RESEARCH METHODOLOGY
Chapter-IV

RESEARCH METHODOLOGY

This chapter deals with the research procedures applied in conducting the present study. For convenience, the research methodology has been discussed under the following three sub-heads :-

1. Research design
2. Variables and their Operationalization
3. Data gathering procedure and statistical techniques used

1. Research design

It comprises of the following sub-parts

(i) Locale of the study
(ii) District under study
(iii) Selection of the colleges
(iv) Sample of respondents
(v) Pilot study
(vi) Pre-testing of instruments
(vii) Tools and data collection
(viii) Statistic analysis of data

(i) Locale of the study

Uttar Pradesh was chosen as locale of the study. This was done with the intention that U.P. is a major state of the country and adolescent girls have an important role to play in the development of the state as well as the country.
(ii) District under study

District Faizabad was purposively selected for this study as the researcher hailed from this place. This helped the investigator to collect the necessary information accurately and timely. The researcher, being from the same place could easily have dialogues and discussions with both during pilot study and final data collection.

(iii) Selection of the colleges

District Faizabad comprises of 139 Hindi medium colleges and 70 English medium colleges, out of which 10 colleges of Hindi medium and 10 colleges of English medium colleges were randomly selected for the purpose of drawing samples.

(iv) Selection of adolescents

After having prepared a list of adolescent girls from each college, out of 220, 11 girls were randomly selected from each 10 colleges of Hindi medium and 10 colleges of English medium with the help of principal.

(v) Pilot study

Prior to finally deciding the title of the project a pilot survey of the area was conducted. This gave an idea about the place of the study and nature of the samples that could be drawn and type of aspects and problems, which could be explored out.

(vi) Pre-testing of instruments

Before collecting the necessary data from the finally selected sample of 220 adolescents, 20 people was identified other than those included in the final sample of respondents. These 20 adolescent were interviewed with the help of schedules and questionnaires developed for collecting the data. This helped the investigator in
making necessary changes in the instruments to be finally used their wording and composition.

(vii) Variables and their measurements

(i) Independent variables

(a) Age:

The chronological age of adolescent at the time of investigation was taken. All adolescents were listed according to following age groups and given the scores as follows.

<table>
<thead>
<tr>
<th>Age-group (years)</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 12 – 14</td>
<td>1</td>
</tr>
<tr>
<td>(b) 14 – 16</td>
<td>2</td>
</tr>
<tr>
<td>(c) 16 – 18</td>
<td>3</td>
</tr>
</tbody>
</table>

(b) Educational qualification

Education was operationalized as the number of years of formal education obtained by the respondents. Scores assigned to different categories on the bases of modified Kulshrestha’s socio-economic status (SES) scale for rural was as follows:

<table>
<thead>
<tr>
<th>Educational qualification</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary level</td>
<td>1</td>
</tr>
<tr>
<td>High school</td>
<td>2</td>
</tr>
<tr>
<td>Intermediate &amp; above</td>
<td>3</td>
</tr>
</tbody>
</table>

(c) Type of family

Family type was divided into two major categories viz. nuclear and joint. Nuclear type was referred to the family composing of parents and their children only, while joint family referred to the family composing of more than one couple and their children including other persons related to them. The scoring procedure
adopted was taken from the modified socio-economic status scale for rural of Kulshrestha.

<table>
<thead>
<tr>
<th>According of family size</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear family</td>
<td>1</td>
</tr>
<tr>
<td>Joint family</td>
<td>2</td>
</tr>
</tbody>
</table>

(d) Family structure

Family composition was scored on the basis of

<table>
<thead>
<tr>
<th>Family size</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5 members</td>
<td>1</td>
</tr>
<tr>
<td>6 and more</td>
<td>2</td>
</tr>
</tbody>
</table>

(e) Caste

Caste of the respondents in the study was measured on the basis of response of individual adolescent to which they belong, i.e. in terms of upper caste, backward caste and schedule caste/schedule tribe. The scores were assigned as -

<table>
<thead>
<tr>
<th>Caste</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper caste (General)</td>
<td>1</td>
</tr>
<tr>
<td>Other backward caste (OBC)</td>
<td>2</td>
</tr>
<tr>
<td>Schedule caste/Scheduled tribe (SC/ST)</td>
<td>3</td>
</tr>
</tbody>
</table>

(f) Religion

The selected study area was having mostly Hindu religion and some are Muslim. The following scoring pattern was adopted

<table>
<thead>
<tr>
<th>Category</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindu</td>
<td>1</td>
</tr>
<tr>
<td>Muslim</td>
<td>2</td>
</tr>
<tr>
<td>Sikh</td>
<td>3</td>
</tr>
<tr>
<td>Christian</td>
<td>4</td>
</tr>
</tbody>
</table>
(g) Total income of the adolescents

The amount of money earned by the adolescents in a month was measured by recording total income of the adolescent from all sources. The recorded total income per month was divided into three categories on the basis of modified Kulshresta’s socio-economic scale for rural (1972) as given below

<table>
<thead>
<tr>
<th>Income group</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to Rs. 10,000</td>
<td>1</td>
</tr>
<tr>
<td>Rs. 10,000 to 20,000</td>
<td>2</td>
</tr>
<tr>
<td>Rs. 20,000 and above</td>
<td>3</td>
</tr>
</tbody>
</table>

(h) Mother’s education

Education status of mother’s of adolescent girl was scored as

<table>
<thead>
<tr>
<th>Educational qualification</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to Secondary level</td>
<td>1</td>
</tr>
<tr>
<td>High school level</td>
<td>2</td>
</tr>
<tr>
<td>Intermediate level</td>
<td>3</td>
</tr>
<tr>
<td>Graduate &amp; above</td>
<td>4</td>
</tr>
</tbody>
</table>

(i) Mother’s occupation

Mother’s occupation of adolescent girl was scored as

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>House wife</td>
<td>1</td>
</tr>
<tr>
<td>Service</td>
<td>2</td>
</tr>
<tr>
<td>Business</td>
<td>3</td>
</tr>
</tbody>
</table>

(j) Family occupation

This was measured on the basis of the scores allotted to different family occupation in the socio-economic status scale developed by Trivedi (1963).

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>1</td>
</tr>
<tr>
<td>Business</td>
<td>2</td>
</tr>
<tr>
<td>Caste occupation</td>
<td>3</td>
</tr>
</tbody>
</table>
(ii) Dependent variables

(a) Anthropometrics measurement

Anthropometric measurement is concerned with the measurement of variation of physical dimension and the gross composition of human body at different age levels and degree of nutrition. All the subjects were measured for weight, height and BMI was then calculated.

(a.1) Height

Height was measured with the help of measuring rod having least count of 0.1 cm. The rod was made to stand straight on a leveled ground. The subject was asked to remove foot wear and head wear and to stand erect, near the rod with heals buttocks, shoulders blades and head in a vertical plane touching anthropometric rod. The pin was kept parallel to ground. The height was recorded in centimeter.

(a.2) Weight

A weighing machine was used to weight the subject in kg with least count of 0.5 kg. Weighing balance was placed on leveled ground and adjusted to zero before measurement. The subject was made to stand erect without touching anything on the weighing balance with minimum clothing and weight was recorded in kilogram.

(a.3) BMI

The continuous BMI variable was categorized into low, middle and high categories, as under weight and overweight status offer risk of different public health problems. The BMI was calculated as –

\[
\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}
\]

Clinical survey

All the subjects were visually examined for the various deficiency disorder in the clinical examination. The method is based on examination for changes believed
to be related to inadequate nutrition that can be seen as felt in superficial epithetical tissues especially skin, eyes, hair, clinical examination consist of routine medical history and physical examination. In order to find nutritional adequacy clinical examination was done. Eyes are examined for cataract, myopia, hypermetropea. Hair was examined for normal, hair loss and loss of colour (whiteness). Teeth were examined for normal, caries or tooth loss. Skin was examined for normal, dry loss of luster and wrinkles.

**Dietary pattern**

The strong symbolic and cultural influence and emotional reasons for food choices are broad concepts create a particular food habits of an individual or a community. The diets they consumed in a day is reflected in the food choices which is known as dietary pattern.

**Nutrient intake**

The proper design for a adequate diet is a variety and amount of different food, sufficient to provide each day and requirement of nutrient. Nutrient intake may be considered under two general headings.

(i) the nutritionally adequate or balanced diet which maintains and promotes health and vigour.

(ii) Special diet prescribed for treatment or prevention of disease state.

**Micronutrients**

The organic substances presents in small amount in several food stuffs. They have important functions in many of the vital processes of life the refer, essential for health and well being and needed only in small amounts, such organic substances are known as ‘micronutrients’ such as vitamins, minerals and fibers.
Dietary surveys

A structured interview schedule was developed and pre-tested before use. Data were collected by paying personal visits to the respondents. Information regarding food consumption habit, dietary intake, nutritional intake etc. were obtained. For this purpose 24 hours recall method was used in the sense that respondents were advised to provide information on the consumption of various food items of the adolescent girls of the day prior to the day of survey. Dietary recall data was not collected after the day of any occasion or fasting. Showing them standard cups, catories, spoons, glass made the standardization and then they were asked that how many cups or catories of the food they have consumed. In this context the data on the amount of various food items were obtained with were later on converted into the form of raw material. It is to be mention here that it is quite difficult to measure the consumption of various food items very accurately because the respondents themselves were not having any accurate records and the information provided by them may be considered only as approximate one.

To calculate the nutrients like energy, protein and fat are used comprehensive Food Exchange List, the amount of food in household measures was converted into metric weight and the nutrient intake was calculated according to the Recommended Dietary Allowances (ICMR). Individual food intake of raw food stuffs was calculated by following formula.

\[
\text{Total cooked amount of food preparation} = \frac{\text{Total raw quantity of food stuff used for preparation} \times \text{Individual intake of cooked amount of that preparation}}{\text{Individual intake of raw food stuff used in food preparation}}
\]
Cyanmethaemoglobin method

Cyanmethaemoglobin method is now recommended as the standard method. The haemoglobin is treated with a reagent containing potassium ferricyanide, potassium cyanide and potassium dehydrogen phosphate. The ferricyanide forms methaemoglobin which is converted to cyanmethaemoglobin by the cyanide.

Cyanmethaemoglobin standard is supplied in sealed ampoules, sterile and without suspended particles keep in dark between 4 and 20°C. Then the colour will remain unchanged until the date stated. The concentration is given on the label. A typical value is 60 mg per 100 ml.

Technique

Add 0.02 ml of blood to 4.0 or 5.0 ml of the reagent. Stand at least 4 minutes and read against a water blank at 540 mμ. Read the standard in the same way. Then

\[
grams \text{ haemoglobin per} = \frac{\text{Reading of unknown}}{100 \text{ ml blood}} \times \frac{\text{Dilution factor}}{1000} \times \frac{\text{Concentration of standard in mg per 100 ml}}{}
\]

The dilution factor is 201 or 25 according to whether 4.0 or 5.0 ml of reagent is used.

Food habits

A pattern of food eaten called food habit. A number of factor influences the food habits these include, educational and economic level of community, availability and cost of foods and social and cultural practices.

Nutrition

The study of foods, diets and food-related behaviours, and how nutrients are used in the body. People also use the term to describe the food intake of a person.
Adolescence

Period between 10-13 years of age when children are growing into adulthood.

Disordered eating

Disordered eating refers to troublesome eating behaviour, such as restrictive dieting, bingeing or purging which occur less frequently or are less severe than those required to meet the full criteria for the diagnosis of an eating disorder.

Anorexia nervosa

Anorexia nervosa is self starvation. People with this disorder eat very little even though they are thin. They have an intense and over powering fear of body fat and weight gain.

Bulimia nervosa

Bulimia nervosa is characterised by cycles of binge eating and purging, either by vomiting or taking laxatives or diuretics (water pills). People with bulimia have a fear of body fat even though their size and weight may be normal.

Binge eating disorder

Binge eating disorder means eating large amounts of food in a short period of time, usually alone, without being able to stop when full. The overeating and bingeing are often accompanied by feeling out of control and followed by feelings of depression, guilt or disgust.

Vitamin A deficiency disorders (VADD)

All the physiological disturbances caused by lack of vitamin A, including clinical signs and symptoms

Balanced diet

A diet that provides an adequate amount and variety of foods to cover a person’s energy and nutrient need.
Iron Deficiency Anaemia

A condition in a person who has a low haemoglobin or haematocrit level. Iron deficiency is the commonest cause. Lack of folate, vitamin B₁₂, iron and protein. Besides this, additional non-nutritional causes like Malaria, hookworm infection, other infections (such as HIV/AIDS), heavy bleeding and sickle-cell disease are also cause of anaemia.

A low level of iron in the blood and other tissues that keeps the body from working properly. It occurs when a person has used up the body’s iron stores, and absorbs too little iron from food to cover needs.

Nutrient

Part of the food that is absorbed and used by the body for energy, growth and repair, and protection from disease.

Construction of interview schedule

The schedule for the present investigation was thus developed in accordance with the methodological procedure described above, keeping in view the objectives of the investigation.

Data collection

The necessary evidence were collected in line with the objectives of the study. All the 220 adolescent girls respondents were inclusively approaches by the researcher. By personal contact, all the respondents were interviewed with the help of the structured schedule developed for the study.

Period of investigation

The data collection was initiated from November 2005 to December 2006.
Statistical analysis

Statistical analyses are procedures used in finding out the numerical value of the whole study. The statistical techniques for data analysis used in the study are as follows:

1. Percentage
2. ‘t’ test
3. Chi-square test
4. Correlation coefficient
5. Arithmetic mean
6. Standard deviation

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 divided by total number of respondents in that particular category to which they belonged.

\[
\text{Percentage} = \frac{\text{The sum of all the responses}}{\text{Total number of all the responses}} \times 100
\]

2. t’ test

It was applied to test the difference between two sample means and when the observations in two set are independent. Following formula is used:

\[
r = \frac{\bar{X} - \bar{Y}}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}
\]

where,

\[
S = \text{combined standard deviation from both sets of data}
\]
\[
n_1 = \text{number of observation in first set of data}
\]
\[
n_2 = \text{number of observation in second set of data}
\]

\[
S = \left[\frac{\sum (X_i - \bar{X})^2 + \sum (Y_i - \bar{Y})^2}{n_1 + n_2 - 2}\right]^{1/2}
\]
3. Chi-square test

In order to test the independence of two attributes a Chi-square test was applied as -

$$\chi^2 = \sum_{i=1}^{n} \frac{(o_i - E_i)^2}{E_i}$$

Where,

$$o_i = \text{Observed frequency of } i^{th} \text{ cell}$$
$$E_i = \text{Expected frequency of } i^{th} \text{ cell}$$

In rxc contingency table, $\chi^2$ value is compared at $(r-1)\times(c-1)$ degree of freedom with theoretical value of $\chi^2$ at 5 per cent level of significance.

4. Correlation coefficient

Karl Pearson has given a coefficient of correlation for the measurement of linear relationship, which exists between two variables. If X and Y are two variables and if E(X,Y) ≠ 0 then correlation coefficient ($r$) is

$$r = \frac{\text{Cov. (X, Y)}}{\sqrt{\text{Var. (X). Var. (Y)}}}$$

or

$$r = \frac{\Sigma x y}{\sqrt{\Sigma x^2 \cdot \Sigma y^2}}$$

where,

$$\Sigma xy = \left[ \sum XY - \frac{\Sigma X \Sigma Y}{n} \right]$$

$$\Sigma x^2 = \left[ \sum X^2 - \frac{(\Sigma X)^2}{n} \right]$$

$$\Sigma y^2 = \left[ \sum Y^2 - \frac{(\Sigma Y)^2}{n} \right]$$

and $n = \text{Sample size}$
Here, one variable is dependent on other. For testing the significance of correlation coefficient \( r \), \( t \) test is applied. Degree of lack of relationship or coefficient of alienation is measured as

\[
K = \sqrt{1 - r^2}
\]

5. Arithmetic mean

Arithmetic mean is the average used in the present study symbolically,

(i) For ungrouped data

\[
\bar{X} = \frac{\sum X_i}{N}
\]

(ii) For grouped data

\[
\bar{X} = \frac{\sum f_iX_i}{\sum f_i}
\]

where,

\( X \) = Arithmetic mean
\( X_i \) = \( i \)th variable
\( f_i \) = \( i \)th frequency
\( \sum f_i \) = Total frequency

6. Standard deviation (S.D.)

It is defined as the square root of the means of the squares of the deviations taken from arithmetic mean –

(i) For ungrouped data – S.D. = \[ \sqrt{\frac{1}{n} \sum (X_i - \bar{X})^2} \]

(ii) For grouped data \( - \) S.D. = \[ \sqrt{\frac{1}{n} \sum f_i (X_i - \bar{X})^2} \]

\( \star \)