Chapter III

Procedure
PROCEDURE

In this chapter, sources and selection of subjects, playing ability assessment, selection of psychomotor variables, formulation of the study, instrument reliability, tester competency, administration of test and statistical analysis are presented.

Sources and selection of subjects

The Senior National Basketball Men players served as the sources of subjects for this study. The 58th Senior National Basketball Championship was held at Puducherry in December, 2007 for a period of eight days. On a purposive sampling 240 men basketball players were selected from a population of 336 players representing their respective states, services and railways. Based on their performance the teams were ranked by the technical commission of the Basketball Federation of India. Twenty eight teams from all over India participated in the 58th Senior National Basketball Championship.

For the purpose of this study, first 20 ranked (N=240) teams were selected. They were further grouped into three groups that is Group I consisted of first best seven elite teams (N=84), Group II was the second best elite seven teams (N=84) and the remaining six teams (N=72) were termed as Group III. The players were twenty five years and above, and such as they were all employed in government organizations, private sectors, public sectors and alike. The average of the players age was 28 years. The selected players were free from chronic diseases and they were
found to be medically fit with optimum fitness level. The study was formulated as a status cum prediction method and in the case of the sub-problem a status cum comparative design was applied.

**Basketball Playing Ability Assessment**

The performance of the basketball players was assessed from the commencement of the Senior National Basketball Championship to the last day that is 21st to 28th December, 2007. The playing ability of the subjects were appraised by three qualified basketball experts during the process of the championship tournament.

To evaluate the performance, three professional basketball experts awarded the score for maximum of 50 marks during the championship progress. The experts awarded score based on the following parameters.

1. Passing
2. Dribbling
3. Shooting
4. Footwork
5. Individual defense
6. Offensive rebound
7. Defensive rebound
8. Tactics
9. Strategy
10. General behaviour
With a grand total of 50 marks the average of all the three experts scores were taken into consideration.

**SELECTION OF VARIABLES**

A feasibility analysis as to which of the psychomotor distinct variables influenced the performance in the game of basketball was taken into consideration, the availability of equipment, acceptability and cooperation of the subjects and legitimate time that was devoted for test administration was decided, with the consultation of team managers, experts and the team captains.

Based on the above criteria, the following psychomotor variables were selected as they are directly or indirectly related to the performance of basketball players in competitive situation.

1. Agility
2. Balance
3. Differentiation Ability
4. Explosive Power
5. Eye-Hand Coordination
6. Kinesthetic Perception
7. Orientation Ability
8. Reaction Ability
9. Speed
CRITERION MEASURES

The criterion measures chosen for this study were:

1. Agility: Time taken in 4 x 10 meters shuttle run was recorded to the nearest 1/10th of a second.
2. Balance: Balance was determined by administrating Modified Bass test and the score was recorded in points.
3. Differentiation ability: Differentiation ability was assessed by using backward medicine ball throw and scored in points.
4. Explosive power: Explosive power was measured by using jump and reach test (Sargent Jump Test). The score was recorded in centimeters.
5. Eye-hand coordination: The total number of correct trails (points) of the subject was recorded with the help of ball transfer tests.
6. Kinesthetic perception: Kinesthetic perception was measured by Kinesthetic obstacle test and score was recorded in points.
7. Orientation ability: Orientation ability was measured by numbered medicine ball test and score was recorded in seconds.
8. Reaction ability: Reaction ability was measured by using ball reaction exercise test and measured in centimeters.
9. Speed: Time taken by an individual to run a distance of 30 meters dash was recorded to the nearest 1/10th of a second.

ORIENTATION

Prior to the administration of the tests, the investigator demonstrated the tests with brief explanation. The scholar executed the tests as and when necessary according to the convenience of the national
basketball players. The data was collected both in the morning and evening session from a population of 240 comprising of 20 state teams from all over the country. Before the administration of the test, the use of equipments were explained and clearly demonstrated by the tester to the subjects so as to become familiar with the various test items.

**RELIABILITY OF DATA**

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

**Instrument Reliability**

The stop watches, scales, adhesive tape markers, measuring tape, medicine balls and gymnastic mats etcetera were obtained from standard firms which catered to the needs of various research laboratories in India and abroad. The reliability of these instruments were ensured and calibrated by their manufactures. Thus all the instruments used in this study was to measure the performance considered reliable and precise.

**Tester Competency and Reliability of Tests**

The tester competency was evaluated together with reliability of tests. To determine the reliability of test, the performances of ten subjects selected at random were recorded twice on the selected psychomotor variables under identical conditions by the scholar. Pearson’s product
moment correlation was computed between the two measures of each variable separately and these correlations (reliability) coefficient ‘r’ are presented in Table I.

From Table I it is obvious that the tester reliability was significantly high for establishing the competency of the scholar to administer the selected tests. For the required correlation with degree of freedom eight was 0.23 less than the obtained correlation coefficient ‘r’.

**TABLE I**

**Tester Competency and Reliability of Tests**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>TEST</th>
<th>COEFFICIENTS OF CORRELATION ‘r’</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>4 x 10 mts. Shuttle Run Test</td>
<td>0.892*</td>
</tr>
<tr>
<td>2.</td>
<td>Modified Bass Test</td>
<td>0.861*</td>
</tr>
<tr>
<td>3.</td>
<td>Backward Medicine Ball Throw Test</td>
<td>0.854*</td>
</tr>
<tr>
<td>4.</td>
<td>Vertical Jump</td>
<td>0.965*</td>
</tr>
<tr>
<td>5.</td>
<td>Ball Transfer Test</td>
<td>0.894*</td>
</tr>
<tr>
<td>6.</td>
<td>Kinesthetic Obstacle Test</td>
<td>0.535*</td>
</tr>
<tr>
<td>7.</td>
<td>Numbered Medicine Ball Run Test</td>
<td>0.873*</td>
</tr>
<tr>
<td>8.</td>
<td>Ball Reaction Exercise Test</td>
<td>0.932*</td>
</tr>
<tr>
<td>9.</td>
<td>30 Meters Dash</td>
<td>0.921*</td>
</tr>
</tbody>
</table>

*Significant at the 0.05 level of confidence*. 
Subject Reliability

The above test retest method also established that the subject’s reliability was determined at the 0.01 level, as the same subjects were used under similar condition by the same tester and no motivational techniques were used on both the occasions.

ADMINISTRATION OF TEST

Agility: 4 x 10 meters shuttle run².

Purpose: To measure the agility of the performer in running and change direction in shortest period of time.

Equipment: Adhesive marking tapes, stopwatches and two blocks of wood. (2” x 2” x 4”).

Procedure: The performer started behind the starting line. On the signal ‘go’ the subject ran to the blocks, picked up one, returned to the starting line and placed the block behind the line, then he repeated the process with the second block as seen in fig.1. Short period of rest was allowed between the two trials.

Scoring: The score for each performer was the length of time required to complete the course. Only the best trial was recorded to the nearest one-tenth of a second.
**Dynamic Balance:** Modified Bass Test³.

**Purpose:** To measure the ability to jump accurately and maintain balance during movement and after the movement.

**Equipment:** Stop watches and adhesive marking tape 3/4 inches.

**Procedure:** The subject stood with his right foot on the starting mark (Fig. 2). Then the subject jumped to the first mark landing on the left foot balancing on the ball of foot as long as possible up to a maximum of five seconds. The subject then jumped to the next mark, landing on the right foot, balancing himself again for a maximum of five seconds, the subject continued with the procedure balancing his leg with one foot on each mark upon a maximum of five seconds on each mark for all the ten marks.

**Scoring:** The subject was scored five points each time when he landed successfully on the mark. One additional point was awarded for each subsequent, second balance held.

**Differentiation Ability:** Backward medicine ball throw test⁴.

**Purpose:** To determine the differentiation ability of the subjects.
Modified Bass Test for Dynamic Balance
Fig. 2
Differentiation Ability Test
Fig. 3
**Equipments and Materials:**

1. A gymnastic mat (size 3’ x 6’).
2. One medicine ball weighing 2 kilograms.
3. 5-medicine balls (1 kilogram each).
4. Pencil, paper and writing pad.

**Procedure:** The floor pattern as presented in Fig. 3 a circle with 40 centimeters of radius was drawn in the middle and medicine ball of two kilogram weight was kept in the center of circle. The subject was asked to stand behind the starting line with back towards the mat at a distance of two meters. The subject was made to throw five medicine balls (one kilogram each) over the head trying to hit the two kilogram medicine ball lying in the centre of the circle with both the hands.

Before commencing the actual test, three practice trials were given to each subject.

**Instructions :**

1. The overhead throw was permitted.
2. The subjects were not allowed to look backward.

**Scoring :**

Medicine ball touching the mat = 1 point
Medicine ball touching the circle = 2 points
Medicine ball falling inside the circle = 3 points
Medicine ball touching 2 kilograms placed in the centre = 4 points

Points were awarded according to the first pitch of the ball. The score of the individuals was the total points scored/earned in all the five throws. Three trials were given and the best one was recorded as the final score.

**Explosive Power:** Sargent vertical jump

**Purpose:** To measure the explosive power of legs\(^5\).

**Equipments:** Measuring tape, chalk powder and a smooth wall surface.

**Procedure:** The subject stood with his one side towards the wall with heels together and with a piece of chalk in hand. In this position the subjects stretched his arms as high as possible with heels intact with the floor and made a mark on the wall. The subject swung his arms forward and backward, high-up, flexed his knees and gave a maximum vertical thrust to his body. Jumped as high as possible and made another mark at the maximum height of his jump reach as seen in fig. 4. Each subject was given two successive trials.
Vertical Power Jump
Fig. 4
**Scoring:** Best of two trials was recorded as the final score.

**Eye-Hand Coordination:** Ball Transfer Test

**Purpose:** To measure the eye-hand coordination of the subjects.

**Equipments:** Two boxes, five size, ten basketball.

**Procedure:** The subject took the ball out of the box (one at a time) on the left and placed them in the box at the right. The manner in which they deposited the ball in the box depended on the nature and level of skill desired. The scholar asked the subject to (a) simply place the balls in the basket, (b) toss it from a specified distance, (c) toss it over a barrier, (d) bounce it in, (e) bank it in. The size and number of balls were altered accordingly as seen in fig. 5.

**Scoring:** The number of correct trials recovered was recorded or the elapsed time for a certain number of trials was recorded.
Eye-Hand Coordination
Fig. 5
**Kinesthetic Perception**: Kinesthetic obstacle test

**Purpose**: To measure kinesthetic ability that is ability of the individual to predict position during movement without the use of the visual stimuli.

**Equipment**: Smooth surface area, 12 chairs and a blind fold cloth.

**Procedure**: 12 chairs were arranged according to marking as shown in Fig.6. Each performer was allowed three practice trial walk through the course without a blind fold and one walked through the course with blind fold for a score.

**Scoring**: The performer scored 10 points for each station successfully cleared without touching. There were 10 stations for a maximum score of 100 points.

**Penalty**: (a) There was a ten point penalty for touching any part of the body against any part of a chair. When such a penalty occurred, the subject was directed to the centre line and one step ahead of the station where the penalty occurred.

(b) There was a five point penalty for each occurrence of the line on pattern of the chairs. Upon such occurrences, the subject was directed back into the center of the pattern at the nearest point from which he went astray.
Marking of Kinesthetic Obstacle Test

Fig. 6
Orientation Ability: Numbered medicine ball run test

Purpose: To determine the orientation ability of the subject.

Equipments: Five medicine balls weighing three kilograms each, one medicine ball weighting four kilograms, stop watch, five metallic/cardboard numbered plates, clapper, pencil, paper and writing pad.

Procedure: All the medicine balls were arranged on the ground. The medicine balls weighing three kilograms each were arranged in a semi-circle with a distance of one and half meters in between each of them. The sixth medicine ball weighing four kilograms was kept three meters away from all these five medicine balls of three kilograms weight. Five metallic numbered plates of one square foot size were kept indicating numbers from 1- 5 on them as seen in fig. 7

Before the start of the test, the subject was asked to stand behind the sixth medicine ball, facing towards opposite direction that is with his back towards the ball. On signal, the subject turned and ran towards the number called by the research scholar and touched the medicine ball and ran back to touch the sixth medicine ball. The moment the subject touched the sixth ball the research scholar would call instantly another number. Similarly total of three times, the number was called by the research scholar and the subject performed accordingly.

Scoring: Time taken to complete the course was recorded in seconds. Two trials were given and the best one was recorded.
**Reaction Ability:** Ball reaction exercise test

**Purpose:** To measure the reaction ability of the subjects.

**Equipments:** Two wooden planks of four meter length each, two to three inflated basketball, whistle, supporting stand, measuring tape, pencil, paper and writing pad.

**Procedure:** The plank was kept inclined by a supporting stand having a height of 1.20 meters so that it will enable the ball to roll freely from a height of 1.20 meters as shown in Fig. 8. The lower end of the wooden planks were at a distance of 1.5 meters from the starting line. Outside edge of the wooden planks was graduated in centimeters or a measuring tape was fixed to the outer edge of one of the planks. A ball was held by the tester at the top of the planks. The subjects were asked to stand behind the starting line with back towards planks and tester on whistling, the subject turned and ran towards the planks and stopped the ball with both the hands which was left by the tester at the time of signal.

**Scoring:** The score was measured from the top of the planks to the point where the subject stopped the ball. The average score of five trials was taken as the final score. The score was recorded in centimeters.
**Speed:** 30 Meters dash^{10}

**Purpose:** To assess the speed of the subject.

**Equipments:** Stop watches, 30 meters, straight smooth space and free of obstacle.

**Procedure:** The subject stood on the starting line. On the command of starter, the subject ran towards the finishing line. At the same time the time keeper started the stop watch and stopped after touching the finishing line by the subject. No trials were given as seen in fig. 9.

**Scoring:** The score was recorded to the nearest of one tenth of a second.

**COLLECTION OF DATA**

Data was collected from 240 subjects representing the 58^{th} Senior National Men Basketball Championship held at Puducherry in December 2007. The first twenty ranked (N=240) teams were grouped into the following categories:

**Group-I** teams are from Services, Punjab, Railways, Tamil Nadu, Karnataka, Kerala and Uttranchal.

**Group-II** comprised of players from Rajasthan, Delhi, Andhra Pradesh, Uttara Pradesh, Maharasta, Orissa and Assam.

**Group-III** team players were from Gujarat, Jharkand, Haryana, Chattisgarh, Chandigarh and Himachal Pradesh.
STATISTICAL ANALYSIS OF DATA

The data collected from two hundred forty men state basketball players, the mean and standard deviation was computed. For comparison among the groups ANOVA was utilized. ‘F’ ratio was tested for its significant difference at the 0.05 level of confidence\(^\text{11}\). To identify the relationship between each psychomotor component with performance, Pearson’s\(^\text{12}\) product moment correlation was utilized. Performance was predicted from psychomotor components by utilizing regression equation. For testing the hypothesis the level of confidence was set at 0.05 level of significance.
REFERENCES


