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 slums
(iv) Sample of respondents
(v) Pilot study
(vi) Pre-testing of instruments
(vii) Tools and data collection
(viii) Statistical analysis of data

(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 diarrhoea is a major problem of the state as well as the country.
Selected slum

- Rawatpur
- Nawabganj
- Panki
- Jajmau
- Jaribehauki
- Kidwai Nagar
(ii) District under study

District Kanpur was purposively selected for this study because Kanpur city is a big city and population of this city are very high. There are many types of industries in Kanpur city and due to this reason there are more pollution and cases of diarrhoea occur more in this city.

(ii) Selection of the slums

Kanpur city is divide in six zones and every zones have some slums. There are about 390 slums in Kanpur city. Present investigations was carried out in 6 urban slums of Kanpur city.

(iii) Selection of children

After having prepared a list of children from each slum, out of 300, 50 children were randomly selected from each 6 zones in Kanpur city.

(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 300 children were identified other than those included in the final sample of respondents. These children's mothers 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.
Kanpur District

Rawatpur 50
Nawabganj 50
Panki 50
Jajmau 50
Jaribchauki 50
Kidwai Nagar 50

300
Total sample size
Variables and their measurements

(i) Independent variables

(a) Age:

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

<table>
<thead>
<tr>
<th>Age-group (months)</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Up to 12</td>
<td>1</td>
</tr>
<tr>
<td>(b) 12 – 24</td>
<td>2</td>
</tr>
<tr>
<td>(c) 24 – 36</td>
<td>3</td>
</tr>
</tbody>
</table>

(b) 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.

(i) According of family size

<table>
<thead>
<tr>
<th>Family type</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear</td>
<td>1</td>
</tr>
<tr>
<td>Joint</td>
<td>2</td>
</tr>
</tbody>
</table>

(c) Family structure

Family composition was scored on the basis of

<table>
<thead>
<tr>
<th>According to family members</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5 members</td>
<td>1</td>
</tr>
<tr>
<td>6 and above</td>
<td>2</td>
</tr>
</tbody>
</table>
(d) Religion

The selected study area was having mostly Hindu religion and some are other religions. 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>

(e) Total income of children's parents

The amount of money earned by the children's parents in a month was measured by recording total income of the parents from all sources. The recorded total income per month was divided into three categories on the basis of modified Kulshrestha'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 2000</td>
<td>1</td>
</tr>
<tr>
<td>2000 – 4000</td>
<td>2</td>
</tr>
<tr>
<td>4000 - 6000</td>
<td>3</td>
</tr>
</tbody>
</table>

(f) Mother’s education

Education status of mother's of children was scored as

<table>
<thead>
<tr>
<th>Educational qualification</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>1</td>
</tr>
<tr>
<td>Primary</td>
<td>2</td>
</tr>
<tr>
<td>Secondary</td>
<td>3</td>
</tr>
<tr>
<td>High school</td>
<td>4</td>
</tr>
</tbody>
</table>

(g) Mother’s occupation

Mother’s occupation of children was scored as:
(i) Father's occupation

Father's occupation of children was scored as:

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Score assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour</td>
<td>1</td>
</tr>
<tr>
<td>Business</td>
<td>2</td>
</tr>
<tr>
<td>Service</td>
<td>3</td>
</tr>
<tr>
<td>Farmer</td>
<td>4</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 tape having least count of 0.1 cm.
(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.

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. The BMI was calculated as:

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

Grading of obesity can be based on BMI

<table>
<thead>
<tr>
<th>Grade</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
<td>&gt; 40</td>
</tr>
<tr>
<td>II</td>
<td>30 – 40</td>
</tr>
<tr>
<td>I</td>
<td>25 – 29.9</td>
</tr>
<tr>
<td>Not obese</td>
<td>&lt; 25</td>
</tr>
</tbody>
</table>

Clinical survey

All the subject visually examined for the various deficiency disorder in 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, 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 habit 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.

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 mother were advised to provide information on the consumption of various food items of the children of the day prior to the day of survey. Showing them standard cups, calories, spoons, glass made the standardization and then they were asked that how many cups or calories of the food they have consumed. In this context the data on the amount of various items were obtained with their later on converted into the form of raw materials.

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 (RDA) individual food intake of raw food stuff was calculated by following formula:

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

**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 300 children respondents were inclusively approaches by the researcher. By personal contact, all the respondents mother were interviewed with the help of the structural schedule developed for the study.

**Period of investigation**

The data collection was initiated from March 2006 to April 2007.

**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. Arithmetic mean
3. Chi-square test
4. Correlation coefficient
5. Standard deviation
6. Weighted mean

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. 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

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

where,

\[
X = \text{Arithmetic mean} \\
X_i = i^{th} \text{variable} \\
f_i = i^{th} \text{frequency} \\
\sum f_i = \text{Total frequency}
\]

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 \((r-1)(c-1)\) 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 \( E(X, Y) \neq 0 \) then correlation coefficient \((r)\) is

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

or

\[
= \frac{\Sigma xy}{\sqrt{\Sigma x^2. \Sigma y^2}}
\]

where,

\[
\Sigma xy = \left[ \Sigma XY - \frac{\Sigma X \Sigma Y}{n} \right]
\]
\[
\Sigma x^2 = \left[ \Sigma X^2 - \frac{(\Sigma X)^2}{n} \right]
\]
\[
\Sigma y^2 = \left[ \Sigma Y^2 - \frac{(\Sigma Y)^2}{n} \right]
\]

and \( n = \text{Sample size} \)

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

6. Weighed mean

In the calculation of the arithmetic mean every item is given equal importance or is equally weighted. But sometimes it so happens that all the items are not of equal importance. At the time they are given proper weights according to their relative importance, and then the average which is calculated on the basis of these weights is called the weighted average or the weighted mean. In such a case, if simple arithmetic mean is calculated, it will be perfectly unsatisfactory average.

To calculate this weighted mean following formula is used which is just similar to the one used for calculating the arithmetic mean, simple with the difference that in place of frequencies of the items, their respective weights are used.

\[
\text{Weighted mean} = \frac{W_1 X_1 + W_2 X_2 + W_3 X_3 \ldots \ldots \ldots + W_k X_k}{W_1 + W_2 + W_3 + \ldots \ldots + W_k}
\]

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