C H A P T E R - VI

NUTRITIONAL DEFICIENCY DISEASES

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6.1 Introduction :

Lack of various nutrients in the diet could cause certain diseases which would be termed as deficiency diseases. Millions of people die every year because of deficiency diseases. Various factors are responsible for these diseases. But it is not the intention of this study to discuss all these factors. It is concerned more with the diet than any other medical aspects. It is important for the writer in the field of Nutrition Geography to understand the elements of the causation of these diseases and to be able to recognize them to some extent at least. In the following table some important diseases and their causes are given.[1]

Condition	Lack of
1. Thick & rough skin, dull eyes	Vitamin A
2. Beri-Beri - Emaciation of the body tissues, soreness in the muscles of leges	Thaimine (Vitamin B_1)
3. Chronic sore at the angles of mouth buring eyes, purlish discoloration of tounge	Riboflavin (Vitamin B_2)
4. Pellagra-(Rough skin, gradual loss of strength) soreness in tongue, nurvousness, dizziness, insomnia, muscular weakness, numb extremities	Niacin (Nicotinic acid)
5. Extreme nervousness and irritability	Vitamin B_6

6. Anaemia (even partial paralysis)	Vitamin B_{12}
7. Kwashiorkor (in children) stunted growth, lack of appetite marked lassitude, anaemia etc.	Protein
8. Reduced growth and badly-formed teeth (in children)	Calcium
9. Rickets (in children)	Vitamin D

6.2 Protein-Caloric Malnutrition :

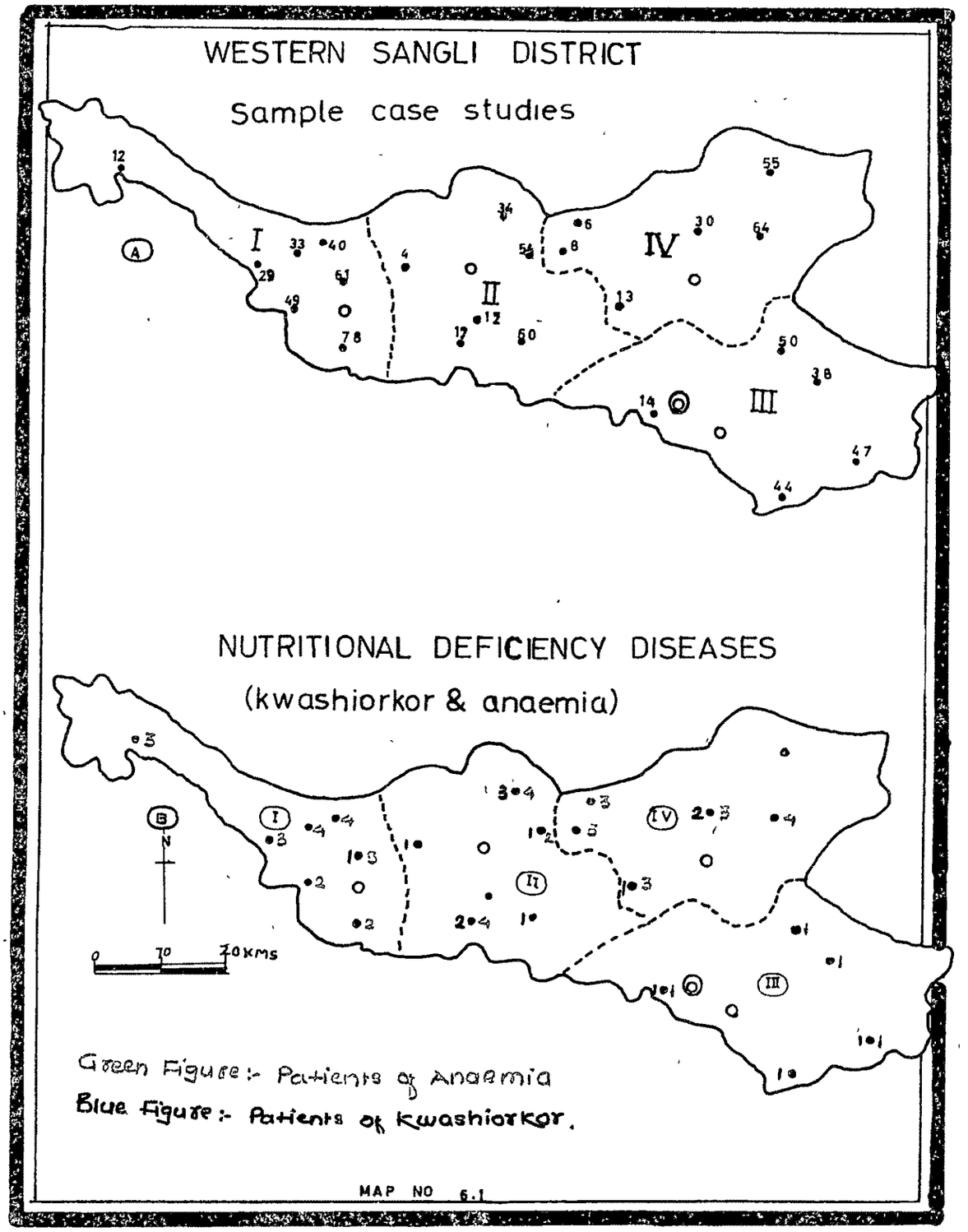
Extensive diet surveys carried out in our country over the last several years, have shown that the diets of a good proportion of our population who belong to the poor income groups are inadequate according to accepted standards. The deficiencies in the diets are both qualitative and quantitative. Among the poorer sections of the population even the basic caloric requirements are not met. The intake of proteins is also marginal while intake of vitamins and minerals falls far short of the desirable levels.[2] The consumption of such unsatisfactory diets is reflected in the wide prevalence of signs of malnutrition in the low and middle income groups in the study region of Western Sangli district.

Scientific evidence can be advanced to show that malnutrition may not only damage the health of a people, and undermine their physical fitness, stamina and efficiency, but also adversely affects their mental and intellectual calibre and

moral fibre.[3] Calories are a prime necessity for body maintenance. Calorie deficiency leads direct to body weakness. It results in low energy level. The normal body activities and energy will be adversely affected by low calorie intake.[4]

Among the nutritional disorders affecting among the all age groups; especially more in children, those due to deficiency of protein and calories in the diet are the most important. Severe protein calorie manutrition in children can manifest in two forms. In one form known as Kwashiorkor the signs and symptoms are stunting of growth; diarrhoea, discolouration and sparseness of hair, discolouration and peeling off of skin, anaemia, swelling of the body (edema) especially in the region of legs and hands, and apathy, although all these symptoms need not be present in every case. In the other form known as marasmus, in addition to stunting of growth there is extreme wasting off of muscles in the body.

Out of the total population of the study region 15 patients found to be suffering from Kwashiorkor (Map 6.1). Among the Kwashiorkor disease discolouration and peeling off of skin is observed in villages viz. Rethare Harnax, Kurlap and Bokharui. Three patients are observed in Rethare Harnax, two in Kurlap and one patient to Shirgaon and Pokharni. Swelling of the body (edema) especially in the region of legs and hands is also observed in Visapur, Haripur, Rethare Harnax and Surul. Two persons of Visapur and one person each to Haripur, Rethare Harnax


WESTERN SANGLI DISTRICT
Sample case studies
NUTRITIONAL DEFICIENCY DISEASES
(kwashiorkor & anaemia)
Green Figure :- Patients of Anaemia
Blue Figure :- Patients of Kwashiorkor.
MAP NO 6.1

WESTERN SANGLI DISTRICT SAMPLE CASE STUDIES

		Location code
I)	**Shirala tahsil**	
	Petlond	12
	Charan	29
	Yelapur	33
	Dhamavade	40
	Rile	49
	Padali	61
	Fakirwadi	78
II)	**Walwa tahsil**	
	Surul	4
	Itakare	12
	Kurlap	17
	Shirgaon	54
	Pokharni	60
	Rethare Harnax	34
III)	**Miraj tahsil**	
	Haripur	14
	Gundewadi	38
	Narwad	44
	Lingnoor	47
	Patgaon	50
IV)	**Tasgaon tahsil**	
	Kundal	6
	Nagrale	8
	Ankalkhop	13
	Visapur	30
	Lode	64
	Gourgaon	55

Code numbers according to 1971 census.

and Surul is suffering from the edema. Discolouration and sparseness of hair is observed in Visapur, Ankalkhop and Padali. Stunting of growth of children is observed in many of the villages. Especially in the villages of Shirala tahsil the people are mostly suffering from the stunting of growth of children. Because most of these villages are below the standard requirement of calories and protein. Stunted growth among children is very common. Protein calorie malnutrition in children Kwashiorkor and Marasmus is observed in Narwad and Lingnoor.

6.3 Anaemia :

Anaemia is caused by the deficiency of iron and also vitamin B_{12} in the diet. A well balanced diet for growing children for an adult should contain sufficient amount of iron to meet the iron requirement of body. The deficiency of iron in the diet could causes certain forms of anaemia (a condition in which the haemoglobin content of blood is low). Like folic acid, vitamin B_{12} is also involved in the maturation of cells and a deficiency of this vitamin also results in certain types of anaemia. Among the nutritional disorders affecting women of child-bearing age, anemia is one of the most important and the cause for this in most cases is the iron deficiency. Another type of anaemia known as megaloblastic anaemia, caused by the deficiency of vitamin B_{12}, is also prevalent among the population of study region. The consumption of green leafy vegetables, and animal foods like milk, meat and liver is very low, which results

in the deficiency of iron and vitamin B_{12}. Anaemia is observed (Map 6.18) in most of the villages of study region. The villages of Miraj, Tasgaon and Shirala tahsils reveal surplus of iron; even then anaemia is noted. This is due to the lack of vitamin B_{12} in the diet. The cases observed in Miraj and Tasgaon tahsils are less than Walwa tahsil. In Miraj tahsil villages like Haripur, Patgaon, Linghoor, Gundewadi have one case each suffered from anemia. In Tasgaon tahsil Ankalkhop, Nagrale, Kundal, Visapur recorded 3 cases in each village, while Lodhe recorded four cases suffering from anaemia. In Walwa tahsil Rethare Harnax and Kuralap observed 4 persons each suffering from anemia. Shirgaon recorded two cases.

The villages of Shirala tahsil viz. Charan, Fakirwadi, Padali, Dhamwade, Yelapur, Rile, Petlond are suffering by anaemia caused by iron deficiency as well as vitamin B_{12} deficiency. In all these villages the large amount of rice is included in the diet which is a poor source of iron. The consumption of green leafy vegetables and animal foods like milk, meat etc. is very low. This is due to dry farming practices and remote places of villages. Villages are away from urban market centres and largely depend on their own products. The village Dhamwade and Yelapur have 4 persons each; Charan, Petlond, Padali recorded three persons each, and Fakirwadi and Rile have 2 persons each suffering from anaemia. Per head availability of iron and vitamin B_{12} of these villages falls short of the standard requirement. So most of the cases seen to be suffering from anaemia were due to iron and vitamin B_{12} deficiency.

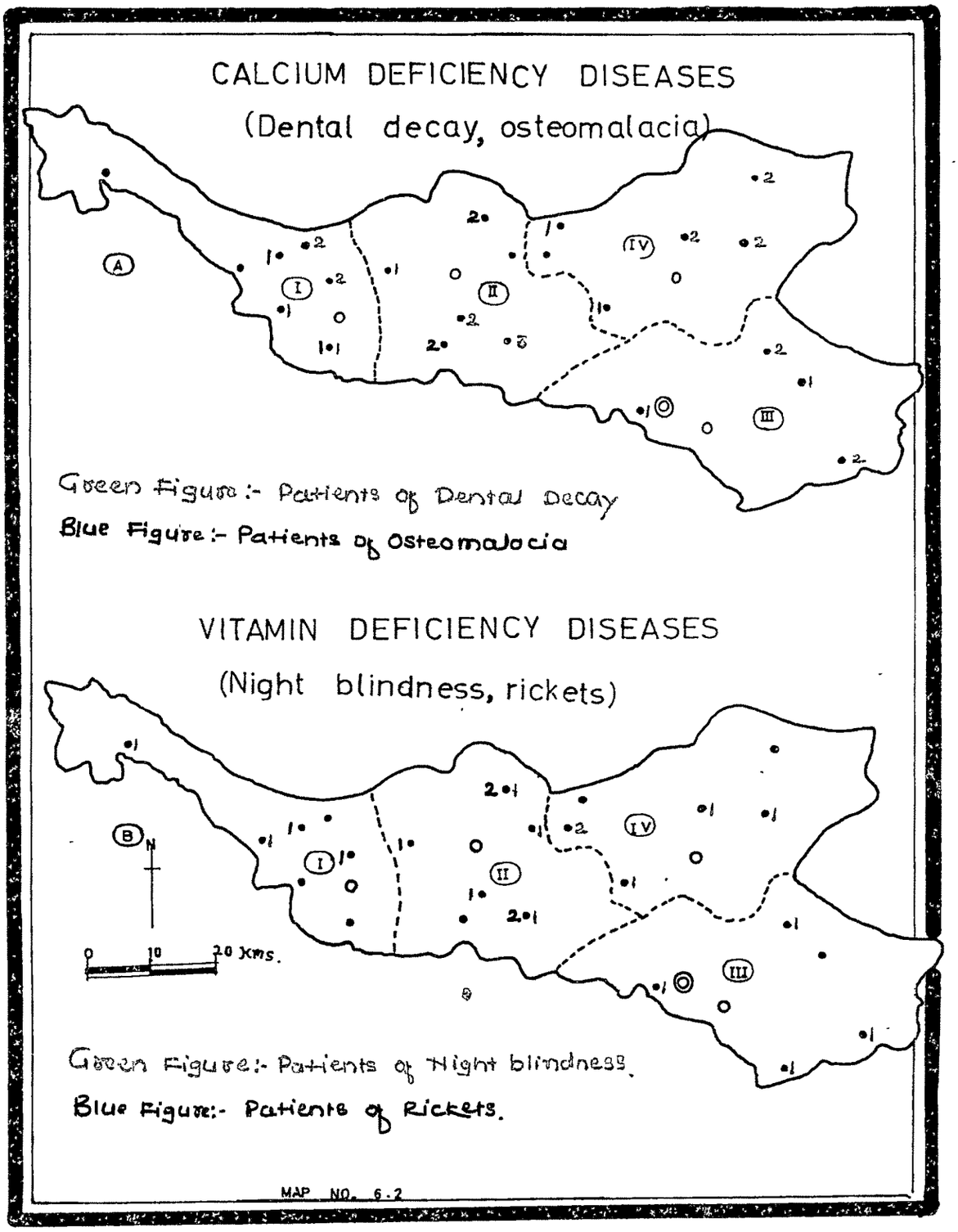
6.4 Calcium deficiency diseases :

Calcium deficiency diseases such as dental decay, badly formed teeth, reduced growth, osteomalacia, rickets, tuberculosis are observed in the study region. The consumption of milk, chease and green leafy vegetables is much below the standard requirement. So most of the villages are deficient in the per day per head availability of calcium. Out of the 24 villages, which were selected for the study, only 7 villages are noted for sufficient amount of calcium is present in the diet. These villages are Ankalkhop, Rethare Harnax, Nagrale, Narwad, Kundal, Lodhe, and Petlond. All the remaining villages have recorded deficient amount of calcium present in the diet. Among the calcium deficiency diseases dental decay is the most prominent. The villages of Miraj tahsil viz. Lingnoor and Patgaon having two persons each suffered from dental decay. Haripur and Gundewadi (one to each) are also noted for dental decay. These four villages have deficiently recorded for per head per day consumption of calcium. The villages of Tasgaon tahsil are rich in calcium consumption. The villages like Ankalkhop, Nagrale, Kundal, are located in Krishna basin. Ankalkhop is famous for dairy farming. So consumption of milk and milk product is satisfactory as compared to the other villages. So these three villages have not revealed any cases of dental diseases. But the other villages like Visapur, Lodhe, Gourgaon recorded the dental decay cases. Although the village Lodhe is surplus of calcium above the

standard requirement, even then 2 cases of dental decay were noted. Visapur and Gourgaon also noted 2 cases each of dental decay.

In Walwa tahsil the only village Rethare Harnax is surplus in the consumption of calcium. Among the other villages Shirgaon, Itakare, Pokharni and Surul have recorded for dental decay. All the villages of Shirala tahsil except Petlond are deficient in the calcium consumption. In all the villages patients of dental decay are observed.

Among the other calcium deficiency diseases osteomalacia is also important. In the villages of Tasgaon tahsil Kundal and Ankalkhop have recorded each of one patient suffering by osteomalacia. In the villages of Walwa tahsil Kurlap 2 cases and Rethare Harnax 2 cases suffered from osteomalacia. In Shirala tahsil Yelapur and Fakirwadi recorded each of one patient suffering by osteomalacia. Tuberculosis is themost common disease throughout India. A very large number of people succumb to tuberculosis every year. Various factors are responsible for the spread of tuberculosis. Calcium deficiency is one of the reason for tuberculosis. Six persons suffered from tuberculosis in the study region. These patients are observed in Gudewadi, Haripur, Yelapur, Padali (one each) and Itakar (two patients). Of these six patients five are males and one is female. Calcium deficiency diseases are shown in Map 6.2A


CALCIUM DEFICIENCY DISEASES
(Dental decay, osteomalacia)
A
I
II
III
IV
Green Figure :- Patients of Dental Decay
Blue Figure :- Patients of Osteomalacia
VITAMIN DEFICIENCY DISEASES
(Night blindness, rickets)
B
N
0 10 20 Kms.
Green Figure :- Patients of Night blindness.
Blue Figure :- Patients of Rickets.
MAP NO. 6.2

6.5 Vitamin deficiency diseases :

Vitamins have important functions in many of the vital processes of life. They are therefore essential for health and well-being of human body. Vitamin A is necessary to keep the several epithelial tissues in body. In the absence of adequate intake of the vitamin A, the outer lining of the eye ball loses its usual moist with appearance and becomes dry and wrinkled (night blindness). Redness and inflammation of the eye and gradual loss of vision; may follow. The central portion of the eye (cornea) may lose its transperency and become opaque and soft, and if not treated in time may lead to total blindness. Vitamin A deficiency is essentially a problem of children because the requirement of vitamin A is greatest during the period of rapid growth. The problem of blindness arising from Vitamin A deficiency is one of considerable magnitude all over the country.[5]

As vitamin A is present in some animal foods like milk, butter, ghee, eggs, liver and some leafy vegetables, as well as ripe fruits such as mangoes, papaya, and tomatoes are rich in carotene (carotene which are converted into vitamin A in the body). Animal foods like milk, ghee, butter, eggs, liver are all expensive and consumption is very low. Green leafy vegetables and fruits are available to a negligible amount. So in all, the 24 villages selected for the study, the availability of vitamin A is below the standard requirement. Even not a single village has sufficient amount of vitamin A in the diet. So most of the

villages are suffering from the eye diseases. Night blindness is most common. 14 persons were found to be suffering from night blindness. In the villages of Tasgaon tahsil except Kundal, all other villages like Ankalkhop, Nagrale, Visapur, Lodhe, Gourgaon recorded for eye diseases. The patients of night blindness were noticed in Nagrale two patients and one each in Ankalkhop, Visapur and Lodhe. In Miraj tahsil, the villages like Haripur and Patgaon, Narwad, Lingnoor recorded eye diseases. One patient to each observed in these four villages. The villages of Walwa tahsil also recorded for eye diseases. Three patients suffered from night blindness. One each in Rethare Harnax, Shirgaon and Pokharni. Shirala tahsil also recorded for the eye diseases. Two cases of night blindness were noticed in Charan and Ptelond.

Out of 14 patients suffering from night blindness, 8 are males and 5 are females. The distribution of these patients is 4 in Miraj tahsil, 5 in Tasgaon tahsil, 3 in Walwa tahsil and 2 in Shirala tahsil.

There are many vitamins grouped under B vitamins. Vitamin B_1 or thaimine is an important member of the B group of vitamins Prolonged deficiency of thaimine in the diet of the humans is one of the main factors in the causations of the disease called beri-beri. Among the commonly used foods the richest sources of thaimine are cereals, pulses and nuts, particularly groundnut. As the food habits of the Western Sangli district is mostly based on the cereals and pulses, so the supply of thaimine is in

sufficient amount. All the twenty four villages are above the standard requirement in the availability of thaimine in the diet. So the important point is that no patient is observed suffering from the thaimine deficiency diseases.

Riboflavin a member of B_2 complex. Riboflavin is concerned with several oxidation processes inside the cell. Some of the symptoms usually attributed to an inadequate supply of this vitamin in the diet are soreness of the tounge, cracking at the angles of the mouth, redness of the eyes, burning sensation in the eyes and scaliness of the skin in the region between in the nose and angles of the lips. The good sources of riboflavin are milk and milk products, eggs, liver and green leafy vegetables. Consumption of these foodstuffs is much below the standard requirements in all the villages. So all these villages are suffering the riboflavin deficiency diseases. It is reported by the medical officer of the concern rural medical centre.

Nicotinic acid or niacin is also a member of B_2 complex. Lack of niacin in the diet causes a disease known as pellagra which is characterised by soreness of the tongue, pigmented scaly skin and diarrhoea. The dermatitis appears most often over areas of skin, which are exposed to sun, such as the back of the hands and feet and generally it is symmentrically distributed in the body. Whole cereals, pulses nuts and meat are good sources of niacin. Consumption of these foodstuffs is above the standard requirement in most of the villages. The villages of Miraj,

Tasgaon and Walwa tahsil are surplus in consumption of niacin in the diet. Even then the cases of pellagra are noted by the medical officers of the some of the rural centres. The villages like Padali, Dhamwade, Yelapur, Rile, Petlond are deficient in niacin consumption. In these villages pellagra is observed by the medical officers and local medical practioners of the respective villages.

Vitamin C (ascorbic acid) prevents scurvy. It is usually found in fresh fruits and vegetables, particularly the green leafy varieties. Fresh meat and milk contain small quantities of vitamin C. The consumption of these foodstuffs is much below the standard requirements. All the twenty four villages are deficient in the consumption of vitamin C. The availabilities of vitamin C in the diet is varied from place to place. The availabilities as very low in Shirala tahsil. The coverage of demand is only about 25 percent. The coverage of demand of vitamin C in Miraj, Tasgaon and Walwa tahsil is about 35 percent. These figures clearly indicate acute shortage of vitamin C in the diet. It reflects the deficiency disease called Scurvy. A number of patients suffered from this disease. Almost all the medical officers and private medical practioners observed the patients of scurvy. The cases found more in number in Shirala tahsil, where the population is subsisting on rice and maize as the major staples. Whereas consumption of fruits and vegetables are to a negligible amount. Similar cases are also observed in Miraj, Tasgaon and Walwa tahsil.

Vitamin D plays an important role in the obsorption of calcium from the intestine and in the deposition of lime salt in the bone. Gross deformities of bones may therefore result; if enough vitamin D is not made available to the body. Vitamin D which prevents richets and osteonalacia. Vitamin D is found in liver and liver oils, egg yoth and in milk and milk fat (butter and ghee). Vitamin D is also formed in the skin by the action of sunlight. Hence rickets generally does not occur among children exposed to sunlight but is apt to occure in infants living in dark houses. Rickets influenced 8 children in the study region. These 8 victims of richets are due to deficiency of vitamin D and calcium. In Miraj and Tasgaon tahsil not recorded any rickets patients. But in Walwa tahsil recorded six children suffering by rickets. Two cases are in Rethare Harnax, two in Pokharni, one in Itakare and one Surul. In Shirala tahsil Yelapur and Padali noted (one patient in each) rickets. Vitamin deficiency diseases are shown in Map 6.2B

6.6 Other deficiency diseases :

Besides the deficiency diseases discussed above, some of the other nutritional deficiency diseases are also observed. Five cases were found to be suffering from diabetes. The consumption of carbohydrates below the standard requirement is one of the causes of diabetes. Two patients of diabetes are observed in Visapur village. The per head per day supply of carbohydrates is 399 grams which is about 21 gram below the

standard requirement. So thelow consumption of carbohydrates reflects into the deficiency diseases. The village Pokharni of Walwa tahsil has also recorded one diabetes patient. The per day per head supply of carbohydrates is 352 grams which is about 68 grams below the standard requirement. Then the village Itakare of the same tahsil (Walwa) is recorded one diabetes patient. In village Rile of Shirala tahsil one diabetes patient was observed. This condition reflects in carbohydrates deficiency diseases.

One patient of hypoprotonaemiea was observed in the village Pokharni of Walwa tahsil. Hyporotonaemia is caused by the deficiency of protein. The village Pokharni is deficient in protein consumption.

The general nutritional deficiency diseases have been discussed in the earlier pages. It is now necessary to point out the most common diseases in the villages with special reference to food habits. The common ailment noticed in the villages are the common cold. The former which is especially prevalent at the change of season indicates a general lack of resistance. Such decreased resistance was reported by medical officers and private medical practioners as due to the general lack of protein. The persons suffered by common cold were seen in all the 24 villages. No village is an exception to the common cold. The villages like Gundewadi and Lingnoor of Miraj tahsil, Shirgaon, Kurlap;Itakar, Surul and Pokharni of Walwa tahsil; Charan, Vakirwadi, Padali, Dhamwade, Yelapur, Rile, Petlond of Shirala

tahsil are deficient in per head per day consumption of protein.

It is important to note here that, nutrition alone is not enough. Persons consuming enough to obtain adequate nutrition are not necessarily safe from the diseases, if their surroundings are unhealthy. Lack of clean drinking water, is one instance. Germs enter the body through impure, germ-contaminated water taken day in and day out. With adequate nutrition one can fight these germs upto a level. However, beyound this, we would fall pray to diseases.[6]

Diarrhoea is the disease caused by the same factor as discussed above. A number of persons are suffering from this disease. In all 24 villages selected for the study, it was noticed that there were patients of diarrhoea. In Miraj tahsil 11 cases, Tasgaon tahsil 16 cases, Walwa tahsil 20 cases and Shirala tahsil 21 cases were observed as suffering from diarrhoea.

The nutritional deficiency diseases observed in Shirala, Walwa, Miraj and Tasgaon, clearly indicates that anaemia, diarroea, dental decay, night blindness are major nutritional deficiency diseases. Particularly in Shirala tahsil anaemia and diarroea are the most common diseases. The western part of the Khanapur tahsil has nearly the same geographical conditions as that of Shirala. So the same diseases prevail in western part of Khanapur tahsil also.

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