Chapter III

Method and Procedure

As per the objective of the study, the investigator had to plan the entire process of research work in terms of research design suited to present study; and to accomplish the purpose of the study; the design has been systematically presented and exhibited in this chapter under the following headings:

1. Sampling plan
2. Tools used
3. Methods and Materials; and
4. Statistical procedure

3.1 Sampling Plan

In the present study, the investigator used multistage sampling plan in which stratified random sampling technique and simple random sampling techniques were used for selecting the samples. The present investigation was conducted on a total of 600 sportspersons of Haryana State, who had participated at National and Inter University level tournaments in contact, semi-contact games and non-contact games. The subjects were in the age group of 18-25 years. Out of total sample of 600 students 200 players were of contact games, whereas, 200 players were from semi-contact games and that of 200 players were from non-contact games.
These three groups were further divided into two sub-categories having 100 males and 100 females each. Scores for different categories taken are given in Appendix (D).

SYSTEMATIC REPRESENTATION OF SAMPLE

3.2 METHODS AND MATERIALS

"The selection of suitable instrument or tool is of vital importance for successful research. Different tools are suitable for collecting various purposes. For any research one or more of the tools in combination can be used" Sukhia (1977)'

The selection of tools was governed by the consideration of their (i) availability (ii) suitability to the sample (iii) reliability and validity. Keeping in view these considerations the following tests were used for data collection:

(a) "Aggression Questionnaire" by Dr. G.C. Pati (1976)\(^2\) in Hindi version (Appendix A) have been used for measuring aggressive behaviour.

(b) "The group test of General Mental Ability" by Dr. S. Jalota (1976)\(^3\) was used in Hindi version (Appendix B) to measure the intelligence level.

(c) "Adjustment Inventory for College Students" (AICS) by Dr. A.K.P. Singh and Dr. R.P.Singh (1980)\(^4\) in Hindi version (Appendix C) have been used to measure adjustment.

(A) AGGRESSION TEST SCALE

Dr. G.C. Pati's Aggression questionnaire consists of 16 questions. Each question describes a situation, where some form of aggression or deviant behaviour has occurred and also some persons who have responded to that in low to mildly aggressive, moderately aggressive and highly aggressive manners. The subject is requested to indicate the best appropriate response out of the given three responses elicited by the situation from persons described in the question.

Result of the pilot study indicated, and several psychologists opined that all 16 questions were good enough as aggression questions. A questionnaire was supplied to the subjects. They were given all the instructions as laid down in the test manual to fill up their response.

(i) Reliability:

Reliability coefficient of the aggression questionnaire was calculated by


"split-half method" of the 16 questions. 8 odd and 3 even questions supplied the halves.

The correlation for a group of 225 subjects was calculated, which showed a good measure of reliability.

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>N</th>
<th>Split-halves</th>
<th>'r' for split-half</th>
<th>'r' for the whole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggression questionnaire</td>
<td>225</td>
<td>odd-even</td>
<td>0.55</td>
<td>0.71</td>
</tr>
</tbody>
</table>

(ii) Validity:

To find the validity coefficient of the aggression questionnaire, it was compared with "statements in questionnaire of aggression" borrowed from Murray.

The group of subjects upon whom this validity study was made, comprised of psychiatrists, clinical psychologists, and students of psychiatry and clinical psychology of National Institute of Mental Health and Neuro-Sciences, Bangalore. After administrating the questionnaire on the subjects they resported in the manner described earlier. They appraised or scaled the "statements of n-aggression". On a six point scale, as these applied to them. The scale was adapted from Murray as given in the "psychological insight test".

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Comparable questionnaire</th>
<th>'N'</th>
<th>Group</th>
<th>Pearsonian 'r'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggression questionnaire</td>
<td>&quot;Statements in questionnaire of n-aggression&quot;</td>
<td>19</td>
<td>Psychiatrists &amp; clinical psychologists</td>
<td>.323</td>
</tr>
</tbody>
</table>

The validity coefficients is significant above one percent level.
(iii) **Scoring:**

The questions admit three possible replies indicating low to mild aggressive, moderate aggressive and high aggressive trends. These may be easily scored as 1, 2 and 3. The distances between 1 and 2 as well as 2 and 3 are mathematically equal. This equality should be expected in the distances between low to mildly aggressive and moderately aggressive, and between moderately aggressive and highly aggressive trends, for these to be scored as 1, 2 and 3. But, the idea of equal distances between them may not be tenable. The theoretical propositions indicate a greater distance between moderate aggression and high aggression than between low-mild aggression and moderate aggression. Therefore, scoring the alternatives as 1, 2 and 3 is not used. And, “Sigma deviate weighing method” as formulated by Likert is used. By this method, a scoring schedule is prepared to score individual performance.

**(B) INTELLIGENCE TEST SCALE**

Dr. S. Jalota’s test for general ability consist of 100 items, divided into a vocabulary group of ten ‘similaras’ plus ten ‘opposite’ items, and a group of twenty ‘classification’items, a set of twenty items of ‘number series’, a group of ten items for ‘selectionof best answers’ plus ten items of reasoning, and twenty items of analogies’. Thus it has five separate categories of twenty task each, (i) vocabulary, (ii) classification, (iii) number series, (iv) analogies and (v) reasoning. The terms were mixed and arranged in an empirically determined order of increasing difficulty.

(i) **Reliability:**

Reliability coefficient of the test has been calculated by the finding of correlations between the odd and even halves scored by tested population. These
correlation coefficient was corrected for length with the spearman-brown formula, as given in the table below:

<table>
<thead>
<tr>
<th>Class</th>
<th>VIII</th>
<th>IX</th>
<th>IXa</th>
<th>IXb</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>.335</td>
<td>.379</td>
<td>.201</td>
<td>.178</td>
<td>.363</td>
</tr>
<tr>
<td>roe</td>
<td>.783</td>
<td>.873</td>
<td>.906</td>
<td>.845</td>
<td>.908</td>
</tr>
<tr>
<td>*ree</td>
<td>.879</td>
<td>.932</td>
<td>.953</td>
<td>.916</td>
<td>.979</td>
</tr>
</tbody>
</table>

* Correlation for the total length of the test.

The test is equally suitable to the assessment of undergraduate classes in the colleges and universities of the Hindi speaking areas. So we anticipate the same utility of the test.

(ii) Validity:

The validity of the test had been reported on the basis of a factor-analysis of the inter-element scores, which gave a pattern of three centroid factors. When obliquely rotated to simple structure, these exhibited an identification of the verbal, numerical and reasoning factors. A result of multiple correlation (R) was reported with study of a group of 178 students of 10th class and a result of 363 students of the 10th class.
Table 3.4

Showing inter-correlation between the V, N, R and a total score of a group of 363 student of class X.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>.683</td>
<td></td>
<td>.582</td>
<td>.620</td>
</tr>
<tr>
<td>N</td>
<td>.599</td>
<td></td>
<td></td>
<td>.491</td>
</tr>
<tr>
<td>R</td>
<td>.874</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ R^2 = 1.234 = .1045 + .1003 + .6087 = .8135 \]

Coefficient of Multiple non determination = .1865

Contribution of U = 10.45%; N = 10.03%; R = 60.87%

[1 = Total; 2 = Verbal; 3 = Numerical; 4 = Reasoning]

Table 3.5

For 379 students of class IX

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>.9033</td>
<td></td>
<td>.5841</td>
<td>.6386</td>
</tr>
<tr>
<td>N</td>
<td>.8004</td>
<td></td>
<td></td>
<td>.5913</td>
</tr>
<tr>
<td>R</td>
<td>.8565</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ R^2 = 1.234 = .3284 + .2337 + .4264 = .9885 \]

Coefficient of Multiple non determination = .0115

Contribution of U = 32.84%; N = 23.37%; R = 42.64%

and another 379 of the 9th class imbalances while the coefficients of non
determinants are quite low the contributions of the specific varial, numerical and reasoning components indicate a fair distribution in the data of our standardisation sample.

(iii) Scoring:

The general key was the key for finding out the examinee's scores of general mental abilities or intelligence from his answers given to the items of the test. On the top row, the pages 1 to 5 refer to the said page in the test booklet. In some cells of each key, the top page row on the key has its lower line to be cut through, to help the anchoring of the given key with the corresponding row of the answersheet. In the key there were two columns for each page. One shows the correct answer for the corresponding series of question items indicated on the answer sheet. To convert the key into a scoring stencil the other column of the key under each page has blank cells. This column has to be cut out carefully from the top to the bottom row.

After scoring the answer column for first page (of the booklet) the numbers of the wrong and unattempted item were counted and were subtracted from 20 (the number of item on each page) it was written on the bottom of the sheet and same was done in rest two sheets and at last the total numbers of all the three sheets were added to get the findings.

(C) ADJUSTMENT TEST SCALE

Sinha & Singh's AICS has been prepared in Hindi as well as in English and it has 102 items to measure five dimensions of adjustment viz., Home16, Health15, Social 19, Emotional 31, and Educational 21 and total adjustment. Item analysis was done by calculating bi-serial correlation of each item (i) with the total score of the inventory and (ii) with the area total scores. The use of small a,
b, c, d, e and Deonagri letters क, ख, ग, घ, च corresponding to the five measures of adjustment, as well as the numbers, enable the test user to discover readily the particular question relating to each measure. The total score may be taken to indicate the general adjustment status.

a. (क) **Home adjustments**: Low scores indicate satisfactory adjustment. Individual scoring high tend to be unsatisfactory adjusted towards their home surroundings.

b. (ख) **Health adjustment**: Low scores indicate satisfactory health adjustment and high scores unsatisfactory adjustment.

c. (ग) **Social adjustment**: Individuals scoring high are submissive and retiring. Low scores indicate aggressive behaviour.

d. (घ) **Emotional adjustment**: High score indicates unstable emotion. Individuals with low scores tend to be emotionally stable.

e. (ङ) **Educational adjustment**: Individuals scoring high are poorly adjusted toward their curricular and cocurricular programmes. Persons with low scores are interested in the educational activities.

AICS questionnaire was supplied to the subjects. They were given all the instructions as laid down in the test manual to fill up their response.

(i) **Reliability**:

Coefficient of reliability was determined by (i) split-half method (ii) Hoyt's analysis of variance method (iii) K.R. Formula 20. Test retest reliability was also determined by administering the test after a period of 3 weeks on 228 students which is 10 percent of the total sample. The following table gives the reliability coefficients determined by different methods.
Table 3.6

Reliability coefficients of the inventory by using different methods

<table>
<thead>
<tr>
<th>Method Used</th>
<th>Reliability Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Home</td>
</tr>
<tr>
<td>Split Half</td>
<td>.87</td>
</tr>
<tr>
<td>Test-retest</td>
<td>.85</td>
</tr>
<tr>
<td>Hoyt's method</td>
<td>.86</td>
</tr>
<tr>
<td>K.-R</td>
<td>.84</td>
</tr>
</tbody>
</table>

Formula-20

(ii) Validity:

In item analysis validity coefficients were determined for each item by biserial correlation method and only such items were retained which yielded biserial correlation which both the criteria (i) total score and (ii) area score, significant c .001 level.

Inter correlation among the five areas of the inventory were calculated. The correlation matrix is presented in the Table.

Table 3.7

Correlation Matrix of the Five Areas

<table>
<thead>
<tr>
<th>Areas</th>
<th>a(क)</th>
<th>b(ख)</th>
<th>c(ग)</th>
<th>d(घ)</th>
<th>e(घ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a(क) Home</td>
<td>—</td>
<td>.22</td>
<td>.16</td>
<td>.26</td>
<td>.25</td>
</tr>
<tr>
<td>b(ख) Health</td>
<td>.22</td>
<td>—</td>
<td>.14</td>
<td>.25</td>
<td>.22</td>
</tr>
<tr>
<td>c(ग) Social</td>
<td>.16</td>
<td>.14</td>
<td>—</td>
<td>.21</td>
<td>.20</td>
</tr>
<tr>
<td>d(घ) Emotional</td>
<td>.26</td>
<td>.25</td>
<td>.21</td>
<td>—</td>
<td>.32</td>
</tr>
<tr>
<td>e(घ) Educational</td>
<td>.25</td>
<td>.22</td>
<td>.20</td>
<td>.32</td>
<td>—</td>
</tr>
</tbody>
</table>
Table reveals that correlation among various areas vary from 0.14 to 0.32 with an average of 0.22. Thurston's centroid method of factor analysis was employed and after the extractions of second centroid factor from the first residual correlation matrix, it was amply proved that there exists inter-independence among the five areas of inventory.

The inventory was also validated by correlating inventory-scores with Hostel Superintendents ratings. This was studied on a sample of 120 students living in different hostels of Patna University. The hostel superintendents rated the students on 5 point scale, mainly. Excellent, Good, Average, Unsatisfactory and Very Unsatisfactory in respect of their adjustment. Product moment coefficient of correlation between the inventory scores and superintendents ratings was obtained to be 0.58.

(iii) Scoring:

The subjects can be classified into five categories in accordance with the raw scores obtained by them on the inventory. The five different categories of adjustment are : "A' which stands for excellent, 'B' which stands for good, 'C' which stands for average, "D' which stands for unsatisfactory, and 'E' which stands for very unsatisfactory adjustment. This categorisation was done by dividing the base line of the normal curve into five equal units, each unit being equal to 1.2.

3.3 COLLECTION OF DATA

"Scientific problems can be resolved only on the basis of data, available or collected and a major responsibility of the scientist is to set up a research design capable of providing the data necessary for the solution of his problem" (Mouly 1964). Factual material or data unknown or untapped so far is essentia! in every
study. They can be obtained from many sources, direct or indirect it is necessary to adopt or evolve a systematic procedure to collect essential facts.

In order to collect the requisite data for any research problem in social sciences the investigator has to sample the population concerned since it is not possible to sample the entire population and to decide appropriate tools to measure the attributes concerned and finally to administer tools on the sample selected. The major task before the investigator in the present study was to administer the tools on the subjects in as homely a manner as possible with a view to get objective and true responses, therefore investigator first establishes personal contact with sports women and achieves a certain degree of rapport with them.

ADMISSION OF TESTS

After selecting the sample of the study and before conducting the tests, the purpose of testing and technique to be employed in the study of the subjects and all possible doubts were cleared. They were assured that the information obtained through the scale would be kept confidential. It would not harm them in any case. Therefore, they were urged to feel free and reply every question frankly and sincerely. The subjects showed enthusiasm and promise to give whole hearted co-operation to the research scholar for this venture. In this study questionnaire methods were used. All questionnaires were administered to all subjects under the direct supervision of the investigator. The questionnaires were administered in accordance with the instructions laid down in the manual. While administering the questionnaires, the subjects were assembled at their places of competition. All the tests were administered one after the other separately with the help of coaches and team managers of the respective teams.
3.4 STATISTICAL PROCEDURES

Keeping in view, the objectives as well as design of the study, the statistical techniques of mean, standard deviation and two way analysis of variance were used to analyse the data as discussed in the next chapter.