CHAPTER - III

PROCEDURE AND METHODOLOGY

In this chapter, the research scholar explained how he has conducted the present research work. The procedure has been explained in line with the delimitations, objectives and selected variables and protocol of testing procedures. For the purpose of the present study, the applied procedure and methodology was explained, which were adopted under the following headings like: selection of the subjects, selection of the variables and their tests, design of the study, instrumental reliability, reliability of data and subjects, administration of the tests, and administration of anthropological tests, physical fitness and psychological tests items to assess the psycho-motor ability, collection of the data and statistical procedure applied for the study, have been described in details:

Selection of the Subjects:

Initially, one hundred Kabaddi and Kho-Kho players were selected on random basis for the present study. The designated delimitations for the present study were kept in mind for the selection of the subjects; those have participated in Delhi School’s Zonal, Inter-zonal and School National Games represented respective team of Delhi Schools. It was also taken into consideration that all the selected subjects were ranged from 16 to 19 years of age and who were involved in regular practice for their respective games of Kabaddi and Kho-Kho to remain physically and mentally fit. Finally, total 50 players were randomly selected from Kabaddi and 50 players were selected from game of Kho-Kho. It was also kept in
mind that all the subjects should participate voluntarily for purpose of data collection during present study.

**Selection of the Variables and their Tests:**

For the present study, the research scholar has gone through the various literatures to finalize the variables. The selection of the variables was utmost important as the total procedure and administration was dependent upon the nature of selection of variables. The variables are the key direction for the nature of the findings and outcomes from the present study. The experts were also consulted to get appropriate and rational suggestions to finalize the variables. The following variables and their test items anthropological and psycho-physical variables were selected for the purpose of present study:

**Anthropological Components:**
(a) Height  
(b) Body Weight  
(c) Body Mass Index (BMI)

**Physical Fitness Components and their Tests:**
(a) Speed : 40m. Sprint Test  
(b) Explosive Strength : Standing Broad Jump  
(c) Cardio-vascular Endurance : 12min. run/walk test  
(d) Coordinative Ability : 4X10 m Shuttle Run  
(e) Flexibility : Sit and Reach Test  
(f) Muscular Strength : One Minute Sit-ups
Psychological Components and their Tests:

The psychological abilities were measured through the selected test items mentioned here as under:

(a) Psycho-motor Ability : Eye-hand Coordination Test
(b) Concentration : Grid Concentration Test
(c) Sports Competition Anxiety Test (SCAT)

Design of the Study:

The design of the study was on the basis to compare the groups specified for Kabaddi and Kho-Kho in relation to the selected variables related to psycho-motor abilities. The selected tests were administered and their measurements were for the test items such as: Height, Body Weight, Body Mass Index (BMI), Speed: 40m Sprint, Explosive Strength: Standing Broad Jump, Cardio-vascular Endurance: 12 minutes Run/Walk Test, Coordinative Ability: 4X10m Shuttle Run, Flexibility: Sit and Reach Test, Psycho-motor Ability: Eye-hand Coordination Test, Concentration: Grid Concentration Test and Sports Competition Anxiety Test (SCAT).

The tests were conducted on all the one hundred randomly and voluntarily selected subjects and data were collected. The present study was designed to assess the comparison among the selected group of players of Kabaddi and Kho-Kho. The above mentioned variables were the basis of the present study for which it was designed to collect the appropriate data from the selected test items. The appropriate statistical analyses were applied for assessing the requisite results related to Kabaddi and Kho-Kho players.
Administration of the Test Items:

The research scholar has adopted required guidelines and precautions to be followed. The prescriptions suggested by Rikli and Jones for administration of the selected test items were taken into consideration. The detailed procedures for administering different tests have been described here as under:

1. **Body Mass Index** *(Height and Weight)*:

   The Body Mass Index (BMI) is a simple measure of the lean weight and fat weight components. It is used in epidemiological research and has a moderately high correlation \((r=-.69)\) with body density. It is easily calculated from the following formula:

   \[
   \text{BMI} = \frac{\text{Weight}}{\text{Height}^2}
   \]

   Where, the weight is measured in kilograms and height in meters.

   BMI is a very simple tool. Its best use is for risk assessment for the general population to calculate body fat. It was compared to height-weight tables though; it has a much higher association with body fat of a person. It has another simple formula to calculate the BMI:

   \[
   \text{BMI} = \frac{\text{Body mass in kilograms}}{(\text{Height} \times \text{Height in meters})}
   \]

   (Divide if weight is in lbs. by 2.2046 to get weight in kilograms)

   So, as an example a 150lb (68kg) man/woman who is 165cm (1.65m) tall.
BMI = 68/ (1.65 x 1.65) 
= 68/ 2.7 
BMI = 25.185

This person has a Body Mass Index of 25.185 then there is an association between BMI and many major degenerative diseases. As, BMI increases so does their risk of ill health.

TABLE: 1

BODY MASS INDEX AT A GLANCE TO VIEW THE STATUS

<table>
<thead>
<tr>
<th>Classification</th>
<th>Risk</th>
<th>BMI Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>Moderate</td>
<td>less than 18.5</td>
</tr>
<tr>
<td>Normal</td>
<td>Very low</td>
<td>18.5 - 24.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>Low</td>
<td>25.0 - 29.9</td>
</tr>
<tr>
<td>Obese Class 1</td>
<td>Moderate</td>
<td>30.0 - 34.9</td>
</tr>
<tr>
<td>Obese class 2</td>
<td>High</td>
<td>35.0 - 39.9</td>
</tr>
<tr>
<td>Extreme obesity</td>
<td>Very high</td>
<td>greater than 40.0</td>
</tr>
</tbody>
</table>
2. SPEED: 40M SPRINT

Purpose: To assess speed

Objective: To run as fast as possible.

Equipment: Two stopwatches, athletics track or leveled surface to run, lime powder to mark.

Instructions: For safety purposes, the subjects were asked to do warm-up for 20 minutes including jogging, strides, loosening, stretching exercises etc. They were also explained and demonstrated sprint start and its commands.

Procedure: After a light warming-up period, the subjects took his/her position on the line. Four subjects run at a time. On signal ‘GO’ the subjects started his/her race.

Scoring: The score was taken as lower time of two stop watches for each subject.

3. STANDING BROAD JUMP:

Purpose: To measure Explosive power

Equipment: Measuring tape and jumping pit.

Procedure: The subject stood behind the takeoff line. He/she were asked to bend his / her backward before the execution of jump. Then he/she jumped forward by extending his/her knees and swings his/her arms forward and
upward simultaneously. Measurement was taken from the heel impression closest to the takeoff line to the inner edge of the takeoff line. He/she executed take off from both the feet and jumped as ahead as possible and landed on both the feet. Three trials were permitted.

**Scoring:** The score was the best of the three distances recorded in feet and inches.

4. **CARDIOVASCULAR ENDURANCE: 12MIN. RUN/WALK TEST:**

**Purpose:** To assess endurance

**Objective:** To run/walk as fast as possible for 12 minutes

**Equipment:** 400m /200m Athletics Track, stop watch, track is used or another suitable running area measured so that exact distances are indicated. Distance covered in 12-minutes is then compared to the score.

**Instructions:** This is a timed run to measure the heart and vascular system’s capability to transport oxygen. It is an important area for performing police tasks involving stamina and endurance and to minimize the risk of cardiovascular problems. The score is in minutes and seconds.

**Procedure:** It is aerobic power test; the term “aerobics” was adopted from the term “aerobic" which refers to the type of metabolism utilizing oxygen in the production of energy for the body. The 12-minute run/walk test is used to determine the efficiency of the cardio-respiratory system.
Scoring: The total time taken for 12 minutes run/walk test was recorded as final score.

Important Suggestions Related to the Administration of the 12 Minutes Run/Walk Test:

i) It was advised to maintain pace to avoid fatigue, practice running and pacing prior to the test.

ii) Allow adequate time for stretching and warm-up exercises.

iii) During the test, time will be called-out.

iv) Guide them run according to their best of capability and endurance and do not over load yourself during course of the run. In case, continuous run is not possible, they may walk at their convenient distance and again they may resume running as per their convenience.

v) Do not disturb and talk to the other subjects so they may perform better and as per their level of capability.

vi) It was instructed that one minute before a whistle will blow to indicate about the remaining time to motivate for the best coverage during one minute time.

vii) At the finishing time, a long whistle will blow to indicate to stop as it is form and where is your position. It was also indicated that nobody should run or walk after the final whistle.
v) Cool down; keep walking for five to ten minutes after the run to prevent pooling of blood in the lower extremities.

5. FLEXIBILITY- SIT AND REACH TEST

**Purpose:** To assess flexibility

**Objective:** To bend and reach as fast as possible. The standard flexibility tests that measures lower back and hamstring flexibility.

**Equipment:** It requires a box about 30cm (12 inches) high and a meter rule.

**Instructions:** Sit and Reach Test:

**Procedure:** Use these flexibility tests before you begin a stretching program and then every 6-8 weeks during your flexibility training. Before you perform these tests make sure you warm up thoroughly with 10 minutes of light jogging or skipping.

**Scoring:** The score is in the centimeters reached on a yardstick.

**Important Suggestions Related to the Administration of the Sit and Reach Test:**

1. Sit on the floor with your back and head against a wall. Legs should be out straight ahead and knees flat against the floor.
2. Have someone place the box flat against your feet (no shoes). Keeping your back and head against the wall stretch your arms out towards the box.

3. Have someone place the ruler on the box and move the zero ends towards your fingertips. When the ruler touches you fingertips you have the zero point and the test can begin.

4. Lean forward slowly as far as possible keeping the fingertips level with each other and the legs flat. Your head and shoulders can come away from the wall now. Do not jerk or bounce to reach further.

5. Slowly reach along the length of the ruler 3 times. On the third attempt reach as far as possible and hold for 2 seconds. Repeat twice and recorded the best score.

6. **ONE MINUTE SIT-UPS TEST:**

   **Purpose:** To measure abdominal strength. This is a measure of the muscular endurance of the abdominal muscles. It is an important area for performing police tasks that may involve the use of force and is also an important area for maintaining good posture and minimizing lower back problems.

   **Equipment:** Duties were spread on the ground and used for this purpose. Stop watch was used for noting time.

   **Procedure:** The subject lay on his back with knees bend, feet on the floor, and heels not more than 12 inches from the buttocks. The subject puts his hand on the back of the neck with finger clasped and places elbows squarely on the mat. Feet were held by the partner to keep them in contact with surface. The subject tightened
his abdominal muscle and brought head and elbow to the knees. This constituted one sit-up. He returned to the starting position with elbow on the surface before he started. On the command of ‘GO’ the subject started the sit-up. The performance was stopped on the word stop.

7. **Scoring:** The number of correct executed sit-ups performed in sixty seconds was the score or the score is in the number of bent leg sit-ups performed in one minute.

8. **PSYCHOMOTOR ABILITY- EYE HAND COORDINATION TEST:**
   
   **Purpose:** To assess the eye-hand coordination of the subjects.

   **Objective:** To complete the assigned task as fast as possible accurately.

   **Equipment:** Psychomotor sheet (attached as appendix), pencil and Casio stop watch

   **Instructions:** The subjects were asked to complete the line in between the two interlinked squares without lifting the pencil and touching the either line of the squares.

   **Procedure:** The subjects were asked to sit comfortably on the desk or chair without any hurdles to write on the table. After the important instructions, first they were asked to complete the example given on the sheet, when they well understand the procedure How to do the task? Than they were asked to follow the command of the scholar/teacher, when they told to start the work and when asked to stop they have to stop at once and put the pencil and sheet separately. The total of five
minutes was given to do the assigned work or complete the maximum possible squares correctly.

**Scoring:** The squares were tested with the help of magnifier, if any line of the square was touched or break in between the line that was not counted. Only correct squares were included in the final score.

9. **CONCENTRATION- GRID CONCENTRATION TEST:**

**Purpose:** To assess concentration ability.

**Objective:** To find-out the counting in sequence wise as fast as possible and cross with pencil.

**Equipment:** Grid test sheet for all the subjects, pencil, and Casio stop watch.

**Instructions:** Follow the instructions of the scholar, mind the command of start and stop, find the counting sequence wise and cross that with pencil.

**Procedure:** All the subjects were asked to follow the instructions, after giving the Grid test sheets asked to find out the counting in sequence like 1, 2, 3, 4, 5, 6… and cross them with the help of pencil. The counting was written on the sheets from 1 to 100 in jumbled form.

**Scoring:** The sequence crossed counting was included in the final score. If left out any sequence one mark was reduced in the score.
10 SPORT COMPETITION ANXIETY TEST (SCAT)

Purpose:-

The sports Competition Anxiety Test is latest and most popular sport-specific anxiety test whose purpose is to assess individual differences in sports competitive trait anxiety or the tendency to pursue competition situations, as threatening, and /or to respond to these situations with elevated state anxiety.

Sports competition anxiety test questionnaire (SCAT) prepared by Rainer Martens (1986), was originally constructed for children (ages 10-15), its adult version was developed later on by suitably modifying the instructions and items. A reliability quotient of 0.85 had been reported for the adult version of SCAT.

Procedure:-

The SCAT questionnaire (Appendix-A) contains fifteen items. The subjects were asked to indicate how they generally felt in competitive sports situations, and responded to each item using a three point ordinal scale (hardly ever, sometimes, or often).

Out of fifteen items, only ten items assess sports competitive trait anxiety proneness (e.g., “Before I compete I feel uneasy”) and used for scoring purpose. These ten items were: 2, 3, 5, 6, 8, 9, 11, 12, 14, and 15. The remaining five test items were the spurious items, which were added to the questionnaire to diminish response bias towards the actual test items (e.g., “Competing against others is socially enjoyable”). These five spurious items were not scored. These spurious were: 1, 4, 7, 10 and 13.

Every statement had three possible responses i.e.:-

1. Hardly ever
2. Sometimes
3. Often
While the subjects were responding to the questionnaire, the scholar went around verifying that they were recording answers sequentially and explained the meaning of the words in case of doubts.

**Scoring:-**

The scholar scrutinized the completed questionnaire in order to ensure that the subject responds to every item and there was no question left unanswered. The items 2, 3, 5, 8, 9, 12, 14 and 15 were worded in such a manner that they were scored according to the following key:-

<table>
<thead>
<tr>
<th>Score</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hardly ever</td>
</tr>
<tr>
<td>2</td>
<td>Sometimes</td>
</tr>
<tr>
<td>3</td>
<td>Often</td>
</tr>
</tbody>
</table>

In the case of items 6 and 11 scoring was carried out according to the following key:-

<table>
<thead>
<tr>
<th>Score</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Often</td>
</tr>
<tr>
<td>2</td>
<td>Sometime</td>
</tr>
<tr>
<td>3</td>
<td>Hardly ever</td>
</tr>
</tbody>
</table>

However spurious questions i.e. 1, 4, 7, 10, and 13 were not be scored as suggested by Rainer Martens.

If a subject deleted one of the test items, her prorated full scale score was obtained by computing the mean score for the nine items answered, multiplying this value by ten values by ten, and rounding the product to the next whole number. When two or more items were omitted, the respondent’s questionnaire was invalidated.

Total scores of SCAT ranged from 10 (low competitive anxiety) to 30 (high competitive anxiety). The subjects were assigned to the following category according to the score obtained by them:
Responses obtained from the subjects on each statements of sports competition anxiety questionnaires were subjected to statistical treatment keeping in view the purpose of study.

**Sport-Confidence Inventory**

**Purpose:-**

To measure sport self-confidence Sports Self Confidence Inventory (Appendix -B) prepared by Robin S. Vealy (1986) was used for this study Questions were based on how confident players generally felt when they competed in sports. They compared their self-confidence to the most confident athlete the knew. A reliability quotient of 0.73 was reported for the Sport Confidence Inventory.

**Procedure:-**

Sport confidence inventory has thirteen items. There are no rights or wrong answers in the inventory. Every question has nine possible responses, i.e. 1 to 3 low, 4 to 6 medium, 7 to 9 high. The subjects were instructed to respond to each question how they felt by placing a circle on the appropriate response.

**Scoring:-**

The scholar scrutinized the completed questionnaires in order to ensure that the subjects respond to every item and there was no question left unanswered. The level of self-confidence depends upon the score obtained. The subjects were assigned to the following categories according to the scores obtained by them:

<table>
<thead>
<tr>
<th>Raw/Mean Score</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 17</td>
<td>Low Anxieties</td>
</tr>
<tr>
<td>17 – 24</td>
<td>Moderate Anxiety</td>
</tr>
<tr>
<td>More than 24</td>
<td>High Anxiety</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Raw/Mean Score</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 – 47</td>
<td>Low Self –Confidence</td>
</tr>
<tr>
<td>48 – 82</td>
<td>Moderate Self-Confidence</td>
</tr>
<tr>
<td>83 – 117</td>
<td>High Self-Confidence</td>
</tr>
</tbody>
</table>
Responses obtained from the subjects on each statement of self confidence inventory were recorded for analysis of data.

**TABLE - 2**

**TESTER’S RELIABILITY THROUGH COEFFICIENTS OF CORRELATION**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Variables / Test Items</th>
<th>‘r’ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body Mass Index</td>
<td>0.88</td>
</tr>
<tr>
<td>2</td>
<td>40 m Dash (in Secs.)</td>
<td>0.97</td>
</tr>
<tr>
<td>3</td>
<td>Standing Broad Jump (in cms.)</td>
<td>0.95</td>
</tr>
<tr>
<td>4</td>
<td>Sit &amp; Reach Test (in cms.)</td>
<td>0.90</td>
</tr>
<tr>
<td>5</td>
<td>Sit-ups Test (in count)</td>
<td>0.98</td>
</tr>
<tr>
<td>6</td>
<td>12 Min. Run/Walk Test (in m.)</td>
<td>0.92</td>
</tr>
<tr>
<td>7</td>
<td>Psycho-motor Ability Test</td>
<td>0.89</td>
</tr>
<tr>
<td>8</td>
<td>Grid Test</td>
<td>0.95</td>
</tr>
<tr>
<td>9</td>
<td>SCAT-Test</td>
<td>0.96</td>
</tr>
</tbody>
</table>
**Instrumental Reliability:**

For the purpose of the test all the instruments were used of high standard and reputed companies and were calibrated by the respective companies. The stop watches were used from Casio Company make.

All the instruments were calibrated prior to the actual testing procedure with the help of experts and also gone through the several practice trials with instruments and testing.

Therefore, it was well established reliability of the instruments used in the present study.

**Statistical Procedure:**

For the purpose of the analyses, the following statistical procedures were employed:

In first step, descriptive statistics was employed in which Mean; SD, Minimum and Maximum scores were computed. The required statistical calculations were computed with the help of SPSS software. The descriptive calculation and ‘t’ test were computed. Then, both the groups were tested to observe the differences among the selected variables.

The level of significance was set at .05 level of confidence.