

## **Chapter III**

### **METHODOLOGY**

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

The purpose of the present study was to compare the selected physical, physiological and psychological variables among Basketball, Football and Volleyball Players. To achieve the purpose of the study, thirty women Basketball, thirty women Football and thirty women Volleyball players were selected randomly, a total of 90 players from the Tirunelveli District who had participated in the inter-district/divisional tournament. The selected players were divided in to three groups with 30 players each according to their events as Basketball, Football and Volleyball.

Power analysis for a one-way ANOVA with 3 groups was conducted in G\*Power to determine a sufficient sample size using an alpha of 0.05, a power of 0.80, and a large effect size ( $f = 0.40$ ) (Faul et al., 2013). Based on the aforementioned assumptions, the desired sample size is 66.

#### **3.2 SELECTION OF VARIABLES**

Through intensive study of the 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.

Physical fitness, physiological and psychological parameters are the ideal indicators of sports performance of an individual. High sports performance is merely the product of physical, physiological and psychic prerequisites possessed by an individual sportsman. Hence, the following variables were selected for this study.

### **Physical Variables (Motor qualities)**

Speed

Leg Explosive Power

Agility

### **Physiological Variables**

Resting Pulse Rate

Respiratory Rate

Peak Flow Rate

### **Psychological Variables**

Cognitive Anxiety

Somatic Anxiety

Self-confidence

Achievement Motivation

### 3.3 SELECTION OF TESTS

The present study was undertaken primarily to compare the selected physical, physiological and psychological variables among district level women Basketball, Football and Volleyball Players. As per the available literature, the following standardized tests were used to collect relevant data on the selected dependent variables and they were presented in the Table I.

**TABLE I**  
**TESTS SELECTED**

S.No	Criterion Variables	Test items	Unit of Measurement
1	Speed	50 meters dash	In seconds
2	Leg explosive power	Vertical jump	In centimeters
3	Agility	Shuttle run	In seconds
4	Resting pulse rate	Radial pulse method	Beats per minute
5	Respiratory Rate	Manual Method	Breath per minute
6	Peak Flow rate	Peak Flow meter	mm <sup>3</sup>
7	Cognitive Anxiety	Martens et al (1990) CSAI-II questionnaire	In numbers
8	Somatic Anxiety		
9	Self confidence		
10	Achievement Motivation	Sports Achievement Motivation Questionnaire	In numbers

### 3.5 RELIABILITY OF THE INSTRUMENTS

The Sargent jump board, stopwatch, measuring tape, peak flow meter used in this study were availed from standardized company. The instruments were purchased from the reliable and standardized companies and were considered accurate enough for the purpose of the study.

### 3.4 COMPETENCY OF THE TESTER

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

### 3.6 RELIABILITY OF THE DATA

Test and retest method were 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 VARIABLES**

S.No.	Variables	'R' Value
1	Speed	0.87*
2	Leg explosive power	0.82*
3	Agility	0.86*
4	Resting pulse rate	0.95*
5	Respiratory Rate	0.97*
6	Peak Flow rate	0.95*
7	Cognitive Anxiety	0.95*
8	Somatic Anxiety	0.94*
9	Self confidence	0.92*
10	Achievement Motivation	0.94*

\*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 were accepted as reliable in terms of instrument, tester and the subjects.

### **3.7 ORIENTATION TO THE SUBJECTS**

The investigator explained the purpose of the study to the subjects and their role 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.

### **3.8 PROCEDURE OF SCORING**

#### **3.8.1 Competitive State Anxiety Inventory (CSAI-II)**

The tool was constructed by Martens et al (1990) to find out the level of cognitive anxiety, somatic anxiety, self-confidence and achievement motivation. The inventory consists of 27 statements about the subjects' feeling. The response sheet was scored in accordance with the response intensity key. Three sets of responses are summated separately. The self-confidence was scored by the response of 3,6,9,12,18,21,24 and 27 numbered questions (Appendix I). In each case, the summated scores are obtained. Response loading was done for the feeling as mentioned below as

Not at all	- 1
Somewhat	- 2
Moderately so	- 3
Very much	- 4

### **3.8.2 Sports Achievement Motivation Questionnaire (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 the correct statement 2 marks and for the incorrect zero mark is awarded. (Appendix II).

### **3.9 COLLECTION OF DATA**

The investigator administered the questionnaire and other tests to measure the criterion variables to ninety subjects. The investigator collected the data from the subjects before their competition during their rest time. The investigator explained the subjects about the uses of the questions and the meaning of each question and how to fill the questionnaire. Care was taken to ensure that the subjects answered the entire questions. The filled-in questionnaires from the respondents were collected after checking all the items were responded and by using the scoring key the total scores obtained by each subject were tabulated.

### **3.10 ADMINISTRATION OF TESTS**

#### **3.10.1. Speed (50 mts Run)**

##### **3.10.1.1 Purpose**

The purpose of the test was to measure the speed of an individual.

##### **3.10.1.2 Equipments required**

Stopwatch, chunnam, Scorecard

##### **3.10.1.3 Procedure**

The subject took a position behind the starting line. The starter used the command, “ready” and “go”. The latter 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 crossed the finish line.



**Figure I: Administration of 50 M run (Speed) test**

### **3.10.1.4 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 finish line. The fractions were rounded to the next largest one tenth of a second. One trial was permitted.

## **3.10.2. Leg Explosive Power (Vertical Jump)**

### **3.10.2.1 Purpose**

To measure the power of the legs in jumping vertically upward

### **3.10.2.2 Equipments required**

Sargent jump board, several pieces of chalk and a smooth wall surface of at least 12 feet from the floor are required.

### **3.10.2.3 Procedure**

The subject stood with one side toward a wall, heels together and held a 1 inch piece of chalk in the hand nearest to the wall keeping the heels on the floor. She reached upward as high as possible and make a mark on the wall. The subject then jumped as high as possible and makes another mark at the height of her jump.

### **3.10.2.4 Scoring**

The number of inches between the reach and jump marks measured to the nearest half inch is the score. Three trials were allowed and the best trial was recorded as the score.



**Figure II: Administration of vertical jump (Leg explosive power) test**

### **3.10.3. Agility (Shuttle Run)**

#### **3.10.3.1 Objective**

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

#### **3.10.3.2 Equipments required**

Measuring tape, Stop watch, lime powder and two blocks of wood (2"x2"x 4").

#### **3.10.3.3 Procedure**

The subject stood behind the starting line, on the signal "go" and run to the blocks, picked up one, returned to the starting line, and placed a block behind the line. She then repeated the process with the second block. Total distance covered in one repetition was 40 yards.

### 3.10.3.4 Scoring

The score for each subject was the length of time required (to the nearest tenth of second) to complete the course.

## 3.10. 4. Resting Pulse Rate

### 3.10.4.1 Purpose

To record the resting pulse rate per minute.

### 3.10.4.2 Equipment required

A Stop watch and a chair were used.



**Figure IV: Administration of Radial Pulse Test (Resting Heart Rate)**

### 3.10.4.3 Procedure

The pulse rate of all the subjects were recorded in a sitting position in the morning session between 6 to 7am. Before taking the pulse rate, the subjects were asked to sit on a chair and relax for 15min. To record the pulse

rate, the three finger tips were placed on the left radial artery at the wrist in such a manner that pulse was clear.

#### **3.10.4.4 Scoring**

The number of pulse were conducted for 15 seconds and then multiplied by four to record for one minute.

#### **3.10.5. Respiratory Rate**

##### **3.10.5.1 Purpose**

To record the respiratory rate per minutes.

##### **3.10.5.2 Equipment**

Stop watch and chair were used.

##### **3.10.5.3 Procedure**

The subjects were asked to lie down in supine position on the bed in a relaxed manner. Now the researcher starts counting the number of breaths for one minute by counting how many times the chest rises.

##### **3.10.5.3 Scoring**

Number of breaths per minute was taken as official score for this study.

#### **3.10.6. Peak Flow Rate**

##### **3.10.6.1 Purpose**

To record the peak flow rate.

### **3.10.6.2 Equipments required**

Peak flow meter, pencil, pad and chair were used.

### **3.10.6.3 Procedure**

First set the instrument into zero then the subject was asked to stand up, take a deep breath and then blow as quickly and strongly into it as she can. A subject blows into it when the signal was given and the peak flow meter measures how much air the lungs pushed out.

### **3.10.6.4 Scoring**

The meter has numbers on it. When subject blow into the meter, a little marker slides up the meter to show how much air subject was able to get out.

## **3.11 EXPERIMENTAL DESIGN AND STATISTICAL TECHNIQUE**

The experimental design for the study was static group comparison design. One way analysis of Variance (ANOVA) was used to find out the difference among Basketball, Football and Volleyball Players on the selected variables.

As the obtained F-ratio was significant, the Scheffe's test was used as a post hoc test to find out the significant difference between each game. In all the cases .05 level of significance was used to test the hypotheses.

### 3.12 RESEARCH FLOW CHART

