CHAPTER – III

METHODOLOGY

In this chapter, procedures and methods applied in selection of subjects, selection of variables, selection of tests, reliability of the instruments, competence of the tester, reliability of the data, orientation to the subjects, pilot study, training programme, collection of the data, administration of the tests, experimental design and statistical technique are presented.

SELECTION OF SUBJECTS

The purpose of this study was to determine the impact of field training with and without yogic practice on selected physical, physiological, psychological and performance variables among Cricketers. To achieve the purpose of the study, forty eight male inter-collegiate Cricket players studying in various colleges affiliated to Madurai Kamaraj University, Madurai were randomly selected as subjects. Their age, height and weight of the selected subjects ranged from 18 to 25 years, 155 to 182 centimetres and 53 to 72 kilograms and the means were 21 years 8 months, 170 centimetres and 62 kilograms respectively. All the subjects have been regularly participating in the Inter-District, Inter-Collegiate and District league and other tournaments in their respective centres. The Inter-Collegiate players are well-versed in the skills of the game. They have high potential and greater ability in the game. The researcher proposed to collect data from these subjects as the scores would be more applicable to the study. The subjects had past playing experience of at least three years in Cricket and only those who represented their respective college teams were chosen as subjects.
CLASSIFICATIONS OF GROUPS

In this study, groups were classified into three. They are as follows:

<table>
<thead>
<tr>
<th>Group</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group-I</td>
<td>Experimental Group ‘A’ (Field training group)</td>
</tr>
<tr>
<td>Group-II</td>
<td>Experimental Group ‘B’ (Field training combined with yogic practice)</td>
</tr>
<tr>
<td>Group-III</td>
<td>Control group</td>
</tr>
</tbody>
</table>

For the convenience of illustration, the investigator takes the liberty to express experimental group ‘A’ and experimental group ‘B’ as field training without yogic practice and field training combined with yogic practice groups respectively.

By using the matching procedure on the basis of their initial test performance scores on Cricket playing ability, the subjects were divided into three equal groups with sixteen subjects in each group.

EXPERIMENTAL DESIGN

This study was conducted to determine possible cause and effect relationship of 12 weeks field training and yogic practice on Cricket players. A pre and post test control group design was employed for this investigation. This study consisted of three experimental groups, Group I (n=16) underwent field training, Group II (n=16) underwent field training combined with yogic practice and Group III (n=16) acted as control group. All the participants were tested prior to and after the experimentation on Physical fitness components namely speed, endurance, explosive strength and flexibility; Physiological variables namely resting heart rate, aerobic power, anaerobic power and breath holding time; Psychological variables namely competitive state anxiety, cognitive, somatic, self
confidence and sports achievement motivation and performance was subjectively rated by three qualified Cricket coaches.

**Randomly assigned** | **Pretest** | **Posttest**
---|---|---
G-I

<table>
<thead>
<tr>
<th>O1</th>
<th>Training without yoga</th>
<th>O4</th>
</tr>
</thead>
<tbody>
<tr>
<td>O2</td>
<td>Training with yoga</td>
<td>O5</td>
</tr>
</tbody>
</table>

G-II

| O3 | No Training | O6 |

G-III

12 weeks period

**TRAINING PROGRAMME**

The field training package was specifically designed to improve the Cricket playing ability and fitness levels of the Cricketers. The field training packages designed by the investigator of the study was administered for a period of twelve weeks, five days a week, two sessions a day, each session lasting for 90 minutes. Both the experimental groups ‘A’ and ‘B’ were subjected to field training schedule. In addition to the above field training package, the experimental group ‘B’ also underwent yogic practice. The yogic practice was meted out for 45 minutes to group-II either before or after the field training. The yogic practice includes selected asanas, pranayamas and meditation. Both field training schedule and yogic practices are presented in Appendices I and II respectively.
The subjects were free to withdraw their consent in case they felt any discomfort during the period of training. But there were no dropouts in the study. A qualified physician examined the subjects medically and declared that they were fit for the study. The subjects underwent their respective programmes under the strict supervision of the investigator. Prior to every field training session, the experimental groups had a ten minute warm-up exercise, which included jogging, stretching and the like.

All the subjects involved in the training programmes were questioned about their stature throughout the training period. None of them reported any injury. However muscle soreness and fatigue were reported in the early weeks which subsided later. Attendance was calculated for both the experimental groups by dividing the total number of training sessions by the number of sessions present. It was 98.48% for the experimental group ‘A’ yogic practice and 98.62% for the experimental group ‘B’.

PILOT STUDY

A pilot study was conducted to assess the initial capacity of the subjects in order to fix the load. For this, twelve Cricket players were selected at random from the selected subjects and divided into two groups of six each, in which group-I underwent field training and group-II performed field training combined with yogic practices under watchful eyes of the experts and the investigator. Based on the responses of the subjects in the pilot study the training schedule for both the groups were constructed.
SUBJECTS
Forty eight cricket players (N = 48)

DESIGN
Related Group Design
On initial test of playing ability

PRE TEST

Physical Variables
1. Speed
2. Endurance
3. Explosive strength
4. Flexibility

Physiological Variables
1. Resting heart rate
2. Aerobic power
3. Anaerobic power
4. Breath holding time

Psychological Variables
1. Sports competitive Anxiety
2. Somatic anxiety
3. Cognitive anxiety
4. Self confidence
5. Sports achievement
   Motivation

Performance factor
Subjective rating
of Cricket playing
ability

Group-I
Experimental Group ‘A’
(n=16)
Field training group
without yoga package
(12 weeks)

Group-II
Experimental Group ‘B’
(n=16)
Field training combined with
yogic practices
(12 weeks)

Group-III
Control Group (n=16)
No specific training /
Conditioning
(12 weeks)

POST - TEST

Statistical Analysis (ANCOVA)
However the individual differences were considered while constructing the training programme. The basic principles of training (progression, over load and specificity) were also followed. Being a player, coach, umpire and teacher, it is easier for researcher to design the field training schedule. The investigator has also undergone a year diploma programme in Yoga. While finalizing the both schedules the investigator obtained expert opinion too.

**RELIABILITY OF THE DATA**

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

**INSTRUMENT RELIABILITY**

The instruments used for this study were calibrated and standardized one. These equipments were taken from the Department of Physical Education, Bharathidasan University, Tiruchirappalli District. These equipments were supplied by reputed scientific firms and the calibrations of the instruments were accepted as accurate enough for the purpose of the study.

**TESTER COMPETENCY AND RELIABILITY OF TEST**

To ensure that the investigator was well versed in the technique of conducting the test, the investigator had a number of practice sessions in the testing procedure. All the measurements were taken by the investigator with the assistance of person well acquainted with tests and their procedures. Tester competency and reliability of test were established by test, retest process. A very high correlation was obtained, the tester competency in taking measurement and test reliability were accepted.
SUBJECT RELIABILITY

The subject reliability was established by test and retest coefficient of correlation for the scores in each of the criterion measures. Re-testing was done within a period of a week of initial tests in each of the criterion measures, to get data for calculating test and re-test coefficient of correlation for reliability of the subject.

Validity of the Questionnaire

Many researchers have used these questionnaires for research. The questionnaires used by them were Sports Competitive Anxiety Test (SCAT), Competition State Anxiety Inventory-II (CSAI-2) and Sports Achievement Motivation Test (SAMT). There can be no better evidence to prove the validity of the questionnaire than this.

1. Sports Competitive Anxiety Test (SCAT)

Researchers like Manicam, had used this Sports Competitive Anxiety Test (SCAT) questionnaire for their research. Therefore can be better evidence to prove the validity of the questionnaire than this.

2. Competitive State Anxiety Inventory – 2 (CSAI)

The American Psychological Association’s (1974) standards for educational and Psychological Tests recommends the self report inventories be first validated by demonstrating concurrent validity with previously validated tests. Thus concurrent validity was inferred when a new inventory was congruent with or divergent from theoretically predicated relationships using previously validated tests.
The concurrent validity of the CSAI-2 was examined by investigating the relationship between each of the CSAI – 2 sub scales and eight selected A-state and A – trait inventories. The same three samples of athletes that were used to evaluate the CSAI-2’s internal consistency also were tested for the part of the new inventory’s concurrent validation.

3. Sports Achievement Motivation (SAMT)

The validity quotient (0.55) obtained by Kamlesh showed market relationship between the level of achievement motivation and sports achievement. Moreover, he also obtained the reliability quotient of 0.70, which was quite high.

Researchers like Kamlesh, Mc Cleland, Havelka, Becanac, Wills, Singrer etcetera had used this SAMT questionnaire for their research. Therefore can be better evidence to prove the validity of the questionnaire than this.

Reliability of the Questionnaire

A trial run of the inventory was made to ensure the reliability of the inventory and also to establish time-limit so that the respondents gave their feeling without too much brooding. Subjects were given Sports Competitive Anxiety Test (SCAT), Competition State Anxiety Inventory-II (CSAI-2) and Sports Achievement Motivation Test (SAMT) to assess their psychological factors. Thus the reliability of the test was established by test and retest method and the results have been presented in table-1.
### Table No.1

**Reliability Coefficient of Test & Retest Scores of Criterion Variables**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Criterion Variables</th>
<th>‘R’ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Speed</td>
<td>0.84*</td>
</tr>
<tr>
<td>2.</td>
<td>Explosive strength</td>
<td>0.89*</td>
</tr>
<tr>
<td>3.</td>
<td>Endurance</td>
<td>0.94*</td>
</tr>
<tr>
<td>4.</td>
<td>Flexibility</td>
<td>0.88*</td>
</tr>
<tr>
<td>5.</td>
<td>Resting Heart Rate</td>
<td>0.86*</td>
</tr>
<tr>
<td>6.</td>
<td>Aerobic power</td>
<td>0.90*</td>
</tr>
<tr>
<td>7.</td>
<td>Anaerobic power</td>
<td>0.89*</td>
</tr>
<tr>
<td>8.</td>
<td>Breath Holding Time</td>
<td>0.89*</td>
</tr>
<tr>
<td>9.</td>
<td>Sports Competitive anxiety test</td>
<td>0.91*</td>
</tr>
<tr>
<td>10.</td>
<td>Somatic anxiety</td>
<td>0.92*</td>
</tr>
<tr>
<td>11.</td>
<td>Cognitive anxiety</td>
<td>0.90*</td>
</tr>
<tr>
<td>12.</td>
<td>Self confidence</td>
<td>0.92*</td>
</tr>
<tr>
<td>13.</td>
<td>Sports achievement motivation</td>
<td>0.89*</td>
</tr>
</tbody>
</table>

* Significant at 0.01 level of confidence.

(Table value required for significance at 0.01 level of confidence was 0.71. Since very high correlation were obtained this established the investigator’s competency to administer the tests as well as reliability of tests)

The Cricket playing ability of each subject was subjectively rate by three judges on batting/bowling/fielding performance. To see the degree of agreement between the three qualified coaches, rank order correlation was used in this
study. The results revealed high correlation, which means that there was a close agreement in rating between the Coaches.

**TABLE No.2**

**RANK ORDER CORRELATION FOR COACHES RATING SCORES ON CRICKET PLAYING ABILITY**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Coaches</th>
<th>‘r’</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I vs II</td>
<td>0.91</td>
</tr>
<tr>
<td>2.</td>
<td>II vs III</td>
<td>0.90</td>
</tr>
<tr>
<td>3.</td>
<td>I vs III</td>
<td>0.89</td>
</tr>
</tbody>
</table>

**ORIENTATION OF THE SUBJECTS**

Before commencement of the training programmes, one week was spent to teach the training schedule for the experimental groups. Four ‘one hour’ sessions were spent on alternate days to have not only the knowledge of the techniques but also a thorough understanding of training.

The investigator held a meeting with the subjects prior to the administration of tests. The purpose, the significance of this study and the requirements of the testing procedure were explained to them in detail. So that there was no ambiguity in their minds, regarding the efforts required of them. All the subjects voluntarily came forward to co-operate in the testing procedures and the training to put in their best efforts in the interest of the scientific investigation and in order to enhance their own performance. The subjects were very enthusiastic and cooperative throughout the due course.
SELECTION OF VARIABLES

The present study mainly concerned with selected physical, physiological, psychological and performance variables. As far as Cricket performance is concerned, physical, physiological and psychological aspects have to be considered as the major factors since these are having the functional association with one another. Earlier studies clearly describe that the disturbed mental state directly influences the physical & physiological system, as a result directly affects the performance factors and also it was accorded by the professional experts. With these causes and effect, to visualize the status of physical, physiological, psychological and performance characteristics of inter-collegiate male cricket players and the effect of newly designed treatments field training and yogic practices among them, the variables underlie the physical, physiological, psychological and performance variables were chosen as the criterion variables.

Having the experts' consultation in the field of Cricket, yoga physical education & sports sciences and scanning various literatures related to physical fitness, physiological, psychological, sports training methods and yoga, the investigator have selected the following test items as criterion measures. The subjects were tested on the following Physical fitness, Physiological, Psychological and performance test variables.
### Table – 3

**SELECTION OF TEST**

<table>
<thead>
<tr>
<th>Area</th>
<th>Sl. No.</th>
<th>Variables</th>
<th>Test</th>
<th>Measuring units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical fitness components</td>
<td>1.</td>
<td>Speed</td>
<td>50 mts dash</td>
<td>seconds</td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td>Explosive Strength</td>
<td>Standing broad jump</td>
<td>meters</td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td>Endurance</td>
<td>12 minutes run</td>
<td>seconds</td>
</tr>
<tr>
<td></td>
<td>4.</td>
<td>Flexibility</td>
<td>Sit and reach test</td>
<td>centimeter</td>
</tr>
<tr>
<td>Physiological parameters</td>
<td>5.</td>
<td>Resting Heart Rate</td>
<td>Digital heart rate monitor</td>
<td>beats / min</td>
</tr>
<tr>
<td></td>
<td>6.</td>
<td>Aerobic power</td>
<td>Astrand-Astrand Nomogram (bench stepping)</td>
<td>liters</td>
</tr>
<tr>
<td></td>
<td>7.</td>
<td>Anaerobic power</td>
<td>Margaria-Kalamen power test</td>
<td>Kg.m/Sec</td>
</tr>
<tr>
<td></td>
<td>8.</td>
<td>Breath Holding Time</td>
<td>Digital stop watch</td>
<td>Seconds</td>
</tr>
<tr>
<td>Psychological factors</td>
<td>9.</td>
<td>Sports Competitive anxiety test</td>
<td>Sports Competitive Anxiety Test Questionnaire (SCAT)</td>
<td>Scores</td>
</tr>
<tr>
<td></td>
<td>10.</td>
<td>cognitive</td>
<td>Competitive state anxiety inventory – II (CSAI – 2)</td>
<td>Scores</td>
</tr>
<tr>
<td></td>
<td>11.</td>
<td>somatic</td>
<td></td>
<td>Scores</td>
</tr>
<tr>
<td></td>
<td>12.</td>
<td>self confidence</td>
<td></td>
<td>Scores</td>
</tr>
<tr>
<td></td>
<td>13.</td>
<td>Sport achievement motivation</td>
<td>Sports achievement motivation test Questionnaire</td>
<td>Scores</td>
</tr>
<tr>
<td>Performance</td>
<td>14.</td>
<td>Cricket playing ability</td>
<td>Subjective rating of Batting / Bowling / Fielding skills</td>
<td>Points</td>
</tr>
</tbody>
</table>

The chosen tests are highly standardized, appropriate and ideal for the selected variables.
JUSTIFICATION FOR SELECTING VARIABLES

PHYSICAL FITNESS VARIABLES

In Cricket, fast bowlers need fast arm movements, and need to accelerate quickly during their run-up. Speed is required as running speed to take quick singles, to stop a ball before it crosses the boundary, chase a ball and during a fast bowler's run-up, bowling speed is required by a fast bowler to bowl a faster ball and throwing speed is required by a fielder to throw a ball.

Endurance is directly or indirectly of high importance in all sports and games. Cricket is a long duration game played for five days, six hours a day. Greater endurance ensures high quality skill of movement execution, which finds expression in accuracy, precision, rhythm, consistency etcetera. Bowlers who can bowl for long spells and batsmen who can bat for over four hours to score a century are displaying sound endurance in the muscle groups responsible for those movements. The most basic requirement is stamina-the ability to keep going at one's best all day. (Botham, 1980)

Strength, especially explosive strength, has influencing role in Cricket. To bowl faster or to throw the ball fast, one needs strength. Similarly, in batting one needs strength to execute strokes. According to Sivaramakrishnan, et al (1998), wicket keeping involves lot of explosive movements. Tyson (1987) says that in Cricket strength is important both to batters and bowlers particularly in muscles of the legs, arms, shoulders, hands and trunk. Strength is required when executing a powerful hit out of the ground or to bowl a bouncer.

Power allows a player fast, explosive movements. It is a combination of strength and speed and is exhibited by top line a fast bowler who bowls at 160 kph/100 mph.
Bowlers who can bowl for long spells and batters who can bat for over four hours to score a century are displaying sound muscular endurance fitness in the muscle groups responsible for those movements.

Flexibility is an important asset in running and then development of flexibility helps to prevent certain muscle injuries common in Cricket. Fast bowlers should develop optional levels of flexibility in the shoulders, back and joints and the surrounding muscles to enhance performance and reduce the possibility of injury.


Hence, the investigator of the study chosen the following physical fitness components variables namely Speed, Endurance, Explosive strength and Flexibility.

**PHYSIOLOGICAL VARIABLES**

High level of performance of a Cricketer might be dependent upon his physiological make up and recognized that physiological fitness was needed for high level performance. Hence resting pulse rate, aerobic power, anaerobic and breath holding time were selected as physiological components for this investigation. Foster and John (1986) emphasis the importance of aerobic and aerobic fitness to attain high level of performance in Cricket. Tyson (1987) also observe similar views.
PSYCHOLOGICAL VARIABLES

Cricket, nowadays, is becoming a mind game. Despite excellent physical condition, techniques and tactics, some player/teams perform very badly, the reason being lack of mental fitness. In Cricket, several psychological parameters play role in performance. To name a few are sports competitive anxiety test, competitive state anxiety - somatic, cognitive, self confidence and sports achievement motivation, concentration, etcetera. According to Gordon (1987) Cricketers performance can be enhance with Self confidence. He further says that pre-game preparation (physical, technical and mental) will facilitate consistent results.

PERFORMANCE VARIABLES

The Cricketers’ performance normally, can be judged by runs in case of a batsman, wickets in case of a bowler and catches/run outs/stumping/ground fielding in case of a fielder. But all can be judged by an individual's playing ability. Due to non-availability of standardized skill tests in Cricket, subjective rating of Cricket playing ability was selected as performance variables.

Keeping in mind the opinion of the experts, availability of requirements, acceptability of the subjects and the time to be devoted, the above mentioned variables were selected as variables, as they may have direct relation to the performance of Cricket players in competitive situations.

TEST ADMINISTRATION

Before the conduct of the tests, the researcher demonstrated each test to the subjects. A model performance by a few persons other than the active
participants has also been done to make them clearly understand the test procedures. The test items and the procedure for the administration used in the present study are explained below.

A. PHYSICAL FITNESS VARIABLES

1. SPEED (50 M DASH)

Objective

To measure the speed of the subjects.

Facilities and Equipments required

Track, measuring tape, clapper and stop watches (calibrated to 1/100 seconds)

Procedure and scoring

The subject was asked to stand behind the starting line and instructed to start with a standing start. On hearing the clapper sound, the subject had to run the required distance with maximum effort. The best time out of two trials was recorded as the individual’s score. (Elliot, et al., 1986)

2. ENDURANCE (12 MINUTES RUN)

Objective

To measure endurance of the subjects.

Facilities and Equipments required

Measuring tape, clapper, cones and stopwatches.
Procedures and Scoring

A 400m track was marked with the help of cones, which was 40 meters apart. From starting line on signal, the subjects started running continuously. At the end of the time allotted for the respective tests, a signal was given where subjects stopped running. The distance covered by individuals in 12 minutes was their individual score. If any subject stopped running or started walking, his timing was not considered as the score. In those cases, one more trial was given. (Donald, 1974)

3. EXPLOSIVE STRENGTH (STANDING BROAD JUMP)

Objective
To measure the explosive power of an individual.

Facilities and Equipments required
Jumping pit, Lime powder and Measuring tape.

Procedure and Scoring
The subject stands behind the restarting line, which was marked on the back of the jumping pit, with feet apart. Before jumping, the examinee should swing the arm backward and bend the knees. To execute the jump, the subject should swing the arms forward, extend the knees, and jump forward as far as possible, attempting to land on the feet and fall forward instead of backward, if balance is lost. Three trials were taken and the best performance was recorded as the final score. Measurements were taken in meters to the nearest centimeter. The best performance was recorded as the score. (Safrit, 1990)
4. FLEXIBILITY (SIT AND REACH)

Objective

To measure the flexibility level of the subject.

Facilities and Equipments required

Measuring tape, scales and flexibility bench.

Procedure and Scoring

The subject sits on the floor, legs extended and feet flat against a flexibility bench (box with a ruler attached). The trunk is then flexed and the fingers extended along the scale where they are held for a period of 3 seconds. The legs must remain extended at the knees throughout the test. The score is recorded in centimeters as either a plus if distances beyond the feet are recorded or a minus if the subject cannot reach his feet. Three trials are given after the subject has been thoroughly warmed-up. (Singh, 1991)

B. PHYSIOLOGICAL VARIABLES

1. RESTING HEART RATE

Objective

To measure the resting heart rate of the subjects.

Facilities and Equipments required

Stethoscope, Digital heart rate monitor, Score Sheet, Stop Watch.

Procedure

For the sake of accuracy, in this study, the resting heart rate was measured in the subject's hostel rooms as soon as they woke up from their sleep in the
morning. They were instructed to remain in their beds till the investigator arrived to measure their resting heart rates.

Even though measuring thirty subjects on a single morning was a time-consuming exercise, the result procured was worth the effort made. The resting pulse was measured while the subject remained lying on the bed around 7 a.m. in the morning. The stopwatch was used to count the seconds for starting and ending the heart beat counts. After every minute, when the stopwatch was stopped, both the subjects and investigator called out the number of beats counted by them simultaneously.

There were five repetitions of such one-minute counts and the highest count was recorded as the subject's resting pulse rate.

**Scoring**

Number of beats per minute was counted.

**2. AEROBIC POWER (ASTRAND – ASTRAND NOMOGRAM)**

**Objective**

To measure the aerobic power of the subjects.

**Facilities and Equipments required**

For assessing aerobic power, Astrand-Astrand Nomogram was used from sub maximal data. The nomogram is said to be more accurate if heart rates between 125 and 170 beats per minute are used to make the predictions of max VO₂.

For the step test, a bench of 40 centimeters height was used.

**Procedure and Scoring**

The subjects performed the stepping exercise with the frequency of 30 steps per minute. One minute determination of heart rate was made between
minutes 5 and 10 of work. The heart rate and body weight recorded from each subject were then applied to the Astrand–Astrand Nomogram as referred by Fox.et.al. to predict max VO$_2$ max was estimated by reading horizontally from the body weight scale to the pulse rate scale. The predicted VO$_2$ max uptake was read on the middle scale. \textit{(Fox et.al., 1993)}.

\textbf{3. ANAEROBIC POWER (MARGARIA-KALAMEN ANAEROBIC POWER TEST)}

\textbf{Objective}

To measure the anaerobic power of the subjects

\textbf{Facilities and Equipments required}

1. A firm fifteen step staircase
2. Digital timer with switch mats to switch ‘ON’ and switch ‘OFF’ the time.

\textbf{Procedure and Scoring}

The subjects stood 6 metres in front of the staircase. They ran up the stairs as rapidly as possible, taking three steps at a time. The clock was started as the person stepped on the first switch mat (on the 3$^{rd}$ step) and stopped as he stepped on the ninth step. The time it took to traverse the distance between stair 3 and stair 9 was recorded in 0.01 sec. The power generated is a product of the subject’s weight (W) and vertical distance (D) divided by time (t)

\[ P = \frac{(W \times D)}{t} \]

Where

- \( P \) = Power
- \( W \) = Weight of the subject in kilograms
- \( D \) = Vertical height between third and ninth steps in stairs
- \( t \) = Time from third to ninth step in seconds \textit{(Fox et.al., 1993)}
4. BREATH HOLDING TIME

Objective
To find out the breath holding time of the subjects.

Facilities Equipments required
A stopwatch and score sheet.

Procedure
The subject was asked to stand at ease and inhale deeply after which he held his breath as long as possible. The index finger of the subject served as an indicator for the investigator to know the start and end of recording time. To prevent exhalation or inhalation through the mouth during the recording time the subject was asked to couple his lips tightly. Two trials were permitted for each subject with a gap of five minutes and the better time was recorded.

Scoring
The time of holding the breath till the subject lets the air out was recorded to the nearest one tenth of a second using a stop watch.

C. PSYCHOLOGICAL VARIABLES

1. SPORTS COMPETITIVE ANXIETY TEST

Objective
To measure the sports competitive anxiety level of the subjects.

Tools Used
Standardized questionnaire developed by Rainer Martens et.al. (1990) was used in the study. The SCAT questionnaire is given to all the subjects before the competition.
Procedure

It is the popular tool used worldwide for the measurement of sports competitive anxiety level of the players of various age groups. The version III meant for adults is used in this study. The questionnaire comprises of 15 items. Each item has three alternatives via

- Hardly ever / Rarely
- Sometimes
- Often

The total score of the respondent may range from 10 to 30. The items 1, 4, 7, and 13 are not to be scored. A score of 1 / 2 / 3 is given to the response often / sometime / Hardly ever for the items 6 and 11. The scoring is reversed for other items. The score 10 indicates a low level of anxiety and 30 a high level of anxiety (stressed). A copy of the questionnaire is given in the appendix-III

2. COMPETITIVE STATE ANXIETY QUESTIONNAIRE-II

(Somatic anxiety, cognitive anxiety and self confidence)

Objective

To assess the level of somatic anxiety, cognitive anxiety and self confidence of the subjects.

Tools Used

Competitive state anxiety questionnaire prepared by Martens, Burton, Vealey, Bump and Smith (1990) was used. The CSAI-2 questionnaire is given to all the subjects before the competition.
**Procedure**

The tool was used to find the level of somatic anxiety, cognitive anxiety, and self confidence. This inventory consist 27 statements about the subject’s feeling. The response sheet is scored in accordance with the response intensity key.

The CSAI-2 is scored by computing a separate total for each of the three sub scales. The scores that can be obtained by a subject is 9 points and the maximum is 36 points. The cognitive a subscale is scored by adding the responses for the following 9 items: 1, 4, 7,10,13,16, 19, 22 and 25. The somatic A -state subscale is scored by adding the responses to the following 9 items: 2, 5, 8, 11, 14, 17, 20, 23 and 26. scoring for the item 14 must be reversed in calculating the score for the somatic A- state sub scale as indicated below ;

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

The state self confidence subscale is scored by adding the following items: 3, 6, 9, 12, 15,18,21,24 and 27. 

For all the questions except – 14

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

There is no right or wrong answers. The subjects are not allowed to spend too much time on any statement. The subjects are asked to choose the word that
described how best they usually feel when participating in sports and games. A copy of the questionnaire is given in the appendix-IV

3. SPORTS ACHIEVEMENT MOTIVATION TEST

Objective

To assess the Sports Achievement Motivation level of the subjects.

Tools used

Dr. M.L. Kamlesh questionnaire was used.

Procedure and Scoring

In the Sports Achievement Motivation test questionnaire there are twenty test items. Among them, for question 1, 3, 4, 9, 10, 11, 12, 13, 15, 16, 17 and 20 the expected answer is ‘a’. For the question 2, 5, 6, 7, 14, 18 and 19 the expected answer ‘b’. For correct statement two marks and for incorrect statement zero marks are awarded. A copy of the questionnaire is given in the appendix-V

D. PERFORMANCE VARIABLES

PERFORMANCE (CRICKET PLAYING ABILITY)

Objective

To assess Cricket playing ability of the subjects.

Facilities and Equipments required

Cricket ground with all Cricket equipments like bats, balls, stumps, pads, guards, gloves, helmet etcetera.

Batting

One’s batting ability can be best judged by the following factors namely ability to time the ball, place the ball and to middle the ball with the bat.
Footwork and ability to defend as well as to attack with wide range of strokes and improvisation are other important factors in batting. Consistency and co-ordination are other vital factors in batting.

**Bowling**

One's bowling level can be judged by field work, his ability to swing/cut/spin the ball. Accuracy in line and length, with wide range of variation in deliveries with good nip make the bowler more effective.

**Fielding and Wicket Keeping**

Consistencies in catching/stumping are vital in fielding/wicket keeping. Accuracy and speed of throw in the game situation add to the ability of the fielder. The consistency and precision in collecting the ball both on the off and leg side, the ability for stumping and collecting sharp catches behind the wicket indicate the ability of a wicket keeper.

**Scoring**

Three judges, who were qualified Cricket coaches, recorded the performance of the subject during the pre and post tests. The investigator provided the guidelines to the coaches for subjective rating of performance. The technico-tactical levels were recorded in points to the maximum out of ten.

The scores ranged from 1 to 10. The average of scores from three coaches for each subject was regarded as the individual's performance score. The rating scale for evaluation of Cricket playing ability is presented in Appendix-IV.
**Table - 4**

**Testing Schedule**

<table>
<thead>
<tr>
<th>Day</th>
<th>Forenoon session</th>
<th>Afternoon session</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Resting heart rate</td>
<td>Speed</td>
</tr>
<tr>
<td></td>
<td>Endurance</td>
<td>Explosive Power</td>
</tr>
<tr>
<td></td>
<td>SCAT- Questionnaire</td>
<td>Flexibility</td>
</tr>
<tr>
<td>II</td>
<td>Breath holding time</td>
<td>Cricket Playing ability</td>
</tr>
<tr>
<td></td>
<td>Aerobic power</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CSAI-II Questionnaire</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Anaerobic power</td>
<td>Cricket Playing ability</td>
</tr>
<tr>
<td></td>
<td>Sports Achievement Motivation</td>
<td></td>
</tr>
</tbody>
</table>

**COLLECTION OF DATA**

Pre test data were collected three days before the commencement of treatment period and post test data were collected next day after completion of experimental treatment period for all three groups namely field training group, field training combined with the yogic practice group and control group. The all cases, the data were collected on three days in the forenoon and afternoon sessions at indicated in the above table - 4. The collected data were processed with appropriate statistical tool and the detailed procedure of the same is given below.

**STATISTICAL TECHNIQUE**

No attempt was made to equate the groups in any manner. Hence, to make adjustments for difference in the initial means and test the adjusted posttest means for significant differences, the analysis of covariance (ANCOVA) was used (Broota, 1989). The scheffe’s test was used as post-hoc test to determine which of the paired means differed significantly where the differences in adjusted posttest
means resided in univariate ANCOVA among four groups. All of the statistical analysis tests were computed at 0.05 level of significance (P<0.05).

**Justifications for Using One-Way ANCOVA**

One-way univariate analysis of covariance (ANCOVA) was used to determine how each dependent variable was influenced by independent variables while controlling for a covariate (pre-test) (Hari, Anderson, Tatham, and Black., 1998). Analysis of covariance adjusts the mean of each dependent variable to what they would be if all groups started out equally on the covariate. In this study, pretest scores of selected variables have been shown to correlate with the posttest scores, thus they were considered as appropriate covariates.

**Assumptions for ANCOVA**

A preliminary analysis was conducted to determine whether the prerequisite assumptions of ANCOVA were met before preceding the univariate analysis. Thus, the assumption of equality of variance (homogeneity), the linear relationship between the covariates and the dependent variables and the homogeneity of regression slopes were examined. Levene’s test of equality of error variances on selected variables was calculated. Homogeneity of variances is a term that is used to indicate that groups have the similar variances. The levene’s test of equality of error variances indicates that the variance of each group was not significantly different from one another. Therefore, the homogeneity of variance of comparing the three groups regardless of the ability level for each of the dependent variables indicated that homogeneity of variance has been met for all the fourteen dependent variables. Hence it was concluded that the assumption of homogeneity of variance has been met for computing univariate ANCOVA.