3 METHODOLOGY

Every research activity needs a particular type of methodology because the charm of research lies more in its methods, than in its contents or subject matter. The present study is not an exception to this. The different steps of any research investigation like selection of problem, selection of research area, sampling frame, use of different tools for data collection and various methods used for data analysis were also considered while carrying out the present investigation on impact of family climate and parental encouragement on academic achievement among adolescents (14-17 years). It covers the following dimensions:

3.1 Research Design
3.2 Locale of the study
3.3 Sampling procedure
3.4 Variables used in the study
3.5 Study tools used in data collections
3.6 Statistical analysis

3.1 RESEARCH DESIGN

Zikmund (1988: 41) has described research design as “a master plan specifying the methods and procedures for collecting and analysing the needed information. The study entitled, “The impact of family climate and parental encouragement on academic achievement among
adolescents” is exploratory in nature. Exploratory design is planned to gain more knowledge and familiarity with a phenomenon or the subject concerned to achieve new insight into the problem.

After a thorough and meaningful formulation of the problem, specific objectives were set to provide the basis for the inquiry. Further, in the light of these objectives, the scope of the study was delimited and techniques of investigation to be adopted, tools to be used and pattern of statistical analysis to be followed were decided. Next, the theme of present study was developed and given a definite shape in the form of outline of the study to evaluate their relevance on the basis of set objectives. An effort was made to obtain a thorough review of the relevant literature relating to the previous research in the field. Further, to provide the scientific basis of the study a proper hypothetical framework was developed, to provide a definite direction and specific scope to the whole investigation. The required conceptual clarifications about the terms and items used within the framework of the study were taken into consideration for which help on the part of both literal and operational definitions was availed.

Lastly, the findings of the study have been discussed in the light of the available research material on the subject and were subsequently summarized throwing light on all the major aspects covered by the study. The results have been point-wise presented under the title of finding and discussion and the possible suggestions on the basis of conclusions drawn of the study are given in the subsequent chapters.

3.2 Locale of the Study

 Uttar Pradesh: There are 28 states and 7 union territories in India, Uttar Pradesh is the state with maximum number of districts in India. It has a
Note: Map of Uttar Pradesh showing location of Aligarh
Note: Map of Aligarh showing location of all five schools selected for the study.
total of 70 districts. Uttar Pradesh is the most populous and fourth largest state in terms of geographical area in India. The total area of the state is 2,38,566 sq.km. Uttar Pradesh is between north latitude 24 degrees and 31.5 degrees and east latitude 77 degrees and 84.5 degrees. It is a border state along the foot hills of Himalayas and Nepal and Tibet (China) to its north, bordered by Bihar in the East. Haryana and Rajasthan are in the West and Madhya Pradesh in the South. Only five countries of the world, China, the United States, Indonesia, Brazil and India itself have populations larger than that of Uttar Pradesh. According to 2001 census it has a population of 16, 60, 52, 859 representing 16.17% of the country’s population. One out of every six persons in India belong to Uttar Pradesh. Every 31st person of the world is a resident of U.P. Its population density of 689 persons per square kilometer is far above than that of 324 for entire country (uponline.in).

**Aligarh:** Aligarh is an administrative district of Uttar Pradesh with the headquarters located at Aligarh town. It forms a part of Agra Division. The district is situated towards the southeast of Delhi. It shares common boundaries with the district of Bulandshahr in the North, Etah in the East, Mathura in the West and Mahamaya Nagar in the south. Aligarh till 18th century was known by the name kol or koil but when the British occupied the land in September 1803, the present district came into existence. Aligarh is located at 27.88° North, 78.08° East. It has an average elevation of 178 meters (587 feet). The city is situated in the middle portion of Doab, or the land between Ganges and Yamuna Rivers. The Grand Trunk Road passes through the city. It is historically famous for its locks industry and called the “City of Locks” in local vernacular (aligarh.wikipedia)
**Population:** According to 2001 census it had a population of 667,732. Males constitute 53% of the population and females 47%. Aligarh has an average literacy rate of 71% higher than the national average of 65.4%, with 79% of the male and 61% of the female literates. 16% of the population is under 6 years of age. The city is an agricultural trade centre.

**Education:** Aligarh is famous for Aligarh Muslim University (AMU). Aligarh is synonymous with the University that is spread across much of the city civil lines area. Aligarh Muslim University is a residential academic institution of international repute offering more than 250 courses in traditional and modern branches of education. It is a premier central university with several faculties and maintained institutions and draws students from all corners of the world, specially Africa, West Asia and South East Asia. Woman literacy is quite low in comparison to that of males in Aligarh, perhaps women are generally confined to home and woman colleges are less in number (thecolorsofindia).

### 3.3 SAMPLING PROCEDURE

Aligarh district was selected purposively as it was convenient to the researcher and need of the study. There were around 500 schools in Aligarh. Out of which forty seven were in urban areas. Five schools were selected randomly from urban areas. 3 co-education schools, 1 girls school and 1 boys school were selected to cover both the sexes. The total number of students in class IX and X of all the five selected schools was 2200, which was the population of the study.

After the total population of the study was known, the sample size was drawn using the mathematical formula by Yamane (1970: 886-87) which is as follows:
$N = \frac{n}{1 + n(e)^2}$,

where $n$ is total population and ‘$e$’ is error of confidence level.

So, by putting the value of population, we have:

$N = \frac{n}{1 + n(e)^2}$

$= \frac{2200}{1 + 2200 (.05)^2}$

$= \frac{2200}{1 + 2200 (.0025)}$

$= \frac{2200}{6.5} = 338$

This sample was rounded off to 352 to equally distribute the sample among 5 schools with both sexes and avoid any further error. Thus, 352 adolescent boys and girls formed the unit of information for the present study.

Table 3.1: Distribution of samples with respect to schools

<table>
<thead>
<tr>
<th>S. No.</th>
<th>School</th>
<th>Estimate Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Our Lady of Fatima, Aligarh</td>
<td>88 (44 Boys + 44 Girls)</td>
</tr>
<tr>
<td>2.</td>
<td>St. Fidelis School, Aligarh</td>
<td>88 (44 Boys + 44 Girls)</td>
</tr>
<tr>
<td>3.</td>
<td>Abdullah Girls High School, AMU, Aligarh</td>
<td>44 (- + 44 girls)</td>
</tr>
<tr>
<td>4.</td>
<td>S.T. High School, AMU, Aligarh</td>
<td>44 (44 boys + -)</td>
</tr>
<tr>
<td>5.</td>
<td>Aligarh Public School, Aligarh</td>
<td>88 (44 boys + 44 girls)</td>
</tr>
</tbody>
</table>
Criterion for selecting the present age group

According to UNFPA, state of world population 2005, nearly half of world population (almost 3 billion people) is under the age of 25. According to Press Trust of India, Guwahati, Feb. 26, 2011, India has the largest population of adolescents in the world being home to 243 million individuals aged 10-19 years (UNICEF). The state of the world’s children’s report said country’s adolescents constituted 20% of the world’s 1.2 billion adolescents.

Since adolescence is the most vulnerable group and its population is growing high day by day. Much researches are being carried out internationally. Family and parents are the basics of every individual and if all these three variables namely family climate, parental encouragement and academic achievement were taken together and studied, the upcoming society can avoid various mistakes committed in the early times and can produce brighter youth for the nation. So, it was imperative to study this age group because they have not been studied at length during the recent past in this part of the country.

3.4 VARIABLES USED IN THE STUDY

Independent variable: The following independent variables have been selected for this study i.e. age, sex, education, family type, family members, area, religion, occupation, income, ordinal position, school type, family climate and parental encouragement etc.

Dependent variable: Academic achievement of the adolescents was used as a dependent variable.
3.5 STUDY TOOLS USED IN THE DATA COLLECTION

Keeping the objectives of the study in view, questionnaire technique was employed to study family climate and parental encouragement and academic achievement of the adolescents. Standard questionnaires (scales) were used for measuring family climate and parental encouragement. The questionnaires were translated into English for the convenience of the respondents.

3.5.1 Measurement of Family Climate: The family climate questionnaire developed by Dr. Beena Shah (2006) has been used (Appendix-I). The inventory was having 90 questions and each question was having three options ranging from most acceptable to least acceptable. The response of each and every adolescent was taken on the questionnaire provided. Time to time explanation of questions was given. Sufficient time was given for their responses.

Parameters of Family Climate Scale:

1) Restrictiveness Vs Freedom
2) Indulgence Vs Avoidance
3) Partiality Vs Fairness
4) Attention Vs Negligence
5) Acceptance Vs Rejection
6) Warmth Vs Cold Relations
7) Trust Vs Distrust
8) Dominance Vs Submissiveness
9) Expectation Vs Hopelessness
10) Open Communication Vs Controlled Communication
**Scoring:** This was a three point scale marking for negative 0, 1 & 2 for ‘always’, ‘sometimes’ and ‘newer’, respectively whereas it was 2, 1, 0 for positive statements. The ‘Positive Total Score’ spoke of the Favourable Family Climate whereas ‘Negative Total Score’ ‘Indicated Unfavourable Family Climate’ of the child.

**Reliability and validity of the scale:**

The investigators adopted the test-retest method to find out the reliability coefficients of the family climate scale (FCS). The values of reliability coefficients for each dimension is given below.

*Figure-2: Values of reliability coefficients for different dimensions of FCS*

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Dimensions</th>
<th>Coefficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Freedom Vs Restrictiveness</td>
<td>.75</td>
</tr>
<tr>
<td>2.</td>
<td>Attention Vs. Negligence</td>
<td>.72</td>
</tr>
<tr>
<td>3.</td>
<td>Dominance Vs Submission</td>
<td>.83</td>
</tr>
<tr>
<td>4.</td>
<td>Acceptance Vs Rejection</td>
<td>.76</td>
</tr>
<tr>
<td>5.</td>
<td>Trust Vs Distrust</td>
<td>.79</td>
</tr>
<tr>
<td>6.</td>
<td>Indulgence Vs Avoidance</td>
<td>.69</td>
</tr>
<tr>
<td>7.</td>
<td>Warmth Vs Coldness</td>
<td>.79</td>
</tr>
<tr>
<td>8.</td>
<td>Expectation Vs Hopelessness</td>
<td>.71</td>
</tr>
<tr>
<td>9.</td>
<td>Partiality Vs Fairness</td>
<td>.76</td>
</tr>
<tr>
<td>10.</td>
<td>Open Communication Vs Controlled Communication</td>
<td>.81</td>
</tr>
</tbody>
</table>

All the values of reliability coefficient are highly significant (P<0.001). The FCS thus is a reliable instrument.

Validity of the FCS was tested against the judgment of 20 judges. The selection of items on the opinions of the experts as well as the highly significant discriminative indices of all the items retained in the final format of FCS, confirm the item validity of the scale. The
interdimensional coefficients of correlation as given in Figure 3.3 also support the high validity of the FCS.

Figure-3: Correlation Matrix of Family Climate Scale

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Dimensions</th>
<th>‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1.</td>
<td>Freedom Vs Restrictiveness</td>
<td>1.00</td>
</tr>
<tr>
<td>2.</td>
<td>Attention Vs Negligence</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Dominance Vs Submission</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Acceptance Vs Rejection</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Trust Vs Distrust</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Indulgence Vs Avoidance</td>
<td>-</td>
</tr>
<tr>
<td>7.</td>
<td>Warmth Vs Coldness</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Expectation Vs Hopelessness</td>
<td>-</td>
</tr>
<tr>
<td>9.</td>
<td>Partiality Vs Fairness</td>
<td>-</td>
</tr>
<tr>
<td>10.</td>
<td>Open Communication Vs Controlled Communication</td>
<td>-</td>
</tr>
</tbody>
</table>

3.5.2. Measurement of Parental Encouragement

The parental encouragement scale developed by Dr. R.R. Sharma (1988) has been used in the present study, which was having 40 questions. Care was taken to ensure that the respondents do not consult one another while filling their responses.

Scoring: There were three response alternatives in each item of the scale. The subjects had to choose only one alternative. The marks were allotted
as (A) – 0, (B) – 1, (C) – 2. Thus, the total score of each item ranged from 0 to 2, whereas grand total of PES ranged from 0 to 80. Higher scores of PES reveal greater degree of parental encouragement, whereas lower scores reveals the lower parental encouragement (Appendix-II).

Every respondent was asked to fill both the questionnaires simultaneously.

**Reliability**

The reliability of the scale was measured firstly by split half method and the value was found to be .83. Secondly, two test-retest reliabilities were determined – one after an interval of 2 weeks and the other of 4 weeks. The values of these two reliabilities were found to be .73 and .76 respectively. The above three sets of reliability coefficients are presented in Figure 3.4.

*Figure-4: Indices of Reliability of PES*

<table>
<thead>
<tr>
<th>Split half method (N=50)</th>
<th>Test retest method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time gap of 2 weeks (N=50)</td>
</tr>
<tr>
<td>.83</td>
<td>.73</td>
</tr>
</tbody>
</table>

**Validity**

Two indices of validity of the PES were worked out.

1. **Content Validity:** The contents of each item of the PES was critically examined by 5 judges specialized in the field of education, psychology and sociology. The opinion of these judges confirmed that the PES was sufficiently valid instrument.

2. **Convergent Validity:** The validity of the PES was ascertained by correlating the scores of this scale with Uniyal and Agrawal’s PES. The
coefficient of correlation was found to be .68. This indicates that the scale is fairly a valid tool.

3.5.3. **Measurement of academic achievement**

The academic achievement of adolescents was assessed from their school result records.

3.6 **STATISTICAL ANALYSIS**

The collected data were coded, tabulated and analyzed using various statistical techniques. The statistical tests were used to know the relationship between dependent and independent variables among the various group of study. The significance levels was used as 5 percent for rejecting the hypothesis. Specific purposes for which tests were used have been given as follows:

*Figure-5: Statistical tests used and their purposes*

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Statistical tests</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Percentage</td>
<td>To study the distribution of both dependent and independent variables.</td>
</tr>
<tr>
<td>2.</td>
<td>Arithmetic Mean</td>
<td>To study the central value.</td>
</tr>
<tr>
<td>3.</td>
<td>Standard deviation</td>
<td>To know the variability among the observations.</td>
</tr>
<tr>
<td>4.</td>
<td>t-test</td>
<td>To test the mean difference between two means.</td>
</tr>
<tr>
<td>5.</td>
<td>Correlation coefficient</td>
<td>To determine the relationship between dependent and independent variables.</td>
</tr>
<tr>
<td>6.</td>
<td>t-test for correlation coefficient</td>
<td>To test the level of significance of correlation coefficient.</td>
</tr>
<tr>
<td>7.</td>
<td>Chi-square</td>
<td>To know the relationship between dependent and independent attributes.</td>
</tr>
</tbody>
</table>
The tests used are described below:

(1) **Percentage**

Single comparisons were made on the basis of the percentage. For drawing percentages the frequency of a particular cell was multiplied by 100 and divide by total number of respondents in that particular category to which they belonged.

(2) **Arithmetic Mean**

Arithmetic mean is the average used in the present study. “Arithmetic mean of a series if the figure obtained by dividing the total values of various items by their number” (Elhance, 2008).

\[
\bar{X} = A + \frac{\sum f u}{\sum f} X i
\]

where, \( \bar{X} = \) Arithmetic mean

\( A = \) Assumed mean

\( \sum f u = \) Product of frequency and deviation from the assumed mean

\( i = \) Class interval

\( \sum f = \) Total frequency

(3) **Standard Deviation**

It is usually denoted by latter \( \sigma \) (small sigma) of the Greek alphabet and is a measure of dispersion. Standard deviation is the square root of the arithmetic mean (average) of the squares of the deviation measured from the mean or assumed mean (Elhance, 2008)

\[
\sigma = i \sqrt{\frac{(\sum f u^2) - (\sum f u)^2/n}{(n-1)}}
\]
where, $\sigma$ = Standard deviation

$\sum f u^2$ = Sum of the product of frequency and square of deviation from assumed mean

$\sum f u$ = Sum of the product of frequency and deviation from assumed mean.

$n$ = Number of observations

$i$ = Class interval

(4) **Test of Significance**

t-test can be expressed as:

$$t = \frac{|\bar{X}_1 - \bar{X}_2|}{\text{C.S.E.}}$$

where $\bar{X}_1$ and $\bar{X}_2$ are the means of the first and second group.

C.S.E. means combined standard error. It is calculated by the following formula:

$$\text{C.S.E.} = \text{C.S.D.} \sqrt{n_1 + n_2}$$

Where $n_1$ and $n_2$ are the number of observations in the first and second group respectively. C.S.D. is the combined standard deviation. It is calculated by the following formula:

$$\text{C.S.D.} = \sqrt{\frac{(n_1-1)\sigma_1^2 + (n_2-1)\sigma_2^2}{n_1 + n_2 - 2}}$$

if $n_1 \leq 30$

if $n_2 \leq 30$

$$\text{C.S.D.} = \sqrt{\frac{n_1 \sigma_1^2 + (n_2-1)\sigma_2^2}{n_1 + n_2 - 1}}$$

if $n_1 > 30$

if $n_2 \leq 30$
C.S.D. = \sqrt{\frac{(n_1 - 1) \sigma_1^2 + n_2 \sigma_2^2}{n_1 + n_2 - 2}} \quad \text{if} \quad n_1 \leq 30
\quad \text{if} \quad n_2 > 30

C.S.D. = \sqrt{\frac{n_1 \sigma_1^2 + n_2 \sigma_2^2}{n_1 + n_2}} \quad \text{if} \quad n_1 > 30
\quad \text{if} \quad n_2 > 30

C.S.D. = \sqrt{\frac{\sigma_1^2 + \sigma_2^2}{n}}

\sigma_1 \text{ and } \sigma_2 \text{ are standard deviations of first and second group respectively.}

(5) Correlation Coefficient (r)

A mathematical method of measuring the intensity and magnitude of linear relationship between two variables of the series, was suggested by Karl Pearson, 1936 (Elhance, 2008).

The coefficient of correlation or the product moment correlation is calculated by the following formula:

\[ r = \frac{n \sum \sum f_{uv} - \sum fu \sum fv}{\sqrt{n \sum fu^2 - (\sum fu)^2}} \frac{\sum \sum f_{uv} - \sum fu \sum fv}{\sqrt{n \sum fv^2 - (\sum fv)^2}} \]

Where, \( r \) stands for correlation coefficient,
\( n \) = number of observations.
\( \sum \sum f_{uv} \) = Sum of the product of deviation of x and y variables with their frequencies
\( \sum fu \) = Sum of the product of deviation of x variable with the frequency.
\[ \sum f v = \text{Sum of the product of deviation of } y \text{ variable with the frequency.} \]
\[ \sum f u^2 = \text{Sum of the product of squares of deviation of } x \text{ variable with the frequency.} \]
\[ \sum f u^2 = \text{Sum of the product of squares of deviation of } y \text{ variables with the frequency.} \]

(6) **Formula for testing correlation coefficient by t-test**

\[ t = r \sqrt{\frac{n - 2}{1 - r^2}} \]

n is the number of observations.

r is the correlation coefficient.

(7) **Chi-square Test**

The Chi-square is one of the simplest and most widely used non-parametric test in statistical work. The Greek letter was first used by Karl Pearson in the year 1900. The quantity of describes the magnitude of the discrepancy between theory and observation. It is defined as:

\[ \chi^2 = \sum \frac{(O - E)^2}{E} \]

Where, O refers to the observed frequencies

E refers to expected frequencies.

Expected frequency (E) = \frac{\text{Sum of rows} \times \text{Sum of columns}}{\text{Total observations}}

Degree of freedom is calculated as \((r - 1)(c - 1)\)

where \(r\) stands for number of rows

and \(c\) stands for number of columns