CHAPTER-III

MATERIALS AND METHODS
CHAPTER- III
MATERIALS AND METHODS

3.1 Introduction
This chapter presents an overview of the research approach and design, the description of the settings, study population, sampling technique, size of sample, tools and techniques of data collection, the pilot study and plan of data analysis.

3.2 Research Approach
In view of the nature of the problem and to achieve the intended objectives of the study, a descriptive survey approach was considered most appropriate. It was considered appropriate for gathering personal and social information and also to obtain factual information on description of the existing prevalence of PEM among children 6 months to 5 years of age in slums of Guwahati city a descriptive survey approach found to be most appropriate.

The study is also intended to find relationship between the PEM and its influencing factors like age and sex of the child, birth order, religion, caste, type and size of family, education & occupation of parents, family income per month, socio-economic status, habit of taking alcohol by parents, maternal health practices, maternal morbidities, child health practices, feeding and dietary practices, morbidities of children such as diarrhoea,
Materials and Methods

respiratory tract infection, measles, worm infestations and environmental factors like type of house, number of rooms, sources of drinking water, purification of drinking water, household sanitation facilities, facilities for drainage system and facilities for disposal of refusal.

3.3 Research Design

Research Design helps researchers to plan and implement the study in a way that will facilitate to obtain the intended results, thus increasing the chances of obtaining information that could be associated with the real situations. As the present study aimed to study the epidemiology of PEM among children 6 months to 5 years of age, the researcher has used community based cross-sectional descriptive survey design for collection and analysis of data.

3.4 Study Setting

The present study has been undertaken in the slums of Guwahati city of Assam. It is the largest city of Assam, the largest metropolitan area in North- Eastern India and one of the fastest developing cities in India, the “Gateway” to India’s North East Region. The city now shoulders the responsibility of being India’s “Gateway” to the ASEAN countries. Guwahati, formerly known as Prāgjyotishpura means "City of eastern light" and "City of eastern astrology", was the capital of the ancient state of Kamrupa. It is also known as the "The City of Temples." Kamakhya a much
revered ancient Hindu temple is located in the city. Dispur, the capital of the Assam is latest addition to the city.

Geographically, the city lies between the southern bank of the Brahmaputra river and the foothills of the Shillong plateau. It is gradually being expanded as North Guwahati to the northern bank of the Brahmaputra and on both its Eastern and Western fringes. The Guwahati Municipal Corporation (GMC), the city's local government, administers an area of 216 km², while the Guwahati Metropolitan Development Authority, the planning and development administers an area of 340 sq. km. Population wise Guwahati is one of the fast growing cities in India. The city's population is 808,021. (www.gmcportal.in, 2008).

The numbers of slums in the city have increased over the past few years. A recent survey carried out by the Guwahati Municipal Corporation (GMC, 2009) on slums in the city revealed that the total number of slums under the jurisdiction of GMC is 90.

The poor in urban areas have so diverse traits that they cannot be called a homogenous lot as ‘slum’. The slum population is a heterogenous population, in terms of religion, caste; community, language, place of origin, occupation and income. The majority of the population belongs to lower socio-economic class, low level education, low level income and low quality housing. They lack basic amenities like safe drinking water, drainage and
Materials and Methods

excreta disposal. Most of the houses are "Kutcha" or "semi pucca" etc. Sources of drinking water vary from household to household, ranging from well, hand pump and stream to municipal tap water at a few places. As regards of health facilities there are no separate health facilities for the slum population.

3.5 Study Period and Study Population

The study period was two year period, commencing from July 2010 to June 2012.

Study Population

The population for the study comprised of all children of 6 months to 5 years of age and their parents from 10 randomly selected slums of Guwahati city.

3.6 Sample and Sampling Technique

3.6.1 The Sample:

The sample to be studied must be representative of the study population. The researcher is to decide as to what sample size would be reasonable against the background of cost, time, man power, size of population, sub population and the purpose of the study.

Considering the time available for data collection and nature of the study, it was decided to include 600 children and their parents in study sample. The sample size was decided on the basis of the prevalence of malnutrition in
Materials and Methods

Assam. The prevalence of malnutrition in Assam as per NFHS III \(^\text{11}\) was 36.4% and taking 10% of permissible error because of limited manpower, limited time and financial constraint.

We have

\[ N = \frac{4Pq}{L^2} \]

Where \( N \) = required sample size

\( P = 36.4\% = 0.4 \) = Prevalence PEM

\( q = (1 - p) = (1 - 0.4) = 0.6 \) (Proportion without PEM)

\( L \) = Acceptable (allowable error) on the estimate of \( p = 10\% \)

of \( p = 10\% \) of 0.4 = 0.04

Here, \( N = 4 \times 0.4 \times 0.6 / (0.04)^2 \)

\[ = 600. \]

The sample size of 600 children 6 months to 5 years of age and their parents were considered as adequate or representative sample of total population and therefore were taken up for this study to estimate the prevalence of PEM and to examine its relationship with some selected factors.

3.6.2 SAMPLING TECHNIQUE

The sampling technique used for the present study was multistage random Sampling Technique. In the First Stage, the slums have been selected using Simple Random Sampling without Replacement Technique. In the Second
Stage, for the selection of the household which has children in the age of 6 months to 5 years, proportionate sampling technique was used.

3.6.2.1 Selection of First Stage Units (FSU)

Information of the slums was obtained from the latest (2009) notification of slums of Guwahati city from the Government of Assam. There are total 90 slums pockets in Guwahati city with total no of household (approximate) 27,966 and approximate population 1,67,796. Selection of 10 slums out of 90 slum pockets was done by simple random sampling technique without Replacement Technique. The randomly selected slums were Fatasil Harijan colony, Bimala Nagar (Bishnupur), Solapara Harijan Basti, Valmiki Harijan colony (Dispur), Dhirenpara (Ujjawal Nagar), Rajabari Uzan Bazar, Modgoria slum colony, Katabari Gorchukh, Islampur Hedayatpur Harijan Colony, Pub Bhaskar Nagar part-2.

3.6.2.2 Selection of Second Stage Units (SSU)

Selection of 600 children with their parents from 10 selected slums. In this study to get 600 children, we have considered 600 households in 10 selected slums. For the selection of the household or rather the individual (children 6 months to 5 years of age with their parents) from each of the selected slum, method of proportionate sampling technique has been used. The number of households in these slum pockets has been shown in table 3.1. From these households which total to 6394 in number, 600 households have been
selected by proportionate sampling technique for the study. Children in the age group 6 months to 5 years with their parents were interviewed using an interview schedule and observation schedule for assessment of PEM. Table 3.1 shows the number of selected household from each selected slum.

The interviews were conducted by house to house visits in the selected slums. Difficulties arose when it was found that GMC house numbers were not properly allotted in these areas. In some cases it was also found that with one house number, more than one household existed. Therefore a technique was devised for selection of households so as to consider one particular spot in each selected slum as the starting point, either chariali or a tiniali, and then moving in one particular direction eastward, westward, northward or southward, whichever was feasible and then considering every second or third household until we have the desire households. If the respondents were not present at the time of visits, two subsequent visits were made to gather information. In spite of these visits if the 6 months to 5 years old child unavailable, next nearest household was taken. In household having more than one eligible child, information of the youngest child was collected.

For data collection president, general secretary/ active members of respective slums were contacted before starting actual process of data collection in order to obtain their cooperation and participation.
Table 3.1: Showing total selected slums household and number of household.

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Name of the selected slum</th>
<th>Household</th>
<th>Selected household</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fatasil Harijan colony</td>
<td>800</td>
<td>75</td>
</tr>
<tr>
<td>2.</td>
<td>Bimala Nagar (Bishnupur)</td>
<td>740</td>
<td>69</td>
</tr>
<tr>
<td>3.</td>
<td>Solapara Harijan Basti</td>
<td>244</td>
<td>23</td>
</tr>
<tr>
<td>4.</td>
<td>Valmiki Harijan colony (Dispur)</td>
<td>350</td>
<td>34</td>
</tr>
<tr>
<td>5.</td>
<td>Dhirenpara (Ujjawal Nagar)</td>
<td>500</td>
<td>46</td>
</tr>
<tr>
<td>6.</td>
<td>Rajabari Uzan Bazar</td>
<td>1000</td>
<td>94</td>
</tr>
<tr>
<td>7.</td>
<td>Modgoria slum colony</td>
<td>600</td>
<td>56</td>
</tr>
<tr>
<td>8.</td>
<td>Katabari Gorchukh</td>
<td>1000</td>
<td>94</td>
</tr>
<tr>
<td>9.</td>
<td>Islampur Hedayatpur Harijan Colony</td>
<td>800</td>
<td>75</td>
</tr>
<tr>
<td>10.</td>
<td>Pub Bhaskar Nagar part-2</td>
<td>360</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6394</td>
<td>600</td>
</tr>
</tbody>
</table>

3.6.3 Inclusion criteria

1. Children who were in the age group of 6 months to 5 years.
2. Children who were present at home at the time of data collection.
3. Children who reside in the selected slums for minimum of two years.
4. Parents and children who were willing to participate in the study.
5. Youngest child from each selected household.

3.6.4 Exclusion criteria

1. Children who were below 6 months and above 5 years of age.
2. Parents whose duration of stay in the slum is less than two years.
3. Children who were severely ill.
3.7 Study Variables

In estimating the prevalence of protein energy malnutrition and examining the association between degrees of protein energy malnutrition and selected factors, presence of PEM was identified as **dependent variables**.

The major **independent variables** identified were: age, sex of the child, religion, caste, type and size of family, birth order, education & occupation of parents, family income per month, socio-economic status, habit of taking alcohol by parents, maternal health practices, maternal morbidity, feeding and dietary practices, childhood morbidities such as diarrhoea, respiratory tract infection, measles, worm infestation, environmental factors like type of house, number of rooms, sources of drinking water, purification of drinking water, household sanitation facilities, facilities for drainage system and facilities for disposal of refusal.

3.8 Definition of Terms

1. **Epidemiology**: In this study the epidemiology refers to prevalence and determinants of PEM among children 6 months of 5 years of age in slums of Guwahati city.


3. **Slum children**: Refers to the children male or female whose age is 6 months to 5 years of age residing in slums of Guwahati city.
4. **Children with PEM:** The term refers to those children (male and female) 6 months to 5 years of age included in the study who are found to have PEM as confirmed by nutritional assessment.

5. **Feeding and dietary practices:**

   **Initiation of breast feeding:** This was considered as initiation of breast feeding within an hour of birth.

   **Prelacteal feeds:** Feeds given to the newborn before starting breast feeding like water, honey, panchamrit,, animal milk or powdered milk.

   **Exclusive breast feeding:** Feeding the child with only breast milk for a minimum duration of 6 months. A child fed on water, any liquids or solids will not be considered as exclusive breast fed.

   **Breast milk substitute:** In this study breast milk substitute refers to other than breast milk such as animal milk or formula milk.

   **Initiation of complementary feeding:** In this study initiation of complementary feeding considered from 6-9 months.

   **Initiation of solid food:** In this study initiation of solid food considered from 9-12 months.

6. **Socio-economic status:** In this study socio-economic status of the family is determined by the scores on related items in Kuppuswamy’s socio economic status scale (Park K. 2009) which includes
education & occupation of parents and monthly income of the family (Appendix- 3A).

7. **Maternal health status**: In this study maternal health status refers to number of antenatal clinic visits, number of T.T & IFA tablets received during last pregnancy, place of delivery and number of postnatal visits during last pregnancy.

8. **Maternal morbidities**: It refers to health problems experienced during last pregnancy which includes excessive fatigue, swelling of the legs/body/face, vaginal bleeding, hypertension and convulsion which is not from fever.

9. **Childhood morbidities**: Childhood morbidities refer to those children who suffered from diarrhoea, respiratory infection, measles and worm infestation during last two weeks.

10. **Environmental factors**: It refers to type of house, sources of drinking water, purification of drinking water, household sanitation facilities, facilities for drainage system and facilities for disposal of refusal.

11. **Weight for Age (WFA)**: Refers to the actual weight of the body measured in kilograms and compare with expected weight for age according to NCHS 2006.

12. **Length for Age (LFA) /Height for Age (HFA)**: It is the actual length of the baby among 6 to 24 months of age measured in centimetre and
compared with expected length for age according to NCHS 2006. Height refers to actual height of the children of 24 to 59 months measured in centimetre and compared with expected height for age according to NCHS 2006.

13. **Mid Upper Arm Circumference (MUAC):** It is the actual circumference MUAC of the children of 12 to 60 months of age measured in centimetre and compared with expected height for age according to NCHS 2006.

### 3.9 Instrument used for data collection

Based on the objectives, a *Structured Interview Schedule* for interviewing the parents regarding socio-demographic characteristics, maternal health practices, maternal morbidities, child health practices, child morbidities, dietary and feeding practices, and environmental conditions were used as data collection instrument.

#### 3.9.1. Structured Interview Schedule

The interview technique provides a greater opportunity to probe and clarify questions and it invariably results in getting nearly complete data from all subjects. Polit and Hungler (1978) state that interview technique is a good method to obtain self-reported information from subjects. After reviewing the literature and an extensive discussions was made with the experts with professional experience in this field; a structured interview schedule to
assess the socio demographic, maternal health practices, child health practices, feeding and dietary practices, environmental data and assessment of nutritional status was prepared. The content of the structured interview schedule was organised under three sections- Section I, Section II and Section III.

**Section I: Assessment of Socio-Demographic characteristics**

This section is divided into three parts; Part A, Part B and Part C.

**Part A:** This part of the Schedule included the questions pertaining to demographic profile of the children aged 6 months to 5 years with their parents. This part has ten items which included age of the child, sex, weight of the child, birth order, religion, caste, type of family, size of family.

**Part B:**

This part of the Schedule has seven items which includes age of the father & mother, education and occupation of parents and total family income, socio-economic status. For assessment of socio-economic status of the family Kuppuswamy’s socio-economic status scale (2009) was used (Appendix - 2(A)). Interpretation of scores is given below:

**Kuppuswamy’s socio-economic status scale (Park K. 2009):**

<table>
<thead>
<tr>
<th>Total score</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 – 29</td>
<td>Upper (I)</td>
</tr>
<tr>
<td>16 – 25</td>
<td>Upper middle (II)</td>
</tr>
<tr>
<td>11 – 15</td>
<td>Lower middle(III)</td>
</tr>
</tbody>
</table>
Part C:

It includes personal habit of parents of the children namely consumption of alcohol, duration of consumption and its frequency.

Section II: Assessment of Health Status of Mother and Child

This section of the tool has four parts; Part A, Part B, Part C and Part D.

Part A dealt with the assessment of maternal health which includes number of antenatal clinic visits, number of T.T & IFA tablets received during last pregnancy, health problems experienced during last pregnancy, place of delivery, reasons for not delivering in a health facility, personnel conducted the delivery of the child, number of post natal visits and extra food taken during last pregnancy.

Part B dealt with the assessment of child health practices which include four items. They are information related to immunization card of the child, immunization Status of the child, place of receiving last immunization and taking of Vit-A solution.

Part C dealt with the assessment of child morbidities which includes four items. They are information related to suffering from diarrhoea includes frequency of diarrhoea, consistency and treatment received, measles, RTI
(fever, cough, cold along with difficulty in breathing) and worm infestation during last 2 weeks and record of treatment received during the disease conditions. Worm infestation of children were assessed from the history of stomach pain off & on after eating food, lack of appetite & poor digestion, weak look, sick, constipation, abdominal distension & vomiting with itching around the anal region. No laboratory investigation was carried for worms because of logical constraints.

**Part D** related to assessment of feeding and dietary practices of children aged 6 months to 5 years of age which includes 17 items. Mothers were asked the time of initiation of breast feeding, practice of giving any prelacteal feeds, reasons for giving prelacteal feeds, giving colostrums, exclusive breast feeding, reasons for not giving exclusive breast feeding for recommended duration, breast milk substitute, reasons for putting him/her on breast milk substitute, method of feeding the breast milk substitute were asked. Questions for age at which complementary feeding was started, about the type of food and frequency of feed were carefully be collected. The mothers were also asked about the introduction solid food. Items included in the family food, number of meals given to the child in a day, frequency of giving of fish, meat & egg, attended school and receiving of mid day meal in the school/anganwadi/non formal school/play school etc.
Section III: Assessment of the environmental conditions

This section of the tool deals with the environmental conditions where the children reside. This includes 14 items. It attempted to sought information about the type of house, ownership of house, number of rooms, ventilation, sources of light, place of cooking, fuel for cooking, sources of drinking water, purification of drinking water, provision for safe disposal of excreta, household sanitation facilities, facilities for drainage system and facilities for disposal of refusal.

3.10 Techniques used in the study for assessment of PEM.

The techniques used in the study are as discussed below:

1. Assessment of nutritional status by clinical assessment.

2. Assessment of anthropometric measurements.
   i. Measurement of weight
   ii. Measurement of length/height
   iii. Measurement of MUAC

3.10.1 Assessment of PEM by clinical assessment

This section dealt with the assessment of PEM of the children aged 6 months to 5 years of age. It is divided into two parts, Part A and Part B.
Part A includes 7 items of clinical assessment of the children. During clinical examination, besides general appearance of the child, stress was given to identify nutritional deficiency signs; viz: Look, appearance of face, condition of hair, skin and muscles, digestive upset and presence or absence of oedema.

Part B includes the assessment of the anthropometric measurements of children aged 6 months to 5 years of age. Three parameters have been considered. They are weight, length/height and Mid Upper Arm Circumference (MUAC) of the children.

3.10.2 Assessment of Anthropometric measurements

Anthropometric measurements for detection of PEM have the advantage of being easy to perform, raising less antagonism form the children and requiring comparatively simple apparatus.

The weight, length/height and Mid Upper Arm Circumference (MUAC) measurements were converted into weight for age, length/height for age and MUAC percentage for each child using NCHS standards.

Anthropometric measurements of the children

Anthropometric assessment of the children in 6 months to 5 years of age included:
**Materials and Methods**

**Weight:** Weight was measured in kilograms by using weighing machine/scale. For this, the children were allowed to wear a light dress, without their footwear. Proper functioning of the weighing machine was assessed by weighing a known weight and also by noting the reading at zero mark upon withdrawal of the weight. The machine was checked for the zero marking before recording the weight of the each child. If the children could stand, they were made to stand on the machine and weights were noted. If the children could not stand, weight was taken along with the mother which was subtracted from mothers weight.

**Length:** Recumbent length (for the child less than 2 years of age) was measured by using an infant measuring board (*Infantometer*). The children were placed supine on the infantometer, the heads were held firmly in a position touching the fixed head end. Legs were straightened with feet at right angles to the legs keeping the toes upwards and were brought in contact with the movable heel end. The measurements were taken in centimetres.

**Height:** For children, who could stand up, heights were measured with non-stretchable measuring tape. Children stood upright without shoes against a vertical wall on which a measuring scale was inscribed. The four points of the body, i.e., occiput, shoulders, buttocks and heels were allowed to touch the wall. The heads were held erect with eyes aligned horizontally and ears vertically without any tilt. A rigid board was placed on the head and its point
Materials and Methods

of contact with the wall was marked. The distance between the point and the floor was measured in centimetres by a non stretchable measuring tape to give the height.

**Mid Upper-Arm circumference (MUAC):** MUAC was taken above the age of 1 year and below the age of 5 years children. The tip of the olecranon process and the acromion process of the left arm was marked. A line joining these two points was drawn and the midpoint was marked. The circumference of the arm at this level was measured in cm with the help of non-stretchable measuring tape by crossing the measuring tape.

### 3.11 Classification of PEM

The children would be grouped into different grades of PEM based on the classification recommended by Indian Academy of Paediatrics (IAP), RAO's and Arnold's classification which are shown in the succeeding paragraph.

1. **According to Indian Academy of Paediatrics (IAP) classification:**

   Normal > 80% of weight for age (50\textsuperscript{th} percentile value) according to NCHS standard.

   - Grade I PEM = 71 - 80%
   - Grade II PEM = 61 - 70%
   - Grade III PEM = 51 - 60%
Grade IV PEM ≤ 50%

To add ‘K” for presence of oedema.

2. **Age independent criteria for classification**:

According to Rao’s classification:

\[
\text{Basis} = \frac{\text{weight in KG}}{(\text{Height in cm})^2} \times 100
\]

Normal value > 0.14

Malnutrition ≤ 0.14.

3. **Mid-Upper Arm circumference (1 - 5 years)**

Arnold’s classification:

Normal > 13.5 cm

Mild malnutrition = 12.5 - 13.5 cm

Severe malnutrition < 12.5 cm.

It is noteworthy to mention that for the present study IAP classification of PEM have been considered for testing the significance of the various independent variables with the prevalence of PEM.

3.12 **Assessment of correct age**

Age would be assessed by verifying discharge certificate from hospital or birth certificate. If birth certificate is not available mother was asked to recall the possible date of birth with coincidence of important events in recent past.
3.13 Pre testing of the structured Interview schedule:

The preliminary pre-testing of the interview schedule was done on 10 children 6 months to 5 years of age with their mother of Kachari Basti, Ulubari (ward no-25) slum of Guwahati city. A pre testing was carried out to test the understanding of the items of the interview schedule. After the pre testing, changes were made to some items and certain terms were grouped in different heading and made simpler for easy understanding.

3.14 Content validity of the interview schedule

To ensure content validity of the structured interview schedule, objectives along with the interview schedule were given to three experts one from Community Medicine department of Gauhati Medical College and another from the field of community health nursing and paediatric nursing to seek their opinion about the relevance of the items to the study objectives. Some suggestions were offered to modify few items under each heading. These suggestions were included in the tool.

3.15 Trial of Interview schedule

Based on suggestions of experts, the tool was modified and tried out on 40 children from 6 months to 5 years of age from Indrapur slum (Ward No: 23) of Guwahati city. The main purpose of this was to test feasibility of each item included in the interview schedule. It took 5 minutes to introduce the
purpose of the study and average 40 - 50 minutes to complete the interview. It was found that all the items were clear and understandable to the parents of the children. The tool was thus, found to be feasible for final study.

3.16 Reliability of Interview Schedule

Reliability refers to the accuracy and consistency of a measuring tool. The reliability of the Interview Schedule was tested by interviewing 40 children aged six months to five years with their parents of Indrapur slum (Ward No: 23) of Guwahati city. The reliability of the Interview schedule was calculated by using split half method and it was found to be 0.91, which was considered to be reliable and adequate.

3.17 About the Pilot Study

The pilot study was conducted on 60 children aged 6 months to 5 years of age with their parents in the Indrapur slum (Ward No: 23) of Guwahati city to find out the feasibility of conducting the main study and to decide on the plan of statistical analysis.

The subjects for the pilot study possessed the same characteristics as anticipated for the sample of final study. Only youngest child of the family in a household was taken into consideration. Verbal consent was obtained from the parents. All the tools mentioned above were used for collecting the relevant data. On the basis of the observations in the pilot study, necessary
changes were made in the instruments and techniques made in the main study.

3.17.1 Important findings of the pilot study

It was found that prevalence of PEM among 6 months to 5 years of age were 60.3 percent whereas 39.7 percent children were normal (According to IAP classification). In regards to grades of PEM it was also observed that majority of the children 65.9 percent are in grade I PEM, followed by 31.9 percent in grade II, 2.2 percent in grade III and there were no children in grade IV PEM.

In respect to association between PEM and selected factors chi- square was computed and it was found that prevalence of PEM was significantly associated with age, sex, birth order, type of family, size of family, education of mother, socio-economic status, children suffering from diarrhoea, and worm infestation, duration of exclusive breast feeding, complementary feeding, type of house and purification of water. No significant association was found between PEM and religion, education of father, occupation of father and mother, breast milk substitute, consumption of IFA tablets, place of delivery, and drainage system of the house of the children. To find out the factors influencing PEM linear regression analysis were done and found that variables like socio-economic status, duration of exclusive breast feeding, sources of water, purification of water,
morbidities of children like diarrhoea, and worm infestation have a significant relation with PEM of children.

The study was thus found to be feasible. Assessment of weight, height, MUAC and clinical examination took 20 - 25 minutes and interviewing the parents, it took another 30 - 35 minutes. Therefore an average of 50 - 55 minutes was taken in every family for individual subject to collect all required data. Based on the pilot study, plan for statistical analysis for final study was decided.

3.18 Data Collection Procedure

The data was collected during the period July 2010 to June 2012. Primary data have been collected for the study using Indirect Oral Investigation Method. Responses have been collected from the parents of the children in the age interval 6 months to 5 years of age residing in the selected slums, whose duration of stay in the slum was minimum two years and who were willing to participate in the study. Moreover, data were collected from those parents whose child was present during the interview. The interviews were conducted by house to house visits in the selected slums. If the respondents were not present at the time of visit, two subsequent visits were made to the house to gather information. In spite of these visits if the respondent was unavailable, another house was selected.
3.19 Plan of Data Analysis

The data analysis was planned which include both descriptive and inferential statistics. Based on objectives of the study plan of data analysis was prepared. For this purpose, all the items of the structured interview schedule were coded and transferred to a master sheet for computer processing as per the prepared computer coding plan. The following specific plan for statistical analysis of the gathered data was formulated:

1. Frequencies and percentages would be computed to describe demographic characteristics, socio economic status, and personal habits of the parents of the sample.

2. Frequencies and percentages would be computed to describe maternal health status and morbidity of mother.

3. Frequencies and percentages would be computed to describe child health practices and morbidity pattern of children.

4. Frequencies and percentages would be computed to describe the feeding and dietary practices of children.

5. Frequencies and percentages would be computed to describe the environmental conditions where the children reside.

6. Frequencies and percentages would be computed for describing the prevalence of protein energy malnutrition.

7. Chi-square test of independence of attributes is used to determine the association between the prevalence of protein energy malnutrition.
and selected epidemiological factors influencing it and examine the significant difference between the different categories under different factors with reference to PEM; the normal test for proportion of attributes is used.

8. To find the Relationship between grades of protein energy malnutrition and selected factors, correlation and linear regression would be used in this regard.