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-test of standing

(i) Locale of the study

Uttar Pradesh was chosen as locale of the study. This was done with the intension that U.P. is a major state of the country and rural women have an important role to play in the development of the state as well as the country.

(i) District under study

District Hamirpur 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.

(ii) Selection of the colleges

District Hamirpur comprises of 70 high school and intermediate colleges (both), out of which four colleges namely three government colleges (B.N.V. Inter College, G.R.V. Inter College, and Faizyam Inter College) and one private college namely Pt. Parmanand Krantikari Inter College were randomly selected for the purpose of drawing samples.

(iii) Selection of adolescents

After having prepared a list of adolescent, for each college, 78 boys and 82 girls total 160 adolescents was selected randomly from selected colleges. The list of adolescent were prepared with the help of principal.

(iv) 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.

(v) Pre-testing of instruments

Before collecting the necessary data from the finally selected sample of 1160 adolescent was identified other than those included in the final sample of respondents. These 160 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 etc.
Sampling size of adolescent

District Hamirpur

Govt. B.N.V. Inter college
- 20 boys
- 20 girls
- Total: 40

Govt. G.R.V. Inter college
- 13 boys
- 27 girls
- Total: 40

Govt. Faizyam Inter college
- 20 boys
- 20 girls
- Total: 40

Private Pt.P.K.K. Inter college
- 18 boys
- 22 girls
- Total: 40

Total Adolescents: 160
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) 13 – 14</td>
<td>1</td>
</tr>
<tr>
<td>(b) 15 – 16</td>
<td>2</td>
</tr>
<tr>
<td>(c) 17 – 18</td>
<td>3</td>
</tr>
</tbody>
</table>

(b) Education of the respondents

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>Upto 9th</td>
<td>1</td>
</tr>
<tr>
<td>High School</td>
<td>2</td>
</tr>
<tr>
<td>11th standard</td>
<td>3</td>
</tr>
<tr>
<td>12th standard</td>
<td>4</td>
</tr>
</tbody>
</table>

(c) Sex

Sex refers to the male and female respondents.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
</tr>
</tbody>
</table>

(d) 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 -
Caste          Score assigned
Upper caste    1
Other backward caste (OBC) 2
Schedule caste/Scheduled tribe (SC/ST) 3

(e) Religion

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

Category          Score assigned
Hindu             1
Muslim            2
Sikh              3
Christian         4

(f) 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).

Occupation          Score assigned
Service            1
Business           2
Housewife          3

(g) Family structure

Family composition was scored on the basis of

According of family size          Score assigned
Up to 3 members                 1
4 to 5 members                  2
6 and above members             3

(h) 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
(ii) Dependent variables

(a) Anthropometrics measurement

Measurement of body weight, body height, mid upper arm circumference, head circumference and chest circumferences was recorded by the technique suggested by Gibson, 1990.

In present investigation the following anthropometric were used.

(a) Technique for measuring body height
(b) Technique for measuring body weight
(c) Technique for measuring mid-upper arm circumference
(d) Technique for measuring head circumference
(e) Technique for measuring chest circumference

(a) Technique for measuring body height

For children, height was measured with a vertical measuring rod. The anthropometric rod with centimeter scale having least count of 154.9 male and 153.0 female cm was used for measuring height. 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 heels buttocks, shoulder blades and head in a vertical plane touching anthropometric rod. The pin was kept parallel to ground. The height was recorded in centimeter.

(b) Technique for measuring body weight

A weighing machine with maximum capacity of 42.9 male and 44.4 kg female used to weight the subject. Weighing balance was placed on level ground and scale was set zero.
The subject was made to stand erect on the weighing balance with minimum clothing and weight was recorded in kilogram.

(c) Technique for measuring mid upper or circumference (IMUAC)

A fiberglass tape was used with least count of 10.5 cm. The left hand sleeve of the garment of the subject was pushed into the shoulder. The subject was asked to make the hand flexible and relaxed. The measurement was taken at the mid point of upper left arm, between the acromion process of the scapula and the trip of the alecranon process of the ulna, while taken measurement care was taken that soft tissues of the arm were not suppressed so tap was kept only sufficiently tight.

(d) Technique for measuring head circumferences

The head circumferences was measured wish a flexible fiber glass take used for measuring arm circumference. The head circumference was measured passing the tape round the head over the supra-orbital ridges (just above the eyes) of the frontal bone and the most protruding point of the acciput on the back of the head, slight pressure should be exerted to allow for the thickness of the hair.

(e) Technique for measuring chest circumferences

The chest circumference was measured with a flexible fiberglass tape. The chest circumference was taken at the nipple level preferable in need inspiration.

Clinical survey

It is an important practical method for assessing the nutritional status of community and the method is based on examination for changes believed to be related to inadequate nutrition. Clinical examination consist of routine medical history and physical examination. In order to find nutritional adequacy clinical examination was done. Eyes were examined for itching, water discharge, night stamatiatis, sever cheilosis swollen puffy. Hair was examined for loss of luster, sparseness, dryness. Teeth were examined for caries, muddy enamel, discoloration.
Gums for bleeding swollen red. Tongue for pale, red, swollen, face was examined for pale, dry, moon face, skin was examined for day and roughness, wrinkled pale. Nails were examined for spoon shaped, brittle, pale. Appetite was examined for anorex skeletal were examined for know ness, bowleg. Per cent prevalence of deficiency signs were computed.

**Dietary surveys**

The dietary surveys among the mother of respondents the performer inclucie table to record the information regarding quantity of different food items in household measures, standardized coups spoons were used for converting the reported quantities into actual measure and weight. Dietary intake of adolescent was determined by 24 hours dietary recall method. The survey was done for 1 day. Mother were asked to recall the adolescent exact food intake during previous 24 hours period in term of home measures like cups, glasses and spoons.

The dietary intake of cooked food was computed with fresh food quantities and nutritive value of diet consumed per day by the adolescents was calculated in terms of energy protein, fat, iron, calcium, beta carotene, vitamin C using the food consumption table of Gopalan *et al.*, 1989 average daily intake was thereafter computed and compared with ICMR (1989) recommendation. Individual food intake of raw food stuffs was calculated by following formula.

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

**Nutrition**

Well nourished adolescent are taller and reach puberty sooner than poorly nourished adolescent. Poor nourishment during puberty can prevent the attainment of hereditary growth potentials.
Nutritional needs

Nutritional requirements are greatest during periods of rapid growth the first 2 or 3 months of life and at puberty. Adolescent who are not getting enough nourishment of the right kind for their growth needs become tired and irritable. They show little interest in college work or play are generally make poor social adjustments.

Nutritional status

Nutrient intake of the subjects was determined by weighment and actual analysis of composite diets.

Nutrient Intake

A structured interview schedule was developed and pre-tested before use. Data were collected by paying personal visits to the respondents. Information regarding the intake of food for three consecutive days are collected from respondents using weighments of raw material and cooked food. Standard measures including katories, spoons and glasses of standard sizes were shown to the respondents and used in order to estimate the amount of raw ingredients used and cooked food consumed. Food intake was recorded in terms of grams and milliliters. Nutrients namely energy, protein, fat, calcium and iron were calculated using food composition table (Gopalan, 1989). Nutrient intake of three consecutive days was added and means values of these were taken.

Micro-nutrients

The organic substances presents in small amounts 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 fibre.

Food habits

Physical and psycho-social pressures influence adolescents eating habits. The boy faces better than the girls in that his large appetite and sheer volume of food
leads him to consume adequate nutrients. But the adolescent girls is less fortunate because

(a) her physiologic sex differences associated with fat deposits during this period and comparative lack of physical activity she may gain weight easily,

(b) social pressures and personal tensions concerning figure control will cause her to follow unwise, self-imposed crash diets for weight loss.

(c) Self starvation may result in result in complex and for reaching eating disorders like anorexia nervosa and bulimia.

Teenagers have the reputation of having the worst eating habits. They may skip a meal. Or they may eat fast foods which are generally inadequate in calcium are vitamin A but high in calories, saturate fat and sodium.

**Physical growth cycles**

The term “cycles” means that physical growth does not occur at a regular rate but rather in periods, phases or “waves” of different velocities, sometimes rapidly sometimes slowly. It, for example, growth in weight continued at same rate as during the first year of life, when it normally trips, it would means that a person who weighed 7 pounds at birth would, at the age of 11 years weight 1,240,029 pounds.

Growth cycle are orderly and predictable, though the tempo varies form child to child, with some children growing at a slow rate and others at a normal or rapid rate. However, each child is fairly consistent, showing a constant tendency toward earliness or lateness in reaching critical points in developments.

Growth cycle are psychologically as well as physically important because they inevitably effect the child’s behaviour.
Prevalence

Diabetes is on increase in India. The multicentre ICMR study showed a prevalence of 2.5 per cent in the urban and 1.8 per cent in the rural population above the age of 15 years. One in every eight individual in India is a diabetic. The revised WHO figures for the year 2025 is 57.2 million diabetic in India. The average age for the onset of diabetes is around 40 years while it is around 55 years in other countries.

Western data suggests that Indians are more centrally obese at a given level of BMI compared to white Caucasians and that Indian are more insulin resistant even at lower levels of BMI.

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 stared. 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

\[
\text{grams haemoglobin per} = \frac{\text{Reading of x Dilution factor x Concentration of unknown}}{100 \text{ ml blood}} \quad \frac{\text{standard in mg per 100 ml}}{1000}
\]
The dilution factor is 201 or 25 according to whether 4.0 or 5.0 ml of regent is used.

**Period of investigation**

The data collection was initiated from middle of February to December, 2006.

**Statistical analysis**

The following statistical techniques for data analysis used in the study are as follows:

1. Percentage
2. Arithmetic mean
3. Standard deviation
4. $\chi^2$
5. ‘t’ test

**1. Percentage**

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

**2. Arithmetic mean**

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

(i) For under grouped data

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

(ii) For grouped data

\[
X = \frac{\sum F_i X_i}{\sum F_i}
\]

where

\[
X = \text{Arithmetic mean}
\]

\[
X_i = i^{th} \text{ variable}
\]
\[ F_i = \text{ } i^{th} \text{ frequency} \]
\[ \sum F_i = \text{ Total frequency} \]

3. Standard deviation

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. \[ = \sqrt{\frac{1}{n} \sum (\bar{X}_i - \bar{X})^2} \]

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

4. ‘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,

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

\[ \left[ \frac{\sum (X_i - \bar{X})^2 + \sum (Y_i - \bar{Y})^2}{n_1 + n_2 - 2} \right] \]

(b) Chi square test

In order to test the independence of two attributes, a Chi-square test is applied as:
\[ \chi^2 = \sum_{i=1}^{n} \frac{(o_i - e_i)^2}{e_i} \]

Where,

- \( o_i \) = Observed frequency of \( i^{th} \) cell
- \( e_i \) = Expected frequency of \( i^{th} \) cell

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