Every piece of research must be planned and designed carefully so that the researcher proceeds ahead without getting confused at the subsequent steps of research. The researcher must have a clean and clear understanding of what is to be done, what data is needed, what data collecting tools need to be employed and how the data is to be statistically analyzed and interpreted. The common idea of methodology is the collection, the comparative study and critique of the individual method that is used in a given discipline or field of inquiry. It can be defined as:

1. A body of method, rules and postulates employed by a discipline.
2. A particular procedure or a set of procedures.
3. The analysis of the principles of the procedures of inquiry in a particular field.

Research, being a methodological approach is a vast and multidimensional concept. It is an endless quest for knowledge or unending research for truth. It brings to light new knowledge, corrects previous errors and misconceptions and adds an orderly way to existing body of knowledge. The knowledge obtained by research is scientific and objective. Therefore it is implied that for obtaining the scientific and objective results, there should be a proper methodology and procedure.

Design is a blueprint of the procedure for completion of various research steps and thus reaching valid conclusions regarding the relationship between the
variables under study. Therefore, it is important that the design is specifically conceived and objectively executed to bring empirical evidence. By doing so, the observations and inferences become valid to rely on. The preparation of a research proposal or design is an important step in the research. It provides a systematic plan and procedure for the research to follow. “Research design refers to the plan and structure of the investigation used to obtain evidence to answer research questions. The design describes the procedure for conducting the study, including when, from whom and under what condition the data will be obtained.” McMillan (1989).

**Formation of Objectives**

The study was taken up by the investigator to study and compare the Physical fitness and Adjustment of the sports persons and non-sports persons of Srinagar, keeping in view the objectives of the study. The objectives of the present study have been framed and mentioned in the Chapter-I.

**Sample Selection:**

After surveying in the district Srinagar, three hundred and twenty subjects (320 = 160 sports persons and 160 Non-sports persons) in the age group of 15-28 years were randomly selected after building rapport with concerned Sports teachers, Principals and Directors of different schools and Colleges of districts Srinagar. Sports Persons who had participated in different sports competitions from Inter School level to the National level competitions organized by Youth Services & Sports Department or Sports Council of J&K State were chosen for the study. These organizations are recognized by School Games Federation of India and All India Council of Sports. Investigator himself took the sample from identified Sports and Non-Sports categories, belonging to rural and urban areas. Out of selected 320 subjects, three (3) sports persons and fifteen (15) Non-sports persons did not co-operate during administration of the physical fitness tests.
Plan and Procedure

Faculty of Education, University of Kashmir.

Break-up of Sample

<table>
<thead>
<tr>
<th>Group</th>
<th>Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>71</td>
<td>86</td>
<td>157</td>
</tr>
<tr>
<td>Non-sports</td>
<td>72</td>
<td>73</td>
<td>145</td>
</tr>
<tr>
<td>Total</td>
<td>143</td>
<td>159</td>
<td>302</td>
</tr>
</tbody>
</table>

Tools Used for the Present Study

1. **Shuttle Run** to measure the Coordinative abilities while running and changing quick directions and body positions in speed.

2. **50 Yards Dash/Run** to measure the speed capacity of the subject.

3. **Pull-Ups** to measure the muscular strength.

4. **Modified Sit and Reach** to measure Flexibility.

5. **Anthropometry** (Anthropometric rod and weighing machine) to measure the height and weight of the subjects respectively to calculate of Body Mass Index (BMI).

6. **Lafayette/Vernier’s digital skin fold caliper** to measure the subcutaneous adipose tissue (Fat %).

7. **Bell’s Adjustment Inventory** translated into Urdu by *Qadri (1964)* comprised of five factors: Social, Emotional, Health, Home and Financial, to measure Adjustment level of subjects.

DESCRIPTION OF THE TOOLS

1. **Shuttle Run** (4 x 10 Meters):

   ![Shuttle Run Agility Test](image1)

   ![Diagram of the course used in the agility test](image2)

   Photographic Depiction of the Administration of the test
Plan and Procedure

Purpose: To measure the agility (Coordinative Ability) of the subject.

Equipments: Even Ground, two wooden Blocks (2x2x4 inches), Stop Watch, Clapper, whistle, Score-card. Description: For administration of Shuttle run test, 10 meter distance was measured on the ground, marked with lime on both sides (as shown in picture). On the sound of clappers, subject starts running from one side (starting line) and crossing the line on other side (restraining line), picking up one wooden block and returning back to the starting line like this subject runs again to pick another wooden block completing total 40 meters as quick as possible. Score (Best of three): The time taken (nearest to 1/100 second) to complete 4 x10m after completion of shuttle run was recorded and entered in the result sheet in seconds, was considered as the measure of agility.

2. 50 Yards Dash/Run:

Purpose: To measure the speed capacity of the subject. Equipments: Flat Ground, measuring tap, two Stop Watches, Clapper, whistles, score card, instructor, Description: Two lines were marked on the ground 50 yards apart. One line was used as starting line and other as finishing line. The subject was asked to take position behind the starting line. The starter used the commands: On your Mark, get set “Go”, and sound of clappers. Each runner was assigned
to a separate time keeper. **Score:** The time keepers recorded time of each subject at the finishing line. Three trials were given to each subject with proper rest in between the trials. Total time taken nearest to 1/100 second) was recorded as the scores of the subject.

3. **Pull-Ups (Also known as Chin-Ups)**

**Purpose:** To measure the strength of the student. **Equipments:** Horizontal wooden or metal Parallel Bar, score card and pen. **Description:** Subjects were asked to use an over hand grip with the palms. The height of the bar was kept so that when subject handed from it with fully extended arms, his feet does not touch the ground. From the hanging position, the subject raised his body by the arms until the chin of the subject crosses parallel bar. The subject was asked to lower his body to a fully extended hang position as shown in the picture above. Only one trial was given unless it was obvious that subject was not given fair chance. **Score:** Total number of completed pull ups was recorded as the score of the subject.
Modified Sit and Reach

**Photographic Depiction of the Administration of the test**

**Purpose:** Modified sit and reach test is an important functional measure of hip region flexibility, including the lower back and hamstring muscles (the back of the legs). To measure the flexibility of the subjects. **Equipments:** modified sit and reach wooden cubical or wooden box (or alternatively a makeshift ruler and box may be used), score card, pen.

**Description:** The subject was asked to remove shoes, sit on the floor with both the legs out straight ahead and knees flat against the ground/floor, and place the feet against the Vertical pillar. Subject was asked to lean forward slowly as far as possible and place and cross both hands side by side over his toes. They were advised not to jerk or bounce to reach further.

**Score:** Holding full reach position for two-three seconds, when the distance of hands reached beyond toes, score of the subject was recorded by measuring scale to the nearest centimeter. Each subject was given three trials and highest score was recorded.

4. **Calculating of Body Mass Index (BMI).**

BMI is calculated by using the following formula given by Quetelet Body Mass Index (Collins, 1990; Verma, and Mokha, 1994; Kansal, 1996 & 2008) respectively.

\[
BMI = \frac{Mass \ (Kg)}{[Height \ (m)]^2}
\]
Equipments: Anthropometric rod to measure the height and weighing machine to measure weight of the subjects

**Standing Height**

**Purpose:** The purpose is to check the standing height of the subjects.

**Administration:** The subjects were asked to stand in the erect position barefoot on a plane horizontal surface against a wall. The subjects were asked to stretch the body upward as much as possible without leaving the ground. The anthropometric rod was kept in front of the subject and the cross-bar of the anthropometry adjusted so that its lower edge touches the highest point of the subject’s head. The measurement was recorded to the minimum 0.1cms.

**Body Weight**

Purpose: The purpose was to check the body weight of the subjects.

**Administration:** Body weight of the subject was taken with minimum cloths, when the subject stands erect on the weighting machine with equal weight on both the feet. The weight was recorded to minimum of 0.01 Kg.

![Body Mass Index (BMI) Chart](image)

**BMI less than 18.4 is classified as underweight for height**

Being underweight also introduces some health risks, such as infertility in women, increased risk of infections and osteoporosis (thin bones). Ensure your diet is healthy and avoid further weight loss.
BMI 18.5 – 24.9 is classified as normal weight for height
This is the range that adults should aim to be for optimal health. Individuals should aim for body weight maintenance. Consider other lifestyle factors e.g. smoking, non-healthy diet, physical inactivity as these may be a risk factor for less optimal health.

BMI 25.0 – 29.9 is classified as overweight
Body fat will be elevated increasing the risk of coronary heart disease, diabetes and high blood pressure. Aim to reduce body weight slowly, with a weight loss of 5-10kg over 12 weeks. Seek medical advice before initiating a dieting regime.

BMI 30.0 – 39.9 is classified as obese
Weight loss is required to reduce health risks. Set a goal of 5-10kg weight loss. Consider a lower-calorie diet and drug therapy if diet, exercise and lifestyle programme is unsuccessful after 12 weeks.

5. Calculation of Body Fat Percentage (subcutaneous adipose tissue) using Lafayette /Vernier’s digital skin fold caliper.

To take the measurement, the skin was gripped about 1cm above the selected site and the calipers applied below this site, grip was then released and measurement noted to the nearest 0.2 mm. The calipers were then removed.
This was repeated for 3 successive measurements, with the mean value calculated. Once the average of each of the four Skin fold thickness i.e Biceps, Triceps, Sub-Scapular and Supra Iliac sites of the body were obtained, the percentage of the total Body fat was computed by the technique described by Durnin and Womersley (1974). This involved the following steps:

- Adding up the four skin fold values to get total value.
- Calculating the Body Density (BD) by using Durnin and Womersley (1974) formula appropriate to the age of the subjects.
The formula is as follows:

\[ BD = 1.1620 - 0.0630 \log (Biceps + Triceps + Sub-scapular + Suprailiac). \]

(For 17 - 19 years).

\[ BD = 1.1631 - 0.0632 \log (Biceps + Triceps + Sub-scapular + Suprailiac). \]

(For 20 - 29 years).

When Body Density was then calculated with the help of the above formulas, it was then converted to measure Fat % by the following formula devised SIRI (1965):

\[ \text{Body Fat \%} = \left( \frac{4.95}{\text{Density}} - 4.50 \right) \times 100 \]

Where: D = Density 4.95 and 4.5 are the constants calculated by SIRI (1961) using the assumptions on the density of Fat Mass and Fat Free Mass.

Note: This calculation is not suitable for children below 15 years of age, because they are still growing and not reached their full height.

**Body Fat Percentage Categories**

In males, mean percentage body fat ranged from 22.9% at age 16–19 years to 30.9% at age 60–79 years. In females, mean percentage body fat ranged from 32.0% at age 8--11 years to 42.4% at age 60–79 years.

The table below from the *American Council on Exercise* shows how average percentages differ according to the specified groups and categories.

<table>
<thead>
<tr>
<th>Category</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential fat</td>
<td>10% to 12%</td>
<td>2% to 4%</td>
</tr>
<tr>
<td>Athletes</td>
<td>14% to 20%</td>
<td>6% to 13%</td>
</tr>
<tr>
<td>Fitness</td>
<td>21% to 24%</td>
<td>14% to 17%</td>
</tr>
<tr>
<td>Acceptable</td>
<td>25% to 31%</td>
<td>18% to 25%</td>
</tr>
<tr>
<td>Obese</td>
<td>32% or higher</td>
<td>26% or higher</td>
</tr>
</tbody>
</table>

The primary task was to determine relevant areas of adjustment and to select representative items for each of them. In this connection a preliminary probe into the multiplicity of adjustment problems faced by our young student community of district Srinagar. In this regard it was decided to use Bell’s Adjustment Inventory translated into Urdu by A. Jaleel Qadri. The investigator felt that this Inventory will suite the Kashmiri students as most of them read and write Urdu easily as compared to other languages and in view of the fact that the areas and items included in the inventory were such as could provide us with a basis for identifying the maladjusted and well adjusted students of District Srinagar. The age range of the subjects was from **15-28 years**. The sample consists of Muslims, Hindus and Sikh students enrolled in different schools and Colleges of District Srinagar were included in the sample, which covers all classes from pre-University to Post Graduate level.

This Adjustment Inventory by Prof. **Jaleel. A. Qadri**, consists of ninety (90) Questions. Twenty (20) each in the above areas except for the financial area which consists only ten (10) questions. The subjects were asked to give their responses in terms of “Yes”, “No” or “Do Not know”. The questionnaire also contains few other items such as Name, Age, sex, Class in school/College, Hostel/Residence, Parental occupation, Parental Income, Religion and Area of residence (Rural or Urban).

The main five areas of the inventory are explained as under:

1. **Social Adjustment:** Items connected with this area mainly seek information regarding the satisfactory quality of one’s behavior.

2. **Emotional Adjustment:** This area explains the most important psychological aspect responsible for satisfactory adjustment in life.

3. **Health Adjustment:** This area explains the items focusing on the deviations in terms of health criteria.
4. **Home Adjustment:** The items in this area probe into the home conditions of the subject and their relationship among the family members.

5. **Financial Adjustment:** This area probe the financial difficulties faced by students in their day today life.

**Administration of the Inventory Test**

Before the administration of the test, instructions appearing on the first page on the first page of respective manual of the test were read out and explained to the students. The test having 90 questions with no time limit for this questionnaire. Usually the subjects complete the questionnaire within 30 to 45 minutes. After the administration of the test, the booklets were collected from the students for next process viz scoring.

**Scoring Procedure**

The returns of the Personality Inventory were scored with the help of a set of Punctured Keys, prepared by the investigator for each area and per page. Scoring with the help of the key was very simple. On every key for an area holes were punched for “Yes” and “No” at the top and at the bottom and above these holes the page number of the form was inscribed. The scorer had to adjust on each page the key for a particular area, count the tick marks through the holes and assign 1 mark (One Mark) to each tick ( √ ) visible through the hole. Having counted the score for each area the scorer had to count and ring the dots given in the profile at the front page of the inventory. Each dot represents a score of 1. The areas were serially arranged as A (Social), B (Emotional), C (Health), D (Home) and E (Financial). By adding the scores of each area, a profile chart was made to give comparative picture of the extent of adjustment of each individual in various areas. The higher the score, the more maladjusted is the individual. In this way all the forms filled in by the student were scored. Then the scores of the individual in each area, his total score, as well as other variables such as subject’s age, parentage, monthly income of parent, hall of residence, Category (Sports/Non Sports - Rural/Urban), Educational
Plan and Procedure

Qualification and Participation in sports in case of Sports persons were transformed to a tabulation sheet.

**Norms for Male Students**

<table>
<thead>
<tr>
<th>Extent of Adjustment</th>
<th>Social</th>
<th>Emotional</th>
<th>Health</th>
<th>Home</th>
<th>Financial</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Adjusted</td>
<td>0-4</td>
<td>0-1</td>
<td>0-1</td>
<td>0-1</td>
<td>0-1</td>
<td>0-12</td>
</tr>
<tr>
<td>Adjusted</td>
<td>5-7</td>
<td>2-4</td>
<td>2-3</td>
<td>2</td>
<td>2</td>
<td>13-18</td>
</tr>
<tr>
<td>Moderately Adjusted</td>
<td>8-9</td>
<td>5-7</td>
<td>4-5</td>
<td>3</td>
<td>3</td>
<td>19-26</td>
</tr>
<tr>
<td>Maladjusted</td>
<td>10-12</td>
<td>8-10</td>
<td>6-7</td>
<td>4-5</td>
<td>4-5</td>
<td>27-35</td>
</tr>
<tr>
<td>Highly Maladjusted</td>
<td>13-20</td>
<td>11-20</td>
<td>8-20</td>
<td>6-20</td>
<td>6-10</td>
<td>36-90</td>
</tr>
</tbody>
</table>

**Statistical Treatment**

After the scoring of the collected data of Physical fitness components and Adjustment factors was completed, the data was subjected to statistical analyses by using Mean, Standard Deviation and ‘t’-test. For proper presentation of data, bar diagrams and line graphs were also plotted.