22 to 28 years.

3.2. SELECTION OF VARIABLES

In this study the following physical, psychological and performance variables were selected as variables, which were considered as the essential ingredients for the game of hockey. In this regard the available scientific literature pertaining to the game of Hockey from periodicals, journals, magazines, research articles and books were reviewed. Resulting from the reviews of literature and the discussion with experts and my own
understanding and also considering the feasibility criteria of the study, in terms of availability of instruments, equipments, and relevance of variables to the present study, the following variables were selected for the analysis.

1. Physical Variables
   a) Speed
   b) Agility
   c) Power

2. Psychological Variables
   a) Self Confidence
   b) Anxiety
   c) Aggression

3. Performance Variables
   a) Dribbling
   b) Hitting
   C) Trapping

3.3. SELECTION OF PHYSICAL VARIABLES

3.3.1. Speed

An essential physical ingredient for successful performance in many activities is speed. Hockey is a game which involves running with and without ball in various directions. Speedy players were always an asset to every team in match winning performances. Speed in hockey refers often to one’s ability to accelerate over a short distance. Penetration into the opponent territory with and without the ball can be achieved more easily with speed and an attack can be launched by speedy runs. So speed appears to be one of the most important factors in the modern hockey. Since speed is applicable to all playing positions it is relevant to analyses the speed of
the subjects. Considering the importance of speed the investigator selected speed as one of the physical variable in this study.

3.3.2. Agility

Agility is to change the direction of the body and its parts rapidly and accurately. In the game of hockey agility is more important for all the teams playing in different position to dodge, to tackle and to defend the ball from the attacker. Agility is more important for the hockey teams while playing in different playfields. Playing in artificial field teams must have very good agility so that they can turn in the required direction quickly. After the introduction of the artificial field, physical variables were considered as most important for each player to perform well.

Taking into consideration of the above importance the agility was selected as one of the physical variables for this study.

3.3.3. Power

Leg muscles, strength and power are important factors for a hockey player. Artificial fields require more power on the legs since the game of hockey requires more running. Playing in the artificial field requires more power than playing in other playfields like grass or gravel. In all the major competitions such as Olympics, World Cup, Asian games, Asia cup, Champion trophy and Common Wealth games, Hockey is played only in the artificial fields. The artificial field is made with artificial grass and to play in the artificial field more power is needed. Playing in the grass field and gravel field may not require power as in the artificial field.

High level of physical fitness is required for good performance in hockey. Fitness requirements will vary according to the team’s levels, playing position and according to the different playfields. A special technique implies not only the specific movements necessary for the sport
concerned but all the related and general complementary movements such as running and jumping. When movements are correctly and economically executed, the standard of the performance can be greatly improved. All the anaerobic activities are related to leg power. Greater the leg power, better the anaerobic performance in the field of sports and games. Hence power plays a vital role in all the anaerobic activities. Because of the above reasons power was selected as a physical variable, for this study.

3.4. SELECTION OF PSYCHOLOGICAL VARIABLES

3.4.1. Self-Confidence

Self-Confidence is a very essential quality of a hockey player. Self-confidence plays a vital role for good performance. Self confidence appears in almost every theoretical account of behaviour. In the field of physical education and sports no teams can win or even show better performance without self-confidence. Self confidence is a very essential quality of sportsmen. A player should have self confidence to achieve high goal. If the player was doubt about his success then the player will not perform well. Self confidence is a boosting variable which helps a performer to do his work in a good manner. Taking into consideration of the importance, self-confidence was chosen as a variable.

3.4.2. Anxiety

Anxiety can either enhance or inhibit performance, whether its effect is positive or negative depends on how a hockey player perceives the situation. People with low strait levels have been known to perform better in selected skills than those with high. A straight level, there is also positive relationship between a trait and region levels of participants in hockey tournaments.
A moderate level of anxiety seems best for the acquisition and performance of skills levels of anxiety either too high or too low trend of inhibit learning and performance.

3.4.3. Aggression

Aggression and performance are thought to be positively related in sports setting are not surprising. Aggressive behaviour is a behaviour designed to harm others. It can be taken physical and verbal forms and can be aimed at physical weakening and psychologically harming others.\textsuperscript{iii2}

Aggression has a positive influence on the performance outcome of an individual or team if the aggressive behaviour harmed the opposition either physically or psychologically either by weakening their resources.

A group’s aggressive behaviour can help its performance outcome by weakening the opposite’s “unity bounds of collective strength and reducing their” sense of control of the opposition. Taking into consideration of the above things aggression has chosen as one of the variable.

3.5. SELECTION OF PERFORMANCE VARIABLES

3.5.1. Dribbling

In modern hockey, the man to man dual is decisive. During the game situation when there is no possibility of scoring or passing the ball to the team mates, dribbling helps the player to find the appropriate opportunity for the next pass. Dribbling is an important aspect of individual tactics. The great dribblers have been creative artists. Good dribblers have the magical powers to attract the crowd.

Dribbling plays a vital role for an individual to possess the ball while the opponent tries to tackle the ball from the dribbler. Dribbling differs from individual to individual and also from one playfield to another
playfield. When a player wants to carry or propel the ball for a longer distance, the dribbling helps to do the same. Recent studies have shown that performance variable dribbling has got direct relationship with the hockey performance and no study has been done to find out the difference of the performance variable in different playfields. Taking into consideration of the above facts dribbling has been selected as one of the performance variable in this study.

3.5.2. Hitting

Hitting is one of the most important fundamental skills in hockey. Hitting plays a vital role in the modern hockey. The hit in, free hit, 16 yards free hit, long corner and the penalty corners are mostly taken by hitting. To score the goal, to clear the ball for a longer distance from the dangerous zone, long pass or diagonal pass and also for cross pass hitting is the prime skill to execute these tactics. It is recognized that among the fundamentals the ability to hit the ball is needed for high level of performance. The ability to hit the ball is more important in the artificial field, gravel and grass field in all the aspects. The technique of hitting may vary from one playfield to another playfield. Because the ball moves faster in the artificial field than the other two play fields. At the same time more power is required in the artificial field to execute hitting at a faster rate because the artificial field has got friction due to the water on the field. In the gravel field less power is required than it is required in the grass field. Because of the above qualities hitting was chosen as one of the performance variable for this study.
3.5.3. Trapping

This is also one of the most important basic skills in the game of hockey. A player insists this skill to his or the team’s advantage to execute the next move. The perfection of trapping not only shows the individual superiority of executing the skill but also to the successful team tactics. Considering the above facts trapping was selected as one of the performance variable for this study.

3.6. RELIABILITY OF DATA

The reliability of data was ensured by establishing the rater’s reliability, instrument reliability, tester’s competency and reliability of test and the subject’s reliability.

3.7. INSTRUMENTS RELIABILITY

The stop watches, measuring tapes, flags, used for measuring hockey skill tests were considered reliable as they were procured from reputed firms and were on use for research purposes. Further these instruments had been calibrated in standard units. To determine the reliability of the instrument, the measurements on each of the variables were recorded five times under similar conditions using the same instruments and the scores obtained were the same. The scores were compared with other scores taken from the instruments purchased from other reputed firms. Thus they were considered reliable and precise for the purpose of this study.

Agnihothir’s self confidence inventory developed by Rehkah Agnihothir was used to measure the level of Self – Confidence of the players. SCAT Questionnaire developed by Rainer Mortin was used to find out the level of Anxiety of the player. Smith’s Aggressive inventory
developed by ‘Bandura’ was used to find out the level of aggression of the player.

3.8. TESTER’ S COMPETENCY AND RELIABILITY OF TEST

The tester’s competency was assessed together with the reliability of the test. To determine the reliability of the test the performance of the 10 subjects were selected at random for each of the chosen variable, were recorded twice under similar conditions by the scholar. This was done by the test retest method on two consecutive days. The tests were administered in the evenings between 4 and 6 p.m. The scores thus obtained for each variable by test retest method were correlated using Pearson’s Product Moment correlation method as suggested by Garrett.

The coefficient of correlation are presented in Table-I

TABLE- I

RELIABILITY COEFFICIENT OF CORRELATION OF TEST RETEST SCORES

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Coefficient of Correlation “r”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grass</td>
</tr>
<tr>
<td>Speed</td>
<td>0.92</td>
</tr>
<tr>
<td>Agility</td>
<td>0.90</td>
</tr>
<tr>
<td>Power</td>
<td>0.93</td>
</tr>
<tr>
<td>Self Confidence</td>
<td>0.86</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.85</td>
</tr>
<tr>
<td>Aggression</td>
<td>0.85</td>
</tr>
<tr>
<td>Dribbling</td>
<td>0.86</td>
</tr>
<tr>
<td>Hitting</td>
<td>0.88</td>
</tr>
<tr>
<td>Trapping</td>
<td>0.87</td>
</tr>
</tbody>
</table>

Table value of 0.05 level = .835 df = N-2 = 10-2 = 8

60
Tabulated $r = .835$ df = 8 at 0.05 level of confidence since the obtained ‘r’ s were more than the table value the reliability of the tests were considered reliable at 0.05 level of confidence.

3.9. SUBJECT’S RELIABILITY

The test retest co-efficient of correlation also indicated the subject’s reliability as the same subjects were used under similar conditions by the same tester. No motivational techniques were used at the time of testing period.

3.10. ORIENTATION OF SUBJECTS

In order to get full co-operation from the subjects the investigator very clearly explained about the purpose of the study.

Prior to the administration of test it was very clearly explained to the subjects in detail about the procedure to be followed in the tests. This explanation helped very much to ensure the effective co-operation from the subjects to obtain the reliable data. Model performances by some of the subjects were also done to make the subjects clearly understand the tests related to the study.

3.11. COLLECTION OF DATA

The administration of test and method of collection of data were explained here.
3.12. DESCRIPTION OF PHYSICAL VARIABLE TESTS

3.12.1. 50 Meters dash test

Objective

The purpose of the 50 meters run was to measure the subjects speed.

Equipment

Measuring tape, stop watch, red, white flags, whistle, clapper and lime powder.

Description

Each subject was asked to start behind the starting line. The starter used the commands “Ready” and “Go” and the word go clapper is also sounded accompanied by a downward sweep of the starters arm as a signal to the timer. Three trials were given in all the three playfields like grass, gravel and the artificial fields, the best time was recorded in seconds as the subject’s score in each playfield separately.

Score

The score was the time elapsed to the nearest 1/10th of a second between the starting commands and instant the subject crossed the finishing line. The best time out of three trials was recorded as the Individuals score.
50 METERS SPRINT TEST
3.12.2. Shuttle run test

Objective

The purpose of the test was to measure the subject’s agility.

Equipment

Measuring tape, stop watch, wooden blocks, lime powder, whistle and clapper.

Description

Two lanes parallel to each other were placed on the field 30 feet apart. The subject stood behind one of the lanes with 2 blocks at the other lane. On the signal "start" the subject ran to the blocks took one block, and return to starting line and placed the block behind that line. The subject returned to the second block, which was carried across the starting lane on the way back. Two trials were given and the best trial was taken into account. Tests were conducted in all the three playfields.

Score

The score was the elapsed time recorded in seconds and one tenths of seconds for the better of 2 trials.
SHUTTLE RUN TEST
3.12.3. Standing broad jump test

Objective
To measure the leg explosive power of the subjects.

Equipment
Measuring tape and lime powder

Description
The subject should stand behind the take off line with his feet several inches apart. Before jumping the subject should dips at the knees and swinger the arms backward, then jumped forward by simultaneously extending the knees and swinger the arms forward. Three trials were given in each playfields. Measurement was taken from the closest heel mark to the take off line. Tests were conducted in all the three playfields.

Score
The score was the distance between the take off line and the nearest point where any part of the subject’s body touched the playfield. The best of three trials was recorded.
STANDING BROAD JUMP TEST
3.13. DESCRIPTION OF PSYCHOLOGICAL VARIABLE TESTS

3.13.1. Self-Confidence

**Purpose**

To find out the Self-confidence level of the men hockey teams.

**Equipment**

Agnihothri Self-Confidence questionnaire developed by Rekha Agnihothri.

**Description**

The Agnihothri’s Self Confidence inventory was given to all the subjects to measure the self confidence. All the items (questions) were adopted for this investigation. The inventory was scored by hand. A score of ‘one’ is awarded for a response indicative of lack of self-confidence. That is for marking [X] to wrong responses to item numbers as follows. They are 2,7,23,31,40,43,44,45,53,54 and 55 for marking [X] to the rest of the items. Lower the score the higher would be the level of self-confidence and vice-versa.
3.13.2. Anxiety

Purpose
To measure the level of anxiety of the subjects.

Equipment
Sports competition Anxiety Test (SCAT) questionnaire developed by Rainer Martin.

Description
Scat questionnaire was given to all the subjects. Fifteen items were adopted from SCAT for this investigation. The questionnaire was scored as follows:
The item 2, 3, 5, 8, 9, 12, 14 and 15 were scored as per the response.\(^8\)

- Hardly ever - 1 point
- Some times - 2 points
- Often - 3 points

Items 6 and 11 were scored as

- Hardly ever - 3 points
- Some times - 2 points
- Often - 1 point

and items 1, 4, 7, 10, 13 were not scored.
3.13.3. Aggression

Purpose
To measure the level of aggressiveness of the men hockey teams.

Equipment
Smith’s Aggressive inventory developed by Bandura.

Description
Standardised Smith’s aggressive questionnaire developed by Bandura was given to all the subjects. The inventory consists of four questions with five levels. The subjects have to response in five levels such as strongly disagreed to strongly agree. The resposes were made encircle the appropriate numbers which suited to their attitude. The inventory was scoured with the help of the scoring key given below. The range of scores was from 4 to 20. The higher the score the level of aggressiveness is high and vice-versa.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Responses</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Strongly disagree</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Undecided</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Agree</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>Strongly Agree</td>
<td>5</td>
</tr>
</tbody>
</table>
3.14. DESCRIPTION OF PERFORMANCE VARIABLE TESTS


Objective
The purpose of “W” form dribbling test was to measure the subjects speed and ball control.

Equipment
Hockey balls, hockey sticks, measuring tape, whistle 5 flag posts, stop watches and lime powder.

Marking
Three flag posts A, C and B were placed in a straight line at a distance of 5 meters from one another. An arc of 5 meters is drawn from point A and C and C and B and flag post are placed at the intersecting points namely B and D.

Description
The subjects starts from flag A and moves with the ball by dribbling forward on the signal “go” and moves to flag B then takes a left turn move to flag C takes a right turn move to D and takes left turn move to B and return back to the starting point by covering the flag posts D, C, B and A respectively. This test was conducted in all the three playfields.

Score
Two chances were given in each playfields. The watch was operated on the signal “go” and was stopped when the subjects returned back to the starting point flag A. The time was recorded in 1/10th of a second as the score of the subject.
“W” FORM DRIBBLING TEST
3.14.2. Hitting for accuracy test

Objective
The purpose of hitting for accuracy was to measure the subject’s accuracy in hitting.

Equipment
Hockey balls, hockey sticks, 2 flag posts, goal post, lime powder.

Marking
A shooting circle is marked. The goal posts either side marked with one meter and flag posts are fixed at this point.

Description
The balls are placed at the top of the shooting circle. The player stands on top of the circle and has to take the ball one by one and shoot the stationary ball to the corners of the goals marked alternatively on left side and right side. Test was conducted in all the three playfields.

Score
10 balls were placed at the top of the circle 16 yards away from the nearest goal posts. Two trials were given to each subject. The subject has to hit the ball alternatively to the right side corner and left side corner of the goal post. One point was awarded for each goal scored accurately. The number of goals scored was recorded as the score of the subject. The test was conducted in all the three playfields.
HITTING FOR ACCURACY TEST
3.14.3. Trapping test

**Objective**

The purpose of trapping test was to measure the subject’s trapping ability.

**Equipments**

Hockey sticks, hockey balls, measuring tape and lime powder.

**Description**

The subjects were asked to stand on the goal line one by one and other subjects should stand on the top of the shooting circle with 10 balls and were asked to hit it into the goal post. The subject standing on the goal line was asked to stop the ball with the stick using any type of technique. The test was conducted in all the three playfields.

**Score**

Three chances were given to each subject in all three playfields. Three experts were assessed the trapping ability of the subjects using five point rating scale (Appendix-B). The mean score of the experts was the individuals score.
TRAPPING TEST
3.15. STATISTICAL TECHNIQUE

1. To find out the differences between the physical, psychological and performance variables in different playfields the statistical method repeated measures ANOVA was used.

2. To compare the physical, psychological and performance variables among the southern region men hockey teams repeated measures ANOVA was used followed by simple effects test as suggested by Clarke and Clarke for interpreting the results. To find the significant differences Scheffe’s post hoc test was used as suggested by Clarke and Clarke.

All the statistical analysis was done with the help of SPSS Package. The level of significance chosen was at 0.05 level.