In this chapter, the selection of sample (subject) selection of variables, tools reliability of data, collection of data, detailed methodology and statistical technique for analyzing the data will be presented.

**Selection of sample:**

Three hundred fifteen subjects (105 each for Jumps, Throw and Run) for the study will be randomly selected from the Inter College, University and All India Intervarsity Athletic tournaments. Most of the subjects came from different parts of India and were of different Socio-economic status. Before filing the questionnaire of different Psychological variables and conducted physiological tests, the research scholar will make meetings with the subject, coaches and managers of the teams. The age was limited from 18 to 25 years.

**SELECTION OF VARIABLES**

For keeping the entire study unitary and integrated, experts consultation was taken. The following Psychological variables were selected:

1. Trait anxiety
2. State anxiety
3. Stress
4. Self efficacy
5. Sports Achievement Motivation
6. Depression
Following **Physiological variables** of elite Indian male middle and long distance runners.

(1) Heart rate

(2) Blood Pressure

(3) Temperature

**TOOLS:**

The following tools were used to collect the data on Psychological variables namely:

1. M.L. Kamlesh’s Sports Achievement Motivation Scale.
2. Spilberger’s State and Trait Anxiety Scale
3. General self efficacy scale Matthias Jerusalem and Ralf Schwarzer in 1981
4. Stress questionnaire developed by international Stress Management Association 2013
6. Stethoscope
7. Sphygmomanometer
8. Electronic thermometer

**COLLECTION OF DATA:**

**Physiological Variables**

(1) **Heart rate in beats/ min.**

The morning resting heart rate of the subject was taken. The subject was made to sit in the resting position and asked to semi-pronate his forearm and slightly flex the wrist. Three fingertips were placed on the radial artery at the lateral border of the wrist and the pulse was counted for one minute with the help
of stopwatch two reading were taken and there average was held to be final score.

2) Blood pressure

The morning blood pressure was taken. Subject was made to sit in resting position and the cuff of sphygmomanometer was wrapped around the upper arm. The stethoscope was placed lightly over the bronchial artery in the Cubital fossa. The pressure was increased in the cuff to 30 mm/Hg, above the level at which radial pulsation can no longer be felt. Then, the pressure was lowered in the cuff to 5 mm/Hg, at a time until the first sound of beat was heard. This was the systolic blood pressure and was recorded. The pressure was lowered further in the cuff, until the sound became suddenly faint or inaudible. This was the diastolic pressure and was recorded.

3) Temperature

The Body Temperature was measure by the digital thermometer. Have the subject place the thermometer under one side of the back of the tongue as pictured to the right. Instruct the patient to close both lips around the thermometer and breath through his/her nose. Wait 3-5 minutes for a mercury thermometer or until the digital beep sounds if using a digital device. An accuracy of +/- 0.1°C can be considered state of the art for high-grade thermometers. The user must not confuse technical accuracy with the accuracy in use. Inaccuracy in human body temperature measurements, which depend on the measurement location and time, are due to physiological causes and are not due to a thermometer malfunction.

Administration of Questionnaire and Collection of Data

The coaches and subjects were consulted personally and their sincere cooperation was solicited. Respondents were called to a common place when they were not busy and had enough time to spare for testing. Necessary instructions were passed on to the subjects before the administration of each test. The research scholar
motivated the student respondents by promising to send a separate abstract of the conclusions of his study to each of the subjects. Confidentiality of responses was guaranteed so that the subject would not camouflage their real feelings. No time limit for filling in the questionnaire was set but the subjects were made to respond as quickly as possible once the instructions are clearly understood by them. As soon as group of players completed one questionnaire, another was given to them after a short interval.

**Psychological Variables**

**Sports Achievement Motivation Test**

Achievement motivation is pre-deposition to approach of avoid a competitive situation. The sport achievement motivation test developed by M.L. Kamlesh (1990) is self evaluation questionnaires of twenty statements responsive value of which extend from 0 – 40 in total statement carries a maximum score of two and minimum score of zero when the subject tick the high place. He has given 2 points and when he touched the low placed he earned zero. After conducting further studies by using SAMT the author has given the following classification criteria based on percent and point.

<table>
<thead>
<tr>
<th>Row/Mean</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-24</td>
<td>Low</td>
</tr>
<tr>
<td>24-30</td>
<td>Moderate</td>
</tr>
<tr>
<td>30 above</td>
<td>High</td>
</tr>
</tbody>
</table>

The treatment of a data obtained from the administration of SMAT. The subject will do in the light of instructions contained in the test.
State and Trait Anxiety Inventory (STAI)

Speilberger (1970) along with Gorsuch and Lushane developed a test of state-trait anxiety to measure a person’s level of anxiety in specific situations which might fluctuate from one movement to the next and a test of a person’s level of anxiety or a more permanent basis as indicated by personality trait.

The test is self-evaluation questionnaire and comprises of two forms i.e. $Y^1$ and $Y^2$ the former being a measure of situational anxiety and the later that of trait anxiety.

In responding to the STAI anxiety scale examinees blacken the number on the standard test from to the right of each ten statement that best describe the intensity of their feelings: (1) not at all (2) some what (3) moderately so (4) very much so. In responding to the T-anxiety scale examinees are instructed to indicate how they generally feel by rating the frequency of their feeling of anxiety on the following four point scale. (1) almost never (2) some times (3) often (4) almost always.

The questionnaire contain a number of statements from 1 to 20 are related to state-anxiety and indicate how one feel right now, that is at this moment. The statement from 20 to 40 accesses the level of trait anxiety and indicates how a person generally feels.

Each STAI item is given a weighted score of 1 to 4. A rating of 4 indicates the presence of a high level of anxiety for ten state anxiety items and eleven trait anxiety item e.g. “I feel frightened”, “I feel upset”. A high rating indicates the absence of anxiety for the remaining ten state anxiety items and nine trait anxiety items i.e. “I feel calm”, “I feel relaxed”. The scoring weights for the anxiety present items are the same as the blackened numbers on the test form. The scoring weights for the anxiety absent items are reserved i.e. responses marked 1, 2, 3, 4 are score 4,
3, 2 or 1 respectively. The anxiety absent items for which the scoring weights are reversed on the state anxiety trait anxiety scales are:

State Anxiety : 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20

Trait Anxiety : 21, 23, 26, 27, 30, 33, 34, 36 and 39

To obtain scores for the state anxiety and trait anxiety scales, simply add the weighted scores for the inventory items that make up each scale taking in the account the fact that the scores are reversed for the above items. Scores for both the state-anxiety and trait anxiety scales can vary from minimum of 20 to a maximum of 80.

**General Self- Efficacy Scale (GSES) for Self – Efficacy**

The General self-efficacy scale is a 10-items psychometric scale that is designed to assess optimistic self-belief to cope with a variety of difficult demands in life. The scale has been originally developed in Germany by Matthias Jerusalem and Ralf Schwarzer in 1981, first as a 20-item version and later as a reduced 10-item version by Sud, R. Schwarzer along and M. Jerusalem (1995), and the test is self-evaluation questionnaire consisting of 10 statements related to situation. Cornbrash’s alphas ranged from 0.76 to 0.90, with the majority in the high 0.80. It has been used in many studies with hundred thousands of participants. In contrast to other scales those were designed to assess optimism. This one explicitly refers to personal agency, i.e., the belief that one’s actions are responsible for successful outcomes.

**ISMA Stress Questionnaire**

Because everyone reacts to stress in his or her own way, no one stress test can give you a complete diagnosis of your stress levels. This stress test is intended to give you an overview only. There are twenty five questions in questionnaire. Answer all the questions but just tick one box that applies to you, either yes or no.
Answer yes, even if only part of a question applies to you. Take your time, but please be completely honest with your answers.

**Scoring:**

Most of us can manage varying amounts of pressure without feeling stressed. However too much or excessive pressure, often created by our own thinking patterns and life experiences, can overstretch our ability to cope and then stress is experienced.

1. **4 points or less:** You are least likely to suffer from stress-related illness.
2. **5 - 13 points:** You are more likely to experience stress related ill health either mental, physical or both. You would benefit from stress management / counseling or advice to help in the identified areas.
3. **14 points or more:** You are the most prone to stress showing a great many traits or characteristics that are creating un-healthy behaviors.

**HAMILTON RATING SCALE FOR DEPRESSION**

Hamilton Depression Rating Scale (HDRS), abbreviated HAM-D, is a multiple item questionnaire used to provide an indication of depression, and as a guide to evaluate recovery. Max Hamilton originally published the scale in 1960 and revised it in 1997. The questionnaire is designed for adults and is used to rate the severity of their depression by probing mood, feelings of guilt, suicide ideation, insomnia, agitation or retardation, anxiety, weight loss, and somatic symptoms.

The Hamilton Depression Rating Scale (HAM-D) has proven useful for many years as a way of determining a patient’s level of depression before, during, and after treatment. It should be administered by a clinician experienced in working with psychiatric patients. Although the HAM-D form lists 21 items, the scoring is based on the first 17. It generally takes 15-20 minutes to complete the interview and
score the results. Eight items are scored on a 5-point scale, ranging from 0 = not present to 4 = severe. Nine are scored from 0-2.

Since its development in 1960 by Dr. Max. Hamilton of the University of Leeds, England, the scale has been widely used in clinical practice and become a standard in pharmaceutical trials.

HAM-D Scoring Instructions:

Sum the scores from the first 17 items.

I. 0-7 = Normal
II. 8-13 = Mild Depression
III. 14-18 = Moderate Depression
IV. 19-22 = Severe Depression
V. \( \geq 23 \) = Very Severe Depression

**STATISTICAL PROCEDURE**

Reiterating the objective of the study, we have to point out that we intend to investigate the psychological and physiological variables of different level athletes of India. Thus we shall use analysis of variance to found out the significant difference among the three types of athletes. Where the difference will significant, we will use L.S.D. test to analyses, which groups mean is greater than other.

**LEVEL OF SIGNIFICANCE**

The differences in various variables of performance of different level male athletes of India will be tested at 0.05 level of Significance.