CHAPTER V

NUTRITIONAL STRUCTURE

(A) Balance Diet, Diet Survey, Methods and Techniques
(B) Dietary Intake of Rural People
(C) Dietary Intake of Urban People
Nutrition is the most important physiological requirement of a living body. Nutrients promote growth and renewal of cells and tissues, and replace the energy which is spent by the body. Food is the source of substances from which regulators of metabolism are synthesized.¹ The main components of food are proteins, fats, carbohydrates, minerals substances, and water. These nutrients provide energy (calorie) for various body functions. A diet is required to supply the body building minerals necessary for an infant to grow into an adult or for an adult to replace the daily wear and tear in tissues accordingly in the course of normal living. Deficient diet leads a large number of deficiency diseases as well as to form a favourable condition, due to weak resistance power for other ill health conditions. The human body builds up and maintain healthy cells and tissue glands and organs with the help of nutrients. The body cannot perform any normal functions without specific nutrients. The health of any communities or region will be determined only by their dietary habits mainly the quality of food eaten, because people get vital nutrients from their food only. People get the energy from food for work and other vitamins and minerals for their growth.

BALANCED DIET

A diet which contains all the essential nutrients in proper proportion and in adequate amounts, to regulate the body function properly may be termed as balance diet. Diet may be of sufficient quantity to provide the needed energy and also ensure at least minimum supply of the essential nutrients to maintain the life process in proper working order. The nutrients that we take in diet are essential for health and protection of body against diseases and also in building tissues.

FUNCTION OF FOOD

No single food will provide all the nutrients because each food stuff contains only few nutrients, but body requires other nutrients also to maintain the good health. Mixed diet is the only way to provide proper nourishment. Food is a composite mixture of various substances the quality of which may vary from fraction of a gram in certain cases to hundred of grams in others. The food stuffs are the things which can be used as food. Foods are grouped according to their function as given below:

1. Energy yielding foods: Cereals, sugar, roots. These are foods rich in carbohydrates, fats and with some other nutrients.

2. Body building foods: Meat, liver, milk, pulses. These are foods rich in protein.
3. Protective foods: Green vegetables, eggs, liver, fruits. These are food rich in protein, vitamins, and minerals.

The main function of food are to provision of energy, body building, repair, and maintenance and regulation of tissue functions.

REQUIREMENT OF NUTRIENTS

The National Advisory Committee of the Indian Council of Medical Research (ICMR) has suggested the composition of a balance diet for an Indian (Table 5.1).

It is observed during diet survey that the people both men and women of the study area are engaged in different types of works from secondary to heavy, i.e. agriculture field, building construction etc. The ICMR has recommended three types of calorie requirements for different types of workers. In the present rural study the average recommendations of ICMR regarding balanced diet have been taken up and it is suggested that the people of rural areas who do each and every type of labour should get the average calories in their diet i.e. 2400, 2800 and 3900 according to their nature of work (i.e. 3000 calories per head per day). As far as calorie requirement for the urban areas are concerned the average need has been calculated on the basis of required allowances by the ICMR which suggests different categories of men and women. ICMR has recommended for man 2400, 2800, and 3900, while for woman 1900, 2200 and 3000 during different types of work. So
<table>
<thead>
<tr>
<th>Food Items (gram)</th>
<th>Adult Man</th>
<th></th>
<th>Adult Woman</th>
<th></th>
<th>Children</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sedentary</td>
<td>Moderate work</td>
<td>Heavy work</td>
<td>Sedentary</td>
<td>Moderate work</td>
<td>Heavy work</td>
</tr>
<tr>
<td>Cereals</td>
<td>460</td>
<td>520</td>
<td>670</td>
<td>410</td>
<td>440</td>
<td>575</td>
</tr>
<tr>
<td>Pulses</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>40</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>Leafy vegetables</td>
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<td>40</td>
<td>40</td>
<td>100</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>40</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Roots &amp; Tubers</td>
<td>50</td>
<td>60</td>
<td>80</td>
<td>50</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Milk</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>100</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>Oil &amp; Fat</td>
<td>40</td>
<td>45</td>
<td>65</td>
<td>20</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>Sugar &amp; Jaggery</td>
<td>30</td>
<td>35</td>
<td>55</td>
<td>20</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

Source: Recommended Dietary Intake of Nutrients, NIN (ICMR), Hyderabad, 1981.
the desirable energy amount required for the urban study is 2700 per head per day. It is calculated on the basis of above recommended allowances. Although ICMR has also recommended some additional allowances for pregnant and lactating women i.e. specific groups of persons require more than 2700 calories per day per head for a particular period of time. Children also require more calories during growth period.

The diet of the area as a whole generally contains more cereals than suggested but much less of the other food like leafy vegetables, fats, fruits etc. A mixed diet containing enough of cereals, milk and its products, leafy vegetables, seasonal fruits and flesh food, is required and can be had at not much extra cost. The nutritive value of the various types of foods will be highly helpful in this task of wiser food selections.

DIET/NUTRITION SURVEY

METHODS

The National Institute of Nutrition, Hyderabad, and the Nutrition Sections of the Department of Public Health in State Government regularly carry out diet surveys. These agencies work regarding the pattern of diets in different states and pattern of consumption of the various food stuffs in different population group like pre-school children, school children, pregnant and nursing women, rural and urban population group, industrial workers and tribal groups that are based on data collection through such diet surveys. Accordingly, the places
covered by diet surveys during the period 1960-69 are indicated in the accompanying chart. During this period, 575 surveys were conducted covering a population of 1,52,025 persons.¹

To detect the nutritional level (intake) of the people of the area the diet/nutrition survey has been conducted through oral questionnaire method in rural as well as urban areas of the unit. Various types of information have been collected from various population group such as pre-school children, school children, pregnant and nursing woman from rural and urban population. The unit for this survey can be an individual family. World Health Organisation (WHO), ICMR and other organization generally have accepted the following method for diet/nutrition survey:

1. Weightment and raw foods,
2. Oral questionnaire,
3. Weightment of cooked food, and
4. Checking of stock by inventory.

In present survey oral questionnaire method has been adopted due to the nature of study.

1. Through proposed method more than one families have been taken up in a day unlike other methods.
2. The study unit is too large and the aim is to conduct the survey about 500 families in short duration.
3. Besides diet survey, the aim was also to collect the other

information regarding medical background of the family, living environmental conditions, drinking water, treatment system etc.

METHOD OF DATA COLLECTION

The main object of the proposed survey was to work out the magnitude of malnutrition, undernutrition of the main nutrients which are deficient in their diet in various communities. The diet survey was conducted in both rural and urban places through the oral questionnaire method. Selected families of different communities were interviewed personally.

To collect the required information a detail schedule (Appendix - B) was prepared regarding dietary habits which also contained their occupation, housing condition, source of drinking water, dietary pattern, consumption of various food stuffs, special food prepared on festivals and general health troubles of the family. Besides, surrounding environment, tradition and customs, method of cooking, smoking habit etc. have also been collected during diet survey.

SELECTION OF VILLAGE

To conduct the diet survey in rural areas, the villages have been selected for diet survey through systematic stratified random sampling method. For this, various disease zones have been prepared on the basis of disease incidence data (1982, 1983 and 1984-85) of the area. Primary Health Centre wise data pertaining to the prevalences of all the
health hazards were obtained. This data was converted into percentage of each disease. On the basis of these data five disease zones were framed for the entire study unit.

It is decided to cover 0.5 per cent villages, so that the first village number 43 was initially selected from box containing serial number 1 to 200 for selecting villages for each zone. The starting number of village in every zone being 43 and onward as follows i.e. 43, 243, 443 ...

To conduct that diet survey a schedule was got filled in from 22 selected villages (Appendix - C) and 9 towns of the study unit. Urban places were selected on the basis of their respective characteristics of towns. For example, Tikamgarh, Panna, Chhatarpur are the former princely states which have their peculiar pattern of living, different house scheme of old etc. Ajaygarh has been selected because it is the next town of Panna district and connected with a number of rural important tracts.

The total number of rural families where diet survey was conducted is 242 whereas of urban families it is 260; in this way the total number of families reaches 502. During diet survey in every survey village some points have been always kept in mind, where survey has been conducted.

1. That the survey should not be confined to a particular place of the village but there should be equitable division so as to have the entire village come under the survey.
2. Almost all the community found in the village should be covered in proportion to each population in the village.

Diet calculation of each family was carried out on the basis of various guide lines and recommended allowances given by ICMR and other medical and nutrition bulletin, published from time to time.

First of all Patel or Kotwal, reputed person of the villages were contacted to know the communities of the village and their location. On the basis of information the family has been selected for the proposed survey.

**DIET ANALYSIS**

The raw food consumption of all the food stuffs of previous day were noted with the help of head of family and/or female member who are responsible for the food preparation. Besides this, other required information has been also noted.

To find out the daily intake of various nutrients, first of all adult unit were calculated for each and every family separately on the basis of information given in the dietary schedule for total family members. For this the analytical study was that the total member of the family were converted into adult units. The information and data given by each family regarding consumption of various food stuffs was collected and analysed. The average daily diet of each of the family were noted and the carrying value of foods stuffs like
protein, vitamins etc. was accordingly calculated. The total nutrients were compared with the Recommended Dietary Intake of Nutrition, 1981 of the ICMR and the deficiency, if any, was counted out.

Since families reported consumption differently i.e. annual, weekly and daily. Only a few interviewed families gave daily information. Hence it was necessary to have a single time unit i.e. one day. They reduce above values in form of the total number. So as to facilitate intake of food stuffs per head per day. The food stuffs consumption by a member was converted into nutritive values, so the total amount of nutrients including total calorie, protein, iron, etc. was calculated. After the calculation of nutrients, the schedule form of rural areas were arranged community wise and of urban areas were arranged town wise separately.

The average intake of different nutrients by the people of the study unit has been calculated from diet schedule. It is a fact that the dietary habits including consumption of various food stuffs are quite different in rural and urban areas of the unit and their consumption is also influenced by many respective local factor. In rural areas the consumption pattern of various food stuffs mainly dependent upon local production, while the consumption pattern of food stuffs in urban areas are mainly influenced by the purchasing power of the family and as far as study area is concerned a majority of population is engage in agriculture and its related
activities. For detailed information the analysis of diet survey has been grouped as under:

A. Rural diet
B. Urban diet

In rural area particularly each and every community has its own dietary habits; such as brahmins and jains mostly take non-vegetarian food stuffs while in urban areas the intake of food stuffs is directly controlled by the purchasing power of the respective family although traditional families also follow their traditional norms as far as consumption of various food stuffs are concerned.

RURAL DIET

In rural areas, diet survey has been conducted in 22 villages, which are scattered over the entire area. The total 242 number of families interviewed belonging to various communities.

The method for selection of villages for survey has been already given in previous pages. The selection of the families in the selected villages was made keeping the following point in mind.

1. Every community of the village must be covered in proper proportion.
2. Survey should not be concentrated at any particular part of the village.
3. Surveyed families should be also from different income groups.

RURAL DIETARY HABIT

Rural dietary habits are directly controlled by the local production of food stuffs and the other living environmental conditions. On the basis of diet survey main character of the people is engaged in various activities was studied. Some men and women also work in fields and homes. Normally people take food three times a day. The rural folk reported that in the morning they take breakfast which is locally known as 'Kaleba'. This is not light; it includes cereals with chatni or pickles i.e. any food stuffs available in the home. Most of the people take previous day left meal in the morning as breakfast. A noticeable similarity is that of tea which is taken by each family in the morning by all members.

Lunch also varies according to status of the family and the availability of local food stuffs. Caste and tradition also influence the consumption of food stuff. Some take pulses, rice, milk every day while some may not afford all these every day. Low income group families have got to be satisfied with 'dal-roti'. It is very occasional that they can take meal like the two other purchasing groups.

The night food (dinner) of rich families normally consists of chapati, dal, vegetable, rice etc. Milk is
consumed in the night but only by few people who can afford. No family has been reported to be having the habit of taking non-vegetarian meals every day. On the eve of important festivals and also on the arrival of guest special meal is prepared by some families but the standard and quality would depend upon the economic condition.

**TABLE 5.2**

**RURAL FAMILY - COMMUNITIES WISE**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the community</th>
<th>No. of family interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scheduled Caste</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>Backward Caste</td>
<td>41</td>
</tr>
<tr>
<td>3</td>
<td>Jain</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>Thakur</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Brahmin</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>Patel</td>
<td>21</td>
</tr>
<tr>
<td>7</td>
<td>Soni</td>
<td>18</td>
</tr>
<tr>
<td>8</td>
<td>Shrivastava</td>
<td>17</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>242</strong></td>
</tr>
</tbody>
</table>

Source: Field data.

The total families have been divided into 8 groups according to communities on the basis of their different dietary habits, beliefs and traditions. Then on the basis of nutritive value of the food stuffs eaten by communities per day per caput intake, family chart was prepared and analysed.
The highest number of families interviewed belonged to the scheduled caste as against Shrivastava belonging to the lowest. Details of each community is incorporated in Table 5.2.

Table 5.2 shows that in total number of families interviewed scheduled castes viz. Chamar, Dhanak, Mehtar, Backward class castes viz. Sahu (Teli), Dhobi (Washerman), Nai (Barber), Lohar (Blacksmith), Badhai (Carpenter) and Jains communities occupy first, second and third positions respectively. And to add more the scheduled caste is found to be inhabiting in every village of the study region; even a village namely Kadta in Rehli PHC is populated only by scheduled caste. Backward class castes are generally found in the areas with a little variation here and there.

Patel community commands the dominating position in respect of consumption of nutrients amongst all the communities of the rural study region. Their profession being the plant vegetables, they grow all shorts of leafy and other vegetables and fruits rich in protein, calcium, iron etc. they are easily and readily available to them that they consume frequently in sufficient quantity throughout the year.

Brahmins, Jains and Sonis are reported to be purely vegetarians. Their dietary habits are strictly controlled by their religious beliefs which forbid them to consume non-vegetarian stuffs. Jains and Sonis are generally engaged in business with agriculture but Brahmins are mostly engaged in
agriculture with their traditional work. Brahmins generally do not have deficiency in diet. Jains are highly religious and their day to day life is strictly regulated. Their dietary habits are remarkably distinct from other communities of the study region. Since their religion does not permit them to consume vegetables and fruits which are taken out from inside the earth. These factors go along to determine the diet of this community and therefore, they are generally found in deficient condition. Sonis and Jains occupy the same position in respect of consumption of nutrients. They are also deficient in nutrients. They are also reported to have various troubles of digestive system due to long sitting in comparison with their businesses.

Other remaining communities have both types of habits vegetarian and non-vegetarian. Their habits are also determined by their customs and beliefs. Thakurs do agriculture and in some cases run dairy side by side. The economic condition is better. Therefore, their diet is found satisfactory which keeps them fit and in healthy condition. The economic condition of backward and scheduled castes is found unsatisfactory and it is one of the main influenceable factors as far as their dietary intakes are concerned. Poverty, living style, ignorance etc. are responsible for their deficient diet.

COMMUNITY-WISE NUTRITIONAL INTAKE

It is already incorporated community-wise, the average intake and ranking value of nutrients in the rural study unit
SAGAR DIVISION

NUTRIENTS: REQUIRED & ACTUAL INTAKE

1986

K cal/day

2700
2500
2000
1500
1000
0
CALORIE

Gram/day

70
50
30
10
0
PROTEIN

Mg/day

1000
500
0
CALCIUM

Mg/day

30
20
10
0
IRON

IU/day

5000
4000
3000
2000
1000
0

VITAMIN A'

Mg/day

1.5
1.0
0.5
0

THIAMINE B1

Mg/day

2
1
0

RIBOFLAVIN B2

Source: Diet survey.

index

Standard requirement

Actual intake

Rural

Urban

PLATE. 6
in table No. 5.3 and 5.4 showing average requirement and intake of nutrients.

CALORIE

The calorie consumption in different communities is varied from 2306 to 2761 per caput per day. The average intake of the rural area per head per day comes to 2490. Calorie intake was not found much lower than other food stuffs because the people consumed varieties of cereals such as maize, jowar, bajra etc. according to season and availability. Cereals are the main source of calorie. Besides this, seasonal vegetables and fruits, which normally rural people consume, also provide calorie.

Thakur community of the rural unit has reported the highest consumption of calorie i.e. 2761. Its reason is attributed to their taking of green leafy vegetables, seasonal fruits consumption of milk and non-vegetarian stuffs every now and then. The scheduled castes and backward castes are placed lowest the reason being their poor purchasing power. They can not afford to take good meals, vegetables, fruits etc. Besides these, communities are mostly illiterate and do not understand as to how to maintain hygienic conditions in their homes and also in their day to day life. Therefore it is also one of the reasons for their being in the stage of under nutrition. It is also found that they do not care much about the proper cooking methods, which protect the nutrients' loss.
Patels, Brahmins and Shrivastavas are found with a little variations from each other 2734, 2688 and 2403 respectively per head per day. In comparison to their work the intake of calories are quite deficient because of their heavy work. Scheduled castes consume lowest (2306) because of their purchasing power.

Most families have no agricultural land and they fully depend on daily wages and are also engaged in heavy work in other families as well as in their own families. In this way their caloric consumption is also found deficient.

PROTEIN

According to the working and physiological conditions of the people in the study area the need of protein is the same as normally required i.e. 55-90 grams per head per day. People of the study unit have usually a habit of taking pulses daily. A majority of villagers take bengal gram, and peas daily during particular season in the field and home regularly which is locally known as 'hola' and 'matar'. During diet survey protein deficiency signs have also been observed among children below the age of five years mainly due to less consumption of protein.

In rural study area the 'Patel' community has reported the highest intake of protein viz. 64 grams per day per head. The lowest consumption reported by Scheduled castes i.e. 48 grams due to their purchasing power and defective cooking method
etc. The consumption of protein among Thakur has been reported 63 grams and gets second position. The reason may be that Thakurs have both types of dietary habits to consume pulses i.e. vegetarian and non-vegetarian. Brahmins and Jains come in third place as far as protein intake is concerned. According to dietary analysis their intake is found 61 grams per head per day. Most of the rural families have vegetarian habits and they consume protein rich food stuffs according to season and their status.

CALCIUM

Green leafy vegetables, fruits, fish, cereals, betal leaves etc. are the various sources of calcium. In some places calcium in drinking water is reported to be in much quantity. Generally people have habits to take calcium directly through betal leaves and with tobacco. The intake of calcium in the study area varies from place to place i.e. from 703 to 903 mg with a mean of 815 mg per day. Most of the calcium comes from cereals, milk and fruits.

Patel community of the area is reported to be taking 903 mg while Soni community 703 mg. It is the lowest consumption. The details of other consumption are given in Table 5.3. Consumption of calcium in the entire area is found deficient, if compared with the ICMR recommendation.

IRON

Anaemia is frequently reported among women of the child
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Community</th>
<th>Calorie Kcal</th>
<th>Proteins (gm)</th>
<th>Calcium (mg)</th>
<th>Iron (mg)</th>
<th>Vitamin A (IU)</th>
<th>Thiamine (mg)</th>
<th>Riboflavin (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scheduled Caste</td>
<td>2306</td>
<td>48</td>
<td>851</td>
<td>15.7</td>
<td>3461</td>
<td>0.60</td>
<td>1.40</td>
</tr>
<tr>
<td>2</td>
<td>Backward Caste</td>
<td>2331</td>
<td>56</td>
<td>853</td>
<td>18.8</td>
<td>3633</td>
<td>0.65</td>
<td>1.50</td>
</tr>
<tr>
<td>3</td>
<td>Jain</td>
<td>2391</td>
<td>61</td>
<td>754</td>
<td>16.8</td>
<td>3776</td>
<td>0.90</td>
<td>1.50</td>
</tr>
<tr>
<td>4</td>
<td>Thakur</td>
<td>2761</td>
<td>63</td>
<td>872</td>
<td>19.2</td>
<td>4018</td>
<td>1.00</td>
<td>1.80</td>
</tr>
<tr>
<td>5</td>
<td>Brahmin</td>
<td>2688</td>
<td>61</td>
<td>730</td>
<td>18.4</td>
<td>3527</td>
<td>0.85</td>
<td>1.65</td>
</tr>
<tr>
<td>6</td>
<td>Patel</td>
<td>2734</td>
<td>64</td>
<td>903</td>
<td>20.7</td>
<td>4156</td>
<td>1.05</td>
<td>1.90</td>
</tr>
<tr>
<td>7</td>
<td>Soni</td>
<td>2309</td>
<td>53</td>
<td>703</td>
<td>18.1</td>
<td>3993</td>
<td>0.75</td>
<td>1.75</td>
</tr>
<tr>
<td>8</td>
<td>Shrivastava</td>
<td>2403</td>
<td>59</td>
<td>857</td>
<td>16.6</td>
<td>3271</td>
<td>0.85</td>
<td>1.85</td>
</tr>
</tbody>
</table>

Source: Based on diet survey.
bearing age and children of pre-school age in the entire study zone. According to private doctors of the study area it is widely reported. During diet survey it is also observed personally that the females and children are the main prey. According to ICMR the need of iron in various age groups and sex are quite different. The source of iron are also few and due to defective cooking method loss of this nutrient also occurs during cooking.

The average intake of iron varies from place to place i.e. from 15.7 to 20.7 mg per caput per day. The average of the total rural area is 18.0 mg. Patel occupies the highest position in the intake of iron i.e. 20.7 mg as against 19.2 mg among Thakurs. The intake in other communities are given in Table 5.3.

Vitamin A : According to ICMR recommendations the average requirement of vitamin A is 5,000 IU. It is also required more in different physiological conditions.

As far as consumption of vitamin A concerned the highest intake is reported by the Patel community i.e. 4,156, while lowest is found 3,271 IU among Shrivastavas. The consumption of other communities varies from 3,461 to 4,718 IU and is given in Table 5.3. This is very essential vitamin for good health and for resistance power of the body. The main sources by which vitamin A in the area are palak, cabbage, pumpkin, carrot, mangoes and papaya etc. It is realized that the intake
of vitamin A must be increased through more consumption of food stuffs, which are rich in vitamin A. If deficient, it will cause various eye diseases.

Vitamin B is really a complex of more than ten vitamins but we have taken up the most important of this group. They are B₁ (Thiamine) and B₂ (Riboflavin). Without thiamine, trouble of the heart and nervous system develop Beri beri affects nervous in the legs especially. It is common in the area where diets are based on rice. Another vitamin of this group is B₂. The main sources of riboflavin are liver, meat, milk, eggs, groundnut, bengal gram, whole wheat, Soreness of the tongue, redness and burning sensation in the eye, cheilosis etc. are the main signs due to deficiency of riboflavin.

Thiamine (B₁): It is clear from the Table 5.3 that the intake of B₁ is not found satisfactory in various communities. Patel consumes more of this vitamin daily i.e. 1.05 mg then comes Thakurs (1.00) followed by Jains (0.90). The lowest is scheduled caste lagging behind the intake of B₁ at 0.60 mg per day, while ICMR recommended 1.5 mg per head per day.

Riboflavin (B₂): Deficiency of riboflavin is very common in the study unit. Desirable allowances of this vitamin is 2.5 mg per head per day.

The intake of this vitamin is noticeable in all the communities in the study unit. The range of intake varies
from 1.40 to 1.90 mg which is quite low, against recommended allowances. Patels consume highest i.e. 1.90 mg daily and scheduled caste consume lowest i.e. 1.40 mg per head per day followed by Shrivastavas (1.85), Thakurs (1.80), Sonis (1.75), Brahmins (1.65) and Jains (1.50). The average intake of the rural study area is 1.66 mg per head per day.

NUTRIENT-WISE RANK OF INTAKE

The ranking status is also calculated of each community of rural area on the basis of intake of nutrients (Table 5.4). A lower rank indicates higher intake and higher rank indicates lower intake. For example Patel community intake of calories is 2,734 which is the highest amongst the other communities and it is ranked first while scheduled caste whose intake of calories is lowest (2,306) and ranked 8th. All the individual ranks get the accumulated rank when the figure is higher the intake is lower.

The study of rank of nutrients is to understand the distribution pattern of intake of nutrients in a community and it shows the influence of intake in order of importance. The importance of nutrients may be compared from one community to another.

The caloric intake is reported highest among Thakurs in the rural areas while scheduled caste classes are reported lowest intake among other communities getting eighth position.
The intake of protein is reported highest by Patel then comes Thakur followed by Jain and Brahmin communities (both equal), while Scheduled caste the lowest i.e. seventh position, due to lowest protein intake.

Patel, Thakur and Shrivastava communities occupy the first, second and third position respectively as far as calcium intake is concerned. The intake of calcium is reported lowest by Soni community.

Regarding intake of iron among the various communities in the study area Patel, Thakur, Backward class community Brahmin, Soni, Jain and Shrivastava communities are placed in decending order.

Vitamin A is required more for the skin and good vision. The intake of this vitamin is reported by Patel is maximum, while Shrivastava is reported lowest. The reason may be that the people do not take milk, leafy vegetables, seasonal fruits daily and take less of non-vegetarian food.

The Patel community is reported to have highest intake of vitamin $B_1$ i.e. 1.05. Scheduled Castes is reported lowest in this respect (0.60 mg). Community-wise ranks are given in Table 5.4.

The intake of vitamin $B_2$ is reported highest by Patel among other communities. While Shrivastava, Thakur and Soni occupy the second, third and fourth positions respectively. Scheduled Caste is reported to have the lowest intake of $B_2$. 
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Community</th>
<th>Calorie</th>
<th>Proteins</th>
<th>Calcium</th>
<th>Iron</th>
<th>Vitamin A</th>
<th>Thiamine</th>
<th>Riboflavin</th>
<th>Accumulated rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scheduled caste</td>
<td>8</td>
<td>7</td>
<td>5</td>
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<td>7</td>
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<td>6</td>
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</tr>
<tr>
<td>3</td>
<td>Jain</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>33</td>
</tr>
<tr>
<td>4</td>
<td>Thakur</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>Brahmin</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>5</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>Soni</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>8</td>
<td>Shrivastava</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>32</td>
</tr>
</tbody>
</table>

Source: Field survey.
On the basis of accumulated rank, which is the total intake of nutrients individually is reported eighth by the Patel community and got the first position because they consume more food stuffs than other communities. Thakur consumes less nutrients than Patel enjoys the second position i.e. 14 followed by Brahmin (32), Jain (33), and backward class (35) respectively. To place in the last is the Scheduled caste it is distinctly noticeable that there is a large gap between Patel and Scheduled Caste in respect of the ranking status. Most of the families in rural area are engaged in bidi making and some in agricultural work. The size of the family are larger, illiteracy and cooking method are faulty. These factors are responsible for their deficient diet.

Rural areas have the limited sources in which they live and enjoy the life. Their necessities are limited and mainly depended on local production. They consume cereals and pulses regularly that provide enough calories and sufficient proteins. 'Dal and roti' form the main food of each family. Vegetable and fruits which are available locally are consumed occasionally.

URBAN DIET

To find out the nutritional gradation of the urban population a diet survey has been conducted in 9 selected towns of the study area. These towns have been selected of the different paraphernalia of towns. It is always kept in view that equilibrium of representation of all communities of
these towns in the survey should be maintained. Secondly, the families to be interviewed in this survey should hail from all parts of these towns. Lastly the selection of families to be interviewed should be from each income group.

The aim of the diet survey is to ascertain the nutritional status of the people under the survey ambit. The questionnaire is divided into the following points which taken together make it easy to know the nutritional status of the family at a glance – (i) Economic condition, (ii) Living environment, (iii) Diet pattern, (iv) Quantitative and qualitative food consumption, and (v) Consumption of other eatables rich in protein and vitamins.

**TABLE 5.5**

**URBAN FAMILY INTERVIEWED**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of town</th>
<th>No. of families interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ajaygarh</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>Bina</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>Chhatarpur</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>Khurai</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>Majhgawan</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>Narsinghgarh</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>Nowgoan</td>
<td>28</td>
</tr>
<tr>
<td>8</td>
<td>Sagar</td>
<td>29</td>
</tr>
<tr>
<td>9</td>
<td>Tikamgarh</td>
<td>27</td>
</tr>
</tbody>
</table>

**TOTAL** 260

Source: Diet survey.
The total families numbering 260 were interviewed belonging to urban area. Eating habits, use of utensils, method of cooking, hygienic conditions etc. are also observed during survey of the urban areas. In different communities of urban areas tea habit is more frequent than rural areas which reduces the capability to consume more food. Generally male and school going children take their meal or breakfast outside which is insufficient looking into their nature of work.

During the course of survey it is noticed that the urban folk are in the habit of taking meals twice a day. Only few families with adequate purchasing power take breakfast regularly. On the other hand the persons, who join the duties in the morning take break fast early in the morning. Generally lunch contains cereals, pulses, rice etc. in almost all the families. Night meal (supper) includes dal, vegetable, rice, milk etc. in higher class whereas in middle class and low class there is found a little variation. There can be more than four eatable in the middle class family, while the low class has to remain contended with only two roti and dal. The vegetables which they consume are mainly seasonal and locally available. The consumption of cereals are varied from place to place. For example the higher and middle class consume cereals throughout the year, on the other hand low class consumes maize, jowar, in a maximum quantity. The quantity and quality both are different in all classes due to their habits and purchasing power.
The total per caput intake of different nutrients in the selected urban towns is presented in Table 5.6. As a whole the consumption of various nutrients in respect to proteins, vitamins and minerals—Ti@amgarh consumed highest amongst all the towns of the area surveyed. The lowest to be placed is Narsinghgarh which suffers from deficiency of proteins and vitamins. There is a great difference in both the towns due to consumption of one cereal for a long period which is short of minerals and vitamins. Chhatarpur, Bina, Ajaygarh and Majhgawan have a little variation in consumption of nutrients, Sagar, Nowgoan and Khurai town comes in third category regarding consumption of nutrients. Khurai consumes more B vitamins among all the other towns.

INTAKE OF NUTRIENTS

CALORIE

The energy requirement of an individual is for such vital function as respiration, blood circulation and maintenance of body temperature. "The inadequacy of nutrition in the human body can result from inadequate quantity or quality of food consumed. The quantitative deficiency generates hunger and calorie deficiency."1

The caloric intake of different towns are given in Table 5.6. Among all the towns Tikamgarh has been reported

to have the highest intake of calories 2601 followed by Bina 2457, Chhatarpur 2423 and Khurai 2358. Sagar and Nowgaon are reported to have the lowest intake of calories i.e. 2041 and 2053 respectively.

PROTEIN

According to Bulletin of NIN, Hyderabad 'Nutrition' (April' 86) has recommended daily allowances of protein for individual between 60-80 grams per head per day according to different physiological condition. For the present study the average desirable protein intake is 70 grams per day per head for an adult unit. Proteins are essential for the growth and repair of the tissues of the body and also for body resistance. Main sources of protein in the area are all kind of cereals, pulses, nuts, bean, milk, egg, fish etc. Among other food stuffs soyabean is very popular in the study area and it is also one of the best sources of protein.

The daily intake of proteins ranges between 43 grams being lowest in Nowgoan town and highest 63 grams in Tikamgarh. This variation is mainly due to their status and local production. Daily consumption of proteins in Chhatarpur, Ajaygarh, Khurai and Bina township consumed protein daily is 56, 57, 61 and 62 respectively while less intake is noticed in Narsinghgarh, Sagar and Majhgawan towns i.e. 46, 51, and 54 grams respectively. The less intake is reported by infant and young children between 1-5 years of age. Animal proteins
are relatively expensive and are not easily available. Deficiency of protein should cause in children growth of short tissues, lack of muscular tone etc. Deficiency of protein is nearly always combined with deficiency of protein calories, it is known as P.C.M. The chief cause of protein deficiency disease is weaned infants known as Kwashiorkor. In this disease child may gain in weight partly due to oedema and partly to increase in body fat. The disease is characterized by depigmentation of the skin and oedema all over the body giving the characteristic moon face and enlargement of the liver. The deficiency of protein also affects the resistance power of the body.

CALCIUM

The best natural sources of calcium are milk, green vegetable, fish, some fruits like Sitafal, and dried fruits. The bones and teeth of a man are made up principally of calcium and it is chiefly needed to build material for strong bones and teeth. Calcium has many other functions also. The construction of the heart due to insufficiency of calcium would be rendered improper and also muscles would not contract in proper way. This calcium is an essential element for several life process. The daily requirement of calcium per day is 1000 mg. The highest intake is reported from Tikamgarh town i.e. 993 mg whereas to put in the last is Narsinghgarh that has registered daily intake of calcium at 675 mg. Less intake has also been reported from Nowgaon and Ajaygarh i.e.
676 mg and 680 mg respectively. Intake of other towns is given in table 5.6

IRON

Iron is also essential for human body. It is found in the blood and has got 75 per cent of its existence out of the total requirement in the human body. It is also considered a 'trace element'. As in other part of the study region the intake of iron is commonly inadequate in all the urban areas. The intake of iron varies from 14.6 mg to 21.7 mg daily per caput. Tikamgarh is reported to be consuming higher quantity of iron i.e. 21.7 mg and the lowest being the town of Narsinghgarh i.e. 14.6 mg. The intake of remaining towns is given in Table 5.6.

VITAMIN A

Vitamin A is essential for the health of skin and the mucous membrane and for good vision. It is secured in foods of animal origin (milk, butter, fish, egg) and also found in green leafy vegetable and fruits like mango and papaya. All green, pink and red colour fruits are generally found rich with this valuable vitamins. If vitamin A is consumed in more quantity than required the excess enters the body remains in the body for about 6-9 months. Carotene yields equal amount of vitamin A and less efficiently converted to vitamin A. Carotene depends on the fat contents of the diet. The required desirable allowances of vitamin A is 5000 IU per head per day.
<table>
<thead>
<tr>
<th>Town</th>
<th>Calorie Kcal</th>
<th>Proteins (gm)</th>
<th>Calcium (mg)</th>
<th>Iron (mg)</th>
<th>Vitamin A (IU)</th>
<th>Thiamine (mg)</th>
<th>Riboflavin (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajaygarh</td>
<td>2328</td>
<td>57</td>
<td>680</td>
<td>17.7</td>
<td>4247</td>
<td>0.85</td>
<td>1.50</td>
</tr>
<tr>
<td>Bina</td>
<td>2457</td>
<td>62</td>
<td>817</td>
<td>18.2</td>
<td>3476</td>
<td>0.80</td>
<td>1.55</td>
</tr>
<tr>
<td>Chhatarpur</td>
<td>2423</td>
<td>56</td>
<td>864</td>
<td>19.6</td>
<td>4227</td>
<td>0.75</td>
<td>1.60</td>
</tr>
<tr>
<td>Khurai</td>
<td>2358</td>
<td>61</td>
<td>907</td>
<td>15.1</td>
<td>3499</td>
<td>1.05</td>
<td>1.45</td>
</tr>
<tr>
<td>Majhgawan</td>
<td>2155</td>
<td>54</td>
<td>782</td>
<td>18.4</td>
<td>4132</td>
<td>0.85</td>
<td>1.50</td>
</tr>
<tr>
<td>Narsinghgarh</td>
<td>1907</td>
<td>46</td>
<td>675</td>
<td>14.6</td>
<td>2716</td>
<td>0.70</td>
<td>1.20</td>
</tr>
<tr>
<td>Nowgoan</td>
<td>2053</td>
<td>43</td>
<td>674</td>
<td>15.9</td>
<td>3928</td>
<td>0.80</td>
<td>1.40</td>
</tr>
<tr>
<td>Sagar</td>
<td>2041</td>
<td>51</td>
<td>754</td>
<td>16.3</td>
<td>3282</td>
<td>0.90</td>
<td>1.35</td>
</tr>
<tr>
<td>Tikamgarh</td>
<td>2601</td>
<td>63</td>
<td>993</td>
<td>21.7</td>
<td>4613</td>
<td>0.95</td>
<td>1.70</td>
</tr>
</tbody>
</table>

Source: Field survey.
The town of Tikamgarh has been reported to have the highest intake of vitamin A i.e. 4613 as against the Narsinghgarh having the lowest i.e. 2716 IU daily. Ajaygarh, Chhatarpur, Majhgawan and Nowgaon are to be placed after the highest intake and reported to have 4247, 4227, 4132 and 3928 IU respectively. It can be seen, on the basis of intake of vitamin A that these towns are more deficient than the other remaining towns viz. Khurai, Bina and Sagar which have daily intake in descending order i.e. 3499, 3476 and 3282 IU respectively.

THIAMINE (B<sub>1</sub>)

Thiamine formally is known as the anti beri beri vitamin. It is water soluble and rapidly destroy an alkaline solution. Thiamine is essential for the utilization of carbohydrates in the body and also for the normal digestion. Unmilled cereals, pulses, oilseeds and groundnut are the main sources of this vitamin. Generally it is lost from the vegetables and fruits during prolonged storage. The nutrition expert group of the ICMR recommended intake to be 1.5 mg per day. The daily intake of thiamine varies from 0.70 mg to 1.05 mg in respect of Narsinghgarh and Khurai respectively. Detail intake in different towns is given in Table 5.6 and rankwise in Table 5.7.

RIBOFLAVIN (B<sub>2</sub>)

Riboflavin is widely found in plant and animal foods like milk, eggs, liver, meat, and growing leafy vegetables.
Cereals, pulses contain some amount of B₂. It is yellow crystalline substance. Its function is respiration and is involved in protein, fat and carbohydrate metabolism.

From the Table 5.6 it can be seen that Tikamgarh has been reported the highest value of daily intake of riboflavin i.e. 1.70 mg; in contrast to Tikamgarh is placed Narsinghgargh which has been reported intake of value at 1.20 mg daily. Chhatarpur, Bina and Ajaygarh have a very little variation in consumption of B₂ which are having 1.60, 1.55 and 1.50 respectively. Khurai, Nowgaon and Sagar are reported the lowest i.e. 1.45, 1.40 and 1.35 mg respectively. It is a fact that the intake depends upon the availability and consumption of food stuffs.

RANK OF INTAKE

The ranking status of different towns is calculated on the basis of intake of respective nutrients. A higher rank indicates the lower intake that means higher deficiency. Table 5.7 shows the nutrients wise rank of intake among selected towns separately.

The rank of intake of various nutrients is a study of distributional pattern in a town and it shows the influence of intake in order of importance. The importance of nutrients may be compared from one town to another.

The intake of calories has been reported highest in Tikamgarh town and it occupies the first position among other
<table>
<thead>
<tr>
<th>Town</th>
<th>Calorie</th>
<th>Proteins</th>
<th>Calcium</th>
<th>Iron</th>
<th>Vitamin A</th>
<th>Thiamine</th>
<th>Riboflavin</th>
<th>Accumulated rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajaygarh</td>
<td>5</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>Bina</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>28</td>
</tr>
<tr>
<td>Chhatarpur</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Khurai</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>Majhgawan</td>
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<td>6</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>Narsinghgarh</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>59</td>
</tr>
<tr>
<td>Nowgoan</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>47</td>
</tr>
<tr>
<td>Sagar</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>7</td>
<td>45</td>
</tr>
<tr>
<td>Tikamgarh</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Field survey.
towns. Bina gets second, and Chhatarpur comes in third. Khurai, Ajaygarh and Majhgawan get fourth, fifth and sixth position and Narsinghgarh gets the ninth position due to lowest intake of calories. Protein is consumed in maximum amount by Tikamgarh and gets first place while Bina, Khurai and Ajaygarh get the second, third and fourth position respectively. Narsinghgarh and Nowgaon are reported to have lowest intake of protein and get the eighth and ninth places amongst other towns.

Calcium and iron both are important minerals and are required for the development of bones and teeth and for the resistance power of the body. Calcium is consumed highest by Tikamgarh town and it occupies the first position. Khurai gets the second position and Chhatarpur gets the third place regarding intake of calcium followed by Bina, Majhgawan, Sagar and Ajaygarh which gets 4th to 7th position respectively. Nowgaon is reported to have the lower intake of calcium and it occupies the ninth place. As far as the iron is concerned it is consumed much by Tikamgarh and it gets first place while Chhatarpur comes in second. Majhgawan in third and Ajaygarh in fourth rank. Regarding the intake of iron Narsinghgarh occupies the ninth place.

Vitamins are essential for the maintenance of normal health. Although it is needed in very small amounts, it has to be meet out through dietary sources. The intake of vitamin A is reported highest in Tikamgarh town and gets
SAGAR DIVISION

(A) ACCUMULATED RANKS OF NUTRIENT (COMMUNITY WISE)

Accumulated Ranks

Patel  Thakur  Soni  Brahmin  Shrivastava  Jain  Backward Classes  Scheduled Caste

RURAL

(B) ACCUMULATED RANKS OF NUTRIENT (IN SELECTED TOWN)

Accumulated Ranks

Tikamgarh  Chatarpur  Bina  Ajaygarh  Majhgawan  Sagar  Nowgoan  Khurai  Narsinghpur

URBAN

Source: Diet Survey.
first position among other towns. Ajaygarh gets the second
and Chhatarpur occupies the third place. Narsinghgarh
occupies the ninth place due to low intake of vitamin A.
Thiamine is consumed much in quantity in Khurai town and gets
first rank while Tikamgarh gets second, Sagar gets third and
Majhgawan gets fourth rank. Narsinghgarh occupies the
seventh rank due to low intake of $B_1$ vitamin. The intake of
Riboflavin ($B_2$) is reported highest in Tikamgarh among other
respective towns and gets first rank, Chhatarpur occupies
the second rank, and, Bina gets the third rank. Ajaygarh,
Khurai, Nowgoan and Sagar consumed less vitamin $B_2$ and
occupies the fourth, fifth, sixth and seventh rank respec-
tively. Narsinghgarh is reported to have the lowest of $B_2$
and gets the last rank i.e. eighth.

All the total individual ranks get the accumulated
rank where the highest rank indicates the lower intake and
higher deficiency. In accumulated rank Tikamgarh is reported
highest intake of nutrients and gets the lowest rank i.e. 8
and gets first position in Narsinghgarh the intake nutrients
are less and occupies the highest accumulated rank and gets
nineth place. Chhatarpur town gets the accumulated rank 24,
Bina gets 28, Khurai gets 29, and Ajaygarh 30, ranked in
serial from 2 to 5 respectively.
<table>
<thead>
<tr>
<th>Name of group</th>
<th>Calorie (Kcal)</th>
<th>Proteins (gm)</th>
<th>Calcium (mg)</th>
<th>Iron (mg)</th>
<th>Vitamin A (IU)</th>
<th>Thiamine B&lt;sub&gt;1&lt;/sub&gt; (mg)</th>
<th>Riboflavin B&lt;sub&gt;2&lt;/sub&gt; (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Rural</td>
<td>2490</td>
<td>56.6</td>
<td>815</td>
<td>18.0</td>
<td>3742</td>
<td>0.83</td>
<td>1.66</td>
</tr>
<tr>
<td>2 Urban</td>
<td>2358</td>
<td>54.7</td>
<td>794</td>
<td>17.5</td>
<td>3791</td>
<td>0.70</td>
<td>1.50</td>
</tr>
<tr>
<td>3 Average area</td>
<td>2424</td>
<td>55.5</td>
<td>804</td>
<td>17.7</td>
<td>3767</td>
<td>0.77</td>
<td>1.58</td>
</tr>
<tr>
<td>4 Desirable</td>
<td>2800</td>
<td>70</td>
<td>1000</td>
<td>30.0</td>
<td>5000</td>
<td>1.50</td>
<td>2.50</td>
</tr>
</tbody>
</table>

Source: Diet survey and other sources.
MALNUTRITION AND UNDERNUTRITION

Insufficient food - lack of calories - is undernutrition and the wrong short of food, i.e. a diet deficient in essential nutrients, produces malnutrition.¹

According to Sukhatme "One out of every two Indians suffers either from under-nutrition or from malnutrition or both."² In the entire study region the diet of none of the families was found to be satisfactory in all respects, lack of calories, proteins and other nutrients in the diet of the people is mainly responsible for the incidence of various deficiency diseases and other health troubles due to low resistance power of the body. The direct influence of malnutrition is the occurrence of various nutritional deficiency diseases. Specific deficiency diseases occur due to specific nutrients in the diet of the respective people. Indirect affect of malnutrition is high morbidity and mortality among infants. Some specified disorders which may occur due to the deficiency of certain nutrients are as follows:

PROTEIN CALORIE MALNUTRITION (PCM)

The body requires energy for its internal and external work. Carbohydrates, fats and proteins are the main source of energy. Protein is essential and important components of food. It is required in various amount from person to person according to their age, sex and physiological state. Much of

the structure human body is made up of proteins. For example
the tropical 160 pounds man is composed of about 100 pounds
of water, 29 pounds of proteins (10 Kg), 25 pounds of fat, 5
pounds of minerals, one pound of carbohydrates and less than
one ounce of vitamin. Since the muscles, heart, brain, lungs
and gastro-intestinal organs are made up largely of proteins
and since the protein in these organs is in constant need of
replacement, its importance is obvious."

PCM is one of the burning problems of our country,
especially at early childhood. Generally it is responsible
for the early death of children and impairs physical growth
and may cause mental and emotional damage to survivors.
Children after 4 to 6 months of age require other foods
besides breast-milk; when this is not done for a long period
many symptoms may be observed such as:

(i) Child may be under-weight and height.
(ii) May have brittleness of hair and can be pulled out
easily.
(iii) The skin becomes very rought and irriable.
(iv) The child may suffer from dysentery and/or diarrhoea.
(v) The child may suffer from the other infectious
diseases due to low resistance power.

The effects of protein deficiency in the adult may
show itself in the form of loss of weight, anaemia, suscepti-

1. Vinod Singh (1986) Human nutrition ; Food energy require-
ment and malnourished status, Swastha Hind, Vol. 30,
pp. 229-32.
bility to infection, frequent loose stools, general weakness and incapability to hard work. Kwashiorkor and Marasmus are the main diseases of this group.

KWASHIORKOR: Kwashiorkor is caused because of the displacement of the young children from the mother's breast by the succeeding infant. Generally it is found in those areas where the staple diet is deficient in protein. Kwashirkor is a serious disease of children between one to four years of age. Loss of weight, eyes red, nose moist, mouth dribbling, enlarged liver, and diarrhoea are the main symptoms. It appears first on feet and face; often spreads to all parts of body. Breast feeding, over diluted milk, poverty, ignorance in child care and faulty feeding practices are the main factors responsible for this hazard.

MARASMUS: It is a normal disorder and occurs in babies due to deficient diet in proteins and calories who can not get sufficient quality of breast milk. Mostly children are fed on the diluted milk of cows or buffaloes. When breast milk is not sufficient and they can not receive any other foods this type of disease develop such as frequent diarrhoea and other infections.

The condition is generally seen in the first year of life and the babies are commonly very thin. They exhibit a retarded growth, rough skin and their weight is low; with the development of the disease, the face appears like that of an
old person. There is a loss of appetite in the later stages of the disease and they do not like to eat. They have to be persuaded to take other food of their liking. They can make a quick recovery on an adequate diet.

VITAMIN A DEFICIENCY DISORDERS

It is one of the most widely prevalent nutritional health hazards of man. "Vitamin A is involved in oxidation-reduction processes, cholesterol transport and glycogen fixation in tissues. It regulates metabolic processes in the skin, mucosa of the eyes, respiration organs, alimentary organs, urinary system, in osteosynthesis, and synthesis of steroid hormones. Vitamin A is also indispensable for night and colour vision; it increases the body resistance to infection. Carotin, which is deposited in the liver, is a precursor of vitamin A." 1

Deficiency of vitamin A causes night blindness, xerophthalmia, conjunctival xerosis and bitot's spots. According to private doctors of the study sunit more than 10 per cent pre-school children and 50 per cent adult (above 45 years) are suffering from night blindness and bitot's spots. Pain in the eye, dry eye, headache, dazzling etc. are the main symptoms of this deficiency. Balanced diet is necessary to ensure enough quantities of Vitamin A.

1. V.M. Bogolyubov (1957) Internal Diseases, Mir Publishers, Moscow, p. 397.
NUTRITIONAL ANAEMIA: Anaemia is a condition that arises from lack of iron in the diet. It reduces the capability of heart to pump oxygen. Anaemia is more common in children between ages of 6 months and 2 years and from 11 to 16 years due to spurts of growth during this period. It is also common in women. During pregnancy anaemia is almost universal. During the nutritional survey it is observed that 80 per cent women are suffering from anaemia and more than 30 per cent children are also found anaemic.

The average diet of the study region is deficient and consumption found very less as far as protective are concerned like milk, fruits and leafy vegetables. On the basis of diet calculation it is observed that not a single family gets balanced diet they get contented only with satisfying their hunger throughout the life. The intake of nutrients in rural areas is better than urban people. The consumption of vitamins and minerals is less in comparison to desirable values in the study area.

As per their labour the intake habit of the people of study region can not be said to be satisfactory. Besides calorie and protein, the intake of calcium is found 815 mg in rural areas while 794 in urban area as against 1 gram of standard. Iron is also found less i.e. 18.0 mg in rural and 17.5 mg in urban against standard of 30 mg. As far as vitamin A is concerned, it is very essential for all age groups for growth and eye sight. The intake of vitamin A
from all sources in rural areas is 3891 IU, while 3791 in urban areas as against 5000 IU. The same condition is in case of vitamin $B_1$ and $B_2$ intake. They are also found quite deficient in the diet of the people. The intake of various important nutrients is given in Table 5.8.

It is important to note that the study unit of even greater consumption of nutrients is not free from malnutrition. The lower nutrients intake indicates both undernutrition and malnutrition. This condition is responsible for the occurrence of various environmental as well as nutritional health hazards.