UNIT 5 DIETARY MANAGEMENT IN DISEASE – II

Structure

5.0 OBJECTIVES

After studying this unit, you should be able to:

- describe dietary management of glandular and neurological disorders;
- understand dietary management in fevers and infections;
- list the specific considerations in dietary management in surgery; cancer and weight related problems;
- discuss special dietary needs in pregnancy and its complications and inborn errors of metabolism; and
- identify the special dietary needs related to children's diseases.

5.1 INTRODUCTION

We hope the information in Unit 4 will help you in interacting with patients and understanding the rationale for the physician's prescription and the dietitian's role in patient care.

In this unit we again cover a wide range of disorders. Take careful note of the problems in each case and the dietary solutions. You should be able to explain why a particular diet is prescribed for a particular disease condition. We've also included a special section on nutrition in children's diseases also.

Use the margin freely to jot down points or make a note of experiences you've had in a hospital or clinic setting. The information would be most relevant if you can relate it to your day-to-day work.

5.2 DIETARY MANAGEMENT IN SPECIFIC CONDITIONS

In the previous unit we discussed disorders related to various body systems. Here we add two more broad categories : glandular or endocrine disturbances and neurological disorders. This section also focuses on dietary management in surgery, cancer, weight-related problems, complications in pregnancy as well as inborn errors of metabolism. You might find some of the terms a little difficult, but don't worry. Explanations are given in detail wherever needed.

Now we begin with diet therapy for glandular disturbances.

5.2.1 Glandular Disturbances

The following table summarizes the major problems and their dietary solutions. See Table 5.1.

Table 5.1: Dietary Solution in Glandular Disorders

Disorder	Problem	Dietary Solution
Addison's disease	Impaired function of the adrenal cortex — inability to retain sodium	Moderate to high sodium diet Frequent feedings high in protein and carbohydrate to prevent hypoglycemia
Hyperthyroidism	Overactivity of the thyroid gland	High calorie, high protein diet to counter increased energy expenditure
Hypothyroidism	Under activity of thyroid gland	Low calorie diet to prevent obesity and to counter lower energy expenditure
Tetany	Deficiency of calcium in blood	High calcium, high vitamin D diet
Diabetes	Deficiency or complete absence of functional insulin in the body	Moderate complex carbohydrate, reduced saturated fat diet with high fibre, calories to maintain ideal weight

Diabetes

We will now discuss the dietary management of diabetes in some detail. You are aware that insulin is secreted by the Islets of Langerhans in the pancreas. Insulin plays a crucial role in the carbohydrate metabolism. It helps glucose to enter cells and used it to generate energy. Thus in this disease the body is unable to use blood glucose (sugar) properly because of total lack of insulin, insufficient insulin, or ineffective use of insulin. The result is too much glucose in the blood. This can damage the heart, blood vessels, kidneys, eyes and nerves. However, by understanding the disease, its complications (if neglected) and the role of diet and drugs can make it possible for leading a normal life inspite of diabetes. Diabetes may be controlled by diet and exercise alone or by diet, exercise and medication (pills or insulin). If you are overweight, weight loss may help to control it. Your doctor will recommend the treatment for you.

Dietary Management of Diabetes Mellitus

Diabetes is treated using

- diet alone or
- diet + oral hypoglycaemic drugs or
- diet + insulin

As you can see diet is a central pillar in therapy for the diabetic. The food you eat contains carbohydrate, protein and fat. These nutrients supply the calories your body uses for

energy. If you eat too many calories it can raise your blood sugar. So you have to follow a meal plan that has right amount of carbohydrates, protein and fat.

Carbohydrates

Carbohydrates are important energy source for the body. Bread, cereals, pasta, rice, fruits and vegetables are some of its rich sources. It is important to eat appropriate carbohydrates at an appropriate time. If you eat large amounts of many carbohydrates it can increase your blood sugar. Eating the same amount of carbohydrate for meals and snack can help to control the sugar level.

Protein

Proteins are found in meat, poultry, fish, eggs, milk and milk products nutrinuggets, pulses etc. It is used in the body for growth and maintenance and energy. If you eat more proteins the extra calories can be stored as energy in the form of fat. Protein from vegetable sources is better than animal sources as they do not contain cholesterol and add fibre to the diets

Fat

To provide energy in the body in small amounts. Meat, poultry, cheese, butter, oils (saturated & unsaturated) nuts, whole milk desserts and snacks provide ample amount of fats. Eating too much fat can contribute to overweight and obesity and soon lead to cardiorascular diseases. Fats from vegetable sources is better than those from animal sources.

So an adequate/balanced diet for diabetes helps as:

- It provides optimum nutrition for health
- It helps to attain and maintain an ideal weight
- It keeps the blood sugar levels within the normal range
- It slows down the various complications of diabetes.

The percentage distribution of total calories is given herewith:

Carbohydrates 60-65%

Protein 15-20%

Fat 15-25%

The first step in planning diabetic diets is to calculate the recommended calorie intake. The following formulae are useful and are based on desirable weight for a particular age, sex and activity level for adults.

Sedentary worker : Desirable weight (kg) × 30 Kcal

Moderate worker : Desirable weight (kg) × 40 Kcal

Heavy : Desirable weight (kg) × 50 Kcal

For individuals above the age of 40 years, calorie intake is reduced as we have already learnt that the basal metabolic rate reduces and so does the physical activity, so the quantity of food(or calories) can be reduced as under:

40-49 years (5%)

50-59 years (10%)

60-69 years (20%)

Over 70 years (30%)

- For weight loss : Desirable weight (kg) X 20 Kcal should be given
- For bed patients : Desirable weight (kg) X 25 Kcal
- In children give 1000 Kcals + for each age group

Further, if the person requires to lose weight we must remember never to reduce energy intake lower than 1200 Kcal for women and 1450-1500 Kcal for men.

Here are some diabetic diets with specific points to remember according to the guidelines for standardized hospital diets laid down by DGHS. See Table 5.2.

Table 5.2: Guidelines for Standardized Diabetic Diets in Hospitals

Food Items	1200 Kcal	1500 Kcal	1800 Kcal	2000 Kcal	2500 Kcal
Cereals and millets	125 g	175 g	225 g	225 g	350 g
Pulses and legumes	50 g	50 g	50 g	75 g	75 g
Milk and milk products	500 ml	500 ml	750 ml	750 ml	750 ml
Green leafy vegetables	200 g	200 g	200 g	200 g	200 g
Other vegetables	200 g	200 g	200 g	200 g	200 g
Fruits	1 Portion	1 Portion	1 Portion	1 Portion	1 Portion
Paneer/egg	30 g/one	30 g/one	30 g/one	30 g/one	30 g/one
Oil	10 g	15 g	15 g	20 g	25 g
Sugar	—	—	—	—	—

Table 5.3 Highlights the foods to be permitted and foods to be avoided by diabetic patients.

Table 5.3: Foods Permitted and Avoided by Diabetic Patients

Foods permitted	Foods avoided
Beverages : soft drinks (sugar free), lime, lemonade, mineral water, tea, coffee without sugar, soups : clear soups, steamed dhokla (**Note :** Roasted bengal gram and fenugreek seeds can be included in the diet as these have been shown to have a hypoglycaemic effect, i.e. effect of lowering blood sugar.)	- Soft drinks with sugar, juices with sugar, alcohol, wines, - Soups : thick soups - Fried foods - Sugar, honey, jams, syrups, sweets, cakes, pastries, cookies, sugar coated nuts and cereals, candy bars. Condensed milk, sweetened curd. - Chutney, pickles in oil.

Note : Potatoes, colocasia, yam, mangoes, banana may be consumed as food alternatives but we must remember that these foods are high in carbohydrates.

Great care is needed in the case of patients who are on insulin therapy. Regular meals are important, fasting or overeating must be avoided. Food also must be distributed properly over the day's meals. It therefore becomes necessary to closely regulate the amount of food and the frequency of eating according to the type and dosage of insulin required. The idea is to divide the daily food allowance between the various meals. How should we do it? A rough guideline is given here. See Table 5.4.

Table 5.4: Guidelines to Divide Daily Carbohydrate Distribution According to the Type of Insulin

Type of insulin	Breakfast	Lunch	Afternoon snack	Dinner
Quick acting (given before each meal)	1/3 of carbohydrate	1/3	—	1/3
Intermediate type	1/6	2/6 or 1/3	1/6	2/6 or 1/3
Long acting	1/5	2/5	—	2/5

Different types of insulin have different peak action, i.e. maximum effect. When the time of greatest action for insulin occurs towards evening, a supplementary feeding may usually be necessary. Supplementary feeding whether between meals or at bedtime must be deducted from the allowances for the meal nearest the feeding. Eating too much or too little is dangerous. If too much is eaten there won't be enough insulin and the complications of diabetes will begin again, e.g. hyperglycema (high blood sugar). This is called diabetic coma and has to be handled immediately by giving insulin. On the other hand, if less food is taken there can be a insulin shock, i.e. sudden drop in blood glucose level e.g. hypoglycema (low blood sugar). Insulin shock can be treated with a readily available source of carbohydrates, e.g. fruit juice, sugar, candy, syrup, honey.

What should be done when these complications arise? What are their common symptoms and why does it occur.

Hypoglycemia (low blood sugar)

Insulin Shock

Symptoms

Sweating, shakiness, weakness, hunger, dizziness, clampy skin, headache, irritability, rapid heartbeat, nausea.

Hypoglycemia may occur if:

- you miss, delay or do not eat a full meal
- your insulin or pill is too large a dose
- you exercise more than usual

When low blood sugar occurs:

— Eat or drink a food that contains sugar

— Eat your meal as soon as possible

— Eat fruit, milk or starch.

Hyperglycemia (high blood sugar)

(Diabetic coma)

Symptoms

Similar to insulin shock

Hyperglycemia may occur when:

- when you have overeaten
- your insulin doze is missed or is small
- you have not had a normal regular exercise

When high blood sugar occurs:

— Test the blood sugar level

— Take the pill or insulin

— Keep taking fluids

— Call the docotor

We have just mentioned the essentials of diet therapy in diabetes. You will find details about diabetes and its treatment in the course on medical-surgical nursing in IInd year.

Do you realize what an important role you have as a nurse in the nutritional care of diabetics? The diabetic needs to be convinced about diet therapy and must have a positive attitude towards it. In addition, you can help to teach the patient to inject insulin into his system. You are aware, of course, that insulin cannot be given orally because it will be digested like any other protein in the stomach and the intenstine. This means it would loose itseffectiveness and special properties.

Now let us move on to a consideration of diet in neurological disorders. You will find the principles quite different from endocrine disorders, as might be expected.

5.2.2 Neurological Disorders

The brain normally relies entirely on glucose for meeting its energy needs. In fact, if the supply of glucose and oxygen to the brain is shut off for even a few minutes it can be severely damaged. In addition to glucose, the B complex vitamins have a crucial role to play in maintaining the health of the nervous system as a whole. The following table shows the conditions resulting from Vitamin B complex deficiences. See Table 5.5.

Table 5.5 : Conditions Resulting from Vitamin B Complex Deficiencies

Disorder	Symptoms	Treatment
Beri beri	ı Reduced tendon reflexes ı peripheral neuritis ı uncoordinated gait ı muscle pain ı irritability ı lack of concentration ı lack of interest ı personality deterioration	Thiamine supplementation Food sources: whole pulses & cereals, meat, poultry, egg
Pellagra	ı Poor memory ı irritability ı dizziness ı hallucinations ı delusions of persecution ı finally dementia	Niacin supplementation Food sources: – Meat, fish, poultry, organ meats – Cereals, pulses – Brewer's yeast, peanuts and peanut butter
Wernicke's syndrome (associated with alcoholism)	ı Opthalmoplegia (paralysis of eye muscle) ı ataxia (uncoordinated gait or walk) ı mental confusion	Thiamine supplementation

One psychological disorder which is definitely linked with food intake is called Anorexia nervosa. It is common in the West in adolescent girls. The patient refuses to eat and has a self image of being slim and healthy even when she is so thin. Death can occur as a result of the obsession with the figure and being slim. For some individuals, total parentereal nutrition becomes a necessity to overcome the lack of food. In any case, treatment of the underlying mental condition is necessary for a lasting cure. The approach of 'behaviour modification' has been tried in which the patient is given positive rewards and privileges for gaining weight. These are withdrawn if there is a weight loss! Now that's an interesting way to handle the problem, isn't it? This approach is obviously relevant to weight reduction as well. Patients who manage to lose weight can be rewarded. Another form of treatment adopted is group therapy in which patients sit together with their physician or dietitian, discuss problems and arrive at solutions to which each person is committed. In such cases, the patient feels less isolated and more capable of coping with the disease.

In the next subsection, we will talk about an important area in hospital practice - fevers and infections. These are some of the most common problems encountered by you, aren't they? So you can look forward to getting more information about them in the following discussion.

5.2.3 Fevers and Infections

Fever, like diarrhoea, is a symptom. It goes hand in hand with infections because it is one of the mechanisms evolved by the body to deal with infections. Fever, by definition, is an "elevation in the body temperature above the normal which may occur in response to infection, inflammation or unknown causes".

Fevers may be of two types, i.e. short duration/acute like typhoid or long duration/chronic like tuberculosis. Fever can also be intermittent as in the case of malaria.

To understand the principles of diet therapy, we need to understand the metabolic changes that occur in fevers and infections. In general, the higher the temperature and, the longer the duration, the more will be the ill effects on the body. These are:

- An increase in the basal metabolic rate is seen. For every degree rise in the celsius temperature the BMR increases by 13% whereas with every one degree rise in farhrenheit temperature the increase is 7%.
- The increase in temperature also increases the need for calories which come from the carbohydrates stored in the liver or from the break down of fats and Proteins.
- These changes can cause a loss of weight and also burden the kidneys because of greater waste products produced.
- Increased respiration, perspiration can result in changes in water and electrolytic balance.

General Dietary Considerations for Fever

We have seen that the demand for energy increases and depending on the pathalogical condition the needs for proteins, could also enhance. Thus the general dietary considerations focus on:

Macro and Micronutrients

The general dietary considerations focus on *a high energy and high protein diet.* There has to be an emphasis on sources of sodium and potassium as well as vitamins. B-complex vitamins are used up more in fever because of the higher metabolic rate. We must also remember that antibiotics and certain other drugs kill intestinal bacteria. These bacteria provide useful amounts of vitamins since the synthesize some B-complex vitamins. In such cases, taking B-complex suppliments is essential. There is one very important point to add. Fluid intake must be liberal — from 2500 to 5000 ml daily. Why is this necessary? The reason is the need to make up for the heavy loss of fluid through the skin (as perspiration) and to allow for adequate volume of urine to get rid of the wastes.

A Bland Diet

A bland diet is recommended due to sluggish working of the intestines, it is better to reduce the fibre content for better digestion and absorption of the nutrients required.

Diet Consistency

Now, what about the consistency of food? In fevers where the patient becomes very weak the patient is recovering, a soft diet is given. Fluid diets could be used initially but should be followed by soft and then normal diets. In some cases, semi-solid diet is tolerated better because fluid diets may not give adequate nutrition. They may cause distention and discomfort and sometimes may initiate nausea and vomiting. The patient preference must be considered.

Meal Frequency

The meal frequency is also an important point to consider. Small quantities of food, at intervals of 2-3 hours, will permit adequate nutrition without overtaxing the digestive system at any one time. With improvement, many patients consume more food if given three meals and a bedtime feeding. This is also important because the patient's appetite is initially poor but improves gradually.

An example of a diet for an adult typhoid patient in the acute phase is as follows:

Milk	-	1000 ml
Barley water	-	1000 ml
Glucose	-	200 g
Cane sugar	-	100 g
Orange juice	-	500 ml
Dextrimaltose	-	200 g
Multivitamin tablet	-	One

Such a diet emphasizes protein from milk, carbohydrates in various form such as glucose, cane sugar, dextrimaltose and of course, vitamins. There is minimal emphasis on fat except the amount provided by milk.

Now, let us turn our attention to diets for chronic fever such as in Tuberculosis. Since the illness is prolonged, tissue wasting takes place. So what kind of diet would be suitable? A high calorie, high protein diet with sufficient vitamins and minerals is the best.

A suitable dietary guideline is as follows:

Food group		Amount (g)
Cereals	-	400
Pulses	-	50
Roots and tubers	-	100
Green leafy vegetables	-	200
Other vegetables	-	200
Eggs/paneer	-	2/60
Fruits	-	200
Milk and milk products	-	One litre
Fats and oil	-	25
Sugar	-	50
Tea or coffee	-	7/15

This hospital diet can be further enriched by addition of 100 g whole milk powder. High protein commercial foods can also be used as supplements.

It must be emphasized that tuberculosis patients have special nutritional needs. Calcium is needed to promote healing of tuberculosis lesions. This is why milk intake is important. Blood losses through sputum, results in anaemia, and hence iron and B-complex vitamins need emphasis. In addition, carotene is poorly converted into vitamin tuberculosis patients and hence the diet should provide vitamin A as its precursor retinol. Vitamin C supplementation is also required.

In short, a well balanced diet — adequate in calories, good quality proteins, rich in minerals and vitamins is recommended for fevers.

Check Your Progress 1

Summarize the key features of diets for the following conditions:

1) Diabetes mellitus

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2) Typhoid

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3) Tuberculosis

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Now, let us add a few words about dietary management of infections. The principles we have already discussed are relevant in infections associated with fever. *Restoration of body tissues* is a major aim in treating infections and promoting recovery. High quality protein is needed for this. Carbohydrates must also be provided to spare proteins for body building and not used as energy. Vitamin supplements are also required. Enough intake of minerals such as potassium, magnesium and phosphorus are essential.

5.2.4 Surgery and Cancer

Surgery is commonly performed for many patients due to disease in various tissues and organs. For speedy recovery the patients must be well nourished as malnourished subjects pose slow progress and are at a risk of several compications. Nutritional resources must provide reserves for surgery and postoperative period until regular feedings can be commenced.

Preoperative nutrition care: The subject needs to be assessed nutritionally and any deficiency must be bridged before the surgery in undertaken Energy, protein, vitamins and minerals, electrolytic imbalances should be corrected so that the individual has better wound healing and shorter time spent in hospital for convalescence.

Postoperative care: Often soon after surgery 24-48 hours oral feeding may be delayed but fluid and electrolytic balance may be maintained through partial peripheral feeding. Do you know why? The reason is that feeding could initiate vomiting and some of the fluid vomitted could be drawn into the lungs causing complications.

Sufficient energy must be given so that protein is not diverted for energy purposes. Protein is very essential for the recovery period as losses that have occurred from wound bleeding, tissue breakdown, haemorrage and exudates is made up and the body does not go into a negative balance. The protein intake needs to be higher than the normal intake. They are needed for the body defence mechanisms, necessary for the transport of fats. Shortage of this major macronutrients could present itself by poor wound healing, delayed healing of fractures, anaemia, reduced resistence to infections, extensive weight loss, liver damage and even depressed heart and lung function. Minerals and vitamins must be adequate particularly Vitamin C which is vital for wound healing. In tissue breakdown potassium and phosphorous is lost and in fluid losses sodium andchloride is lost. Malabsorption anaemia can also develop.

As soon as intestinal peristalsis returns clear liquids such as light tea, broth, juice could be given along with sodium chloride. These fluids stimulate gastrointestinal functioning. This should be followed by milk and milk products such as puddings, creamed soups, high protein beverages etc. When the patient has stabilized on soft foods then he/she could be given solid normal foods. If the subject still is having inadequate quantitative or qualitative food then nutrients could be provided by special feeding methods about which we have talked to you earlier.

Now, why is oral feeding delayed for the first 24-48 hours after surgery? The reason is that oral intake can lead to vomiting and some of the fluid/vomit may be drawn into the lungs.

Cancer

Cancer includes many disease conditions characterized by growth of cells that have lost their usual growth restraints and thus multiply and spread. The spread interferes with the function of adjacent, organs and affects the functions leading to undesirable affects. These include changes in the appetite and food intake resulting in weight loss and under nutrition, taste changes, absorption problems and alterations in the protein, carbohydrate and fat etabolism. In general the recommendations for a cancer patient should consist of:

1 High calorie foods that emphasize proteins (drink more milk, cream, cheese and cooked eggs)

- avoid foods with additives
- eat less of certain high fibre foods
- get sufficient exercise and
- reduce stress in daily life and think positively

Some of the side effects of **cancer therapy with the suggested dietary management** are summarized in Table 5.6.

Table 5.6: Suggested Dietary Management of Cancer Patients with Side Effects

Side Effects	Dietary Management
Nausea and vomiting	clear, cold and carbonated beverages
	sipping beverages slowly through a straw
	small, frequent meals low in fat
	dry biscuits, dry toast or rusk before getting up in the morning
	acidic or salty foods
	cold foods e.g. fruit salads, desserts gelatin based and jellies
	consumption of liquids 30 to 60 minutes before eating
Dry mouth	drinking plenty of fluids — high calorie beverages preferred to water intakes
	foods to be moistened for ease of swallowing
	chewing sugar-free gum or sugar-free candy for stimulation of salivation
	artificial saliva
Taste alteration	try giving foods prepared with different seasonings (especially marinated foods with different flavours.
	dipping and soaking foods in fruit juice or vegetable extracts
Loss of appetite	small frequent feeds
	high calorie, high protein snacks and beverages
Sore mouth and throat	soft, non-acid foods (try milk shakes, apple sauce, curds, mashed potatoes, noodles, custard, scrambled eggs, mashed meats)
	foods and beverages at room temperature
	using straw for liquids
	avoiding highly spiced foods
Swallowing problems	liquid feedings or pureed foods (foods mashed to a thick paste after boiling)
	frequent feedings orally or if necessary by tube feeding
	adding butter, sauces, gravy to foods
	finely chopped foods or foods cut into small pieces
Early satiety	small frequent meals
	chewing foods well and eating slowly
	avoiding foods excessively high in fat and rich sauces
	having liquids before meals and not with meals

Activity 1

1) Have you worked with cancer/surgical patients? If so, from your experience list some of the problems you encountered with the patient and how did you solve those problems. If not, talk to your colleagues or friends who have this information. Use this space to jot down the main points briefly.

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2) Did you find the activity useful? You could keep a note of your daily experience with different patients in a diary format. That would be interesting, wouldn't it?

Now we turn our attention to weight-related problems. Both over weight and under weight are associated with health risks. The effort should be allowed the patient to reach a desirable weight and help him/her to maintain it.

5.2.5 Weight-related Problems

The whole issue of weight-related problems is the question of energy imbalance. A person who is in a energy balance spends as much energy (energy out) as he takes in through the food he eats (energy in) or in other words

Energy Balance : Food energy in (consumed food) = Energy out (through activity)

If more energy goes in than out, the person will put on weight. On the other hand, if less energy goes in and more is spent i.e. more energy out the person will be thin. In fact, the following rhyme brings out this point cleverly.

"MORE ENERGY IN, LESS ENERGY OUT, EQUALS STOUT
MORE ENERGY OUT, LESS ENERGY IN, EQUALS THIN"

Activity 2

Think for a few minutes and try to suggest measures which can remedy:

1) Overweight

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2) Underweight

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Now, look at this diet prescribed for weight reduction. After this make a mental note of its salient features:

Foods		Amounts (g)
Milk and milk products	-	500 ml
Cereals	-	150
Pulses	-	50
Green leafy vegetables	-	200
Other vegetables	-	100
Cereals	-	150
Fruit	-	1 portion
Paneer/egg	-	30 (one)
Fats and oils	-	5
Sugar	-	Nil

This diet provides only about 1200 Kcal. Compare this to the RDIs for an adult man (2425 Kcal) and adult woman (1875 Kcal). If you look at the diet carefully, you would notice that there is a sharp reduction in intake of cereals, fats and oils and sugar. (These foods provide more energy in the body.)

Here is a list of foods **to avoid if the patient has to lose weight.** They are the foods rich in fat and/or sugar. These foods include:

- Ice cream
- Desserts with cream
- Cream rolls
- Patties
- Pastries
- Pizzas and hamburgers
- Indian sweets with khoya (Barfi)
- Sugar, jams and jellies
- Fried snacks/foods (paratha, pakoras, samosas)
- Aerated water
- Chocolates and sweets

However, foods such as vegetables, fruits such as watermelon, lime, fruit juice, clear soups can be consumed without any restriction - without sugar, of course!

One more point. Don't assume that all patients with weight problems would be prescribed the diet given here. If less weight reduction is needed a 1500 Kcal or even an 1800 Kcal diet may be prescribed! The intake should, of course, be less than the habitual consumption. We must also remember that it is a good idea to give vitamin and mineral supplements to prevent any deficiency of these.

Now, what about patients with problems of underweight? We would obviously have to give a high calorie diet. If underweight is due to malnutrition, high amounts of protein also need to be given for rebuilding of the lost muscle tissues. Mineral and vitamin supplements may also be required.

Check Your Progress 2

1) Make a list of foods which would be recommended for a patient suffering from underweight.

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2) Explain why these foods are useful in the dietary management of underweight.

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3) Why should patients on weight reducing diets be prescribed vitamin and mineral supplements?

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4) What is the role of a nurse in diet therapy for cancer patients? List any two points.

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5) Predict the influence of the following on nutritional status and write a few lines:

a) Removal of the stomach

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b) Removal of the ileum

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c) Severe burns

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5.2.6 Complications in Pregnancy

Pregnancy is a rapid growth period. For the growth of the foetus and other developments that take place through out pregnancy and delivery of the child involve increase in nutritional requirements. Sometimes pregnancy can be associated with complications which need attention. Table 5.7 briefly lists these complications and the dietary solutions.

Table 5.7: Complications in Pregnancy and Dietary Solutions

Complications/Problems	Dietary Change
Toxaemia	ı Protein of good quality and restriction of salt
Anaemia	ı Include iron rich foods. Supplements of iron folic acid and B complex could be given
Heart conditions	ı Restrict sodium and fluids to control oedema
	ı Drugs therapy with strict diet control, low fats
Diabetes	ı Restrict calories and fat, moderate protein and high fibre diet
Nausea and vomiting	ı Excessive persistant vomiting give fluid and electrolytes
(morning sickness)	parenterally
	ı Recommend a dry biscuit, rusk, toast (simple carbohydrates) before rising from bed
Constipation	ı Increase intake of fibre and fluids. Give fruits with skin, whole wheat cereals and leafy vegetables.

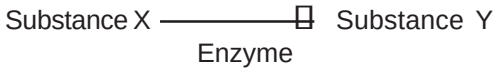
You would have noticed that specific dietary changes are made in each case. We may add here that heart conditions and diabetes may manifest themselves during pregnancy as they may be present already during the pre pregnancy stage.

We have so far looked at dietary management of several conditions such as diabetes, infections and fevers, surgery, cancer, weight problems and complications in pregnancy.

Now, we will focus on an entirely different set of conditions. These are the inborn errors of metabolism. What does the term “inborn errors” mean? Inborn refers to a congenital problem (a problem present from the time of birth). The word “error” refers to a defect in metabolic processes. You can read more about these conditions in the next subsection.

5.2.7 Inborn Errors of Metabolism

As we already mentioned, inborn errors of metabolism are congenital. This indicates that such disorders are hereditary in nature. In most cases, the problem is of a particular enzyme which is absent or non-functional. What would be the effect of this? To answer the question look at the following illustration:



In this case, the enzyme converts substance X into substance Y. Now, if this enzyme is missing, what will happen? Obviously the substance will not be converted to substance Y and X substance will accumulate. If X is harmful and has serious effects in high concentrations, the baby will be retarded mentally and physically. Otherwise no serious problems may arise. Table 5.8 summarises the dietary management of some common inborn errors of metabolism.

Table 5.8: Dietary Management in Inborn Errors of Metabolism

Disorders	Enzyme lacking	Problem arising	Dietary Management
Phenylketonuria (PKU)	Phenyalanine hydroxylase	Causes severe mental retardation	1 Restriction of foods containing phenylalanine; 1 Administration of phenylalamine free formulae
Galactosemia	Absence of enzymes converting galactose to glucose	Mental retardation, cataract, ascites, bleeding occur.	1 Prompt elimination of milk and milk products (milk, sugar is known as lactose which is broken down to galactose).
Homocystinuria	Lack of enzymes involved in metabolism of the amino acid methionine and another methionine; substance called homocystine accumulate and are excreted in large amounts in urine.	Mental retardation, muscle weakness, skeletal problems and dislocation of the optic lens.	1 Low methionine commercial preparations. 1 Pyridoxine or vitamin B_6 therapy. Low methionine diets with adequate amounts of the amino acid cysteine are recommended.

5.3 NUTRITION IN CHILDHOOD PROBLEMS

Our discussion so far has not mentioned any specific age group. However, the diets given are, in general, meant for adults. Younger children are adolescents must be treated differently. Can you think of reasons for this? As a matter of fact, the main difference between infants, young children and adolescents is the rate of growth. When compared to adults, children are still growing while adults have stopped growing.

We must also remember that the "turnover" of nutrients is much faster in children. This means, in other words, that in children *nutrients are broken down and resynthesized at a much quicker pace than in adults.*

Besides this, the particular stage of physical, mental, emotional and social development is crucial. Can the child feed himself? Can the child decide on foods he would like to eat? Can she be relied on to make a right choice of foods? Would the child be able to understand what is required to him or her?

Both psychological and physiological reasons can interfere with food intake. Eating a satisfactory diet may be difficult because of fatigue, nausea or lack of appetite caused by illness, drugs and pain. The child in hospital also faces the feeling of loneliness because of

the separation from the parents and other sibblings. Allowing to eat along with other children in a pediatric ward has been found to be more effective than when the child eats alone. Special foods can be given to children on birthdays or holidays which are prepared within the needed modifications of the diet.

Feeding Children with Physical Defects or Handicaps

Feeding children who have physical defects or handicaps is an issue of special concern. Children with **cerebral palsy** often cannot swallow. In the beginning such children need to be tube fed, but in due course they learn to put food at the back of the tongue and, by tilting the head backward, learn to swallow. These children often become severely undernourished because feeding is very difficult and takes a long time for such children especially prepared dense foods in an answer. The child thus has to eat less food in bulk and volume and yet suffies the nutrients required.

Infants with cleft palate have severe feeding problems. Corrective surgery can be done only after a certain age. Till then solutions have to be found for adequate feeding of the child. The various ways it can be done is given below:

- Enlarged nipple opening in bottles
- Feed in an upright position
- Burp frequently to remove the air swallowed
- Avoid fibrous, pasty or food in small pieces as it sticks in the opening of the cleft palate.

  Examples of such foods are: small pieces of vegetables and fruits, nuts, creamed dishes and peanut butter
- Pureed foods can be diluted and given from a bottle with a large nipple opening
- Smaller meals can be given with increased frequency
- Children who have undergone surgery can be offered a liquid or pureed diet till healing is completed.

Children with Diabetes

A good example of the disease is diabetes. The child with diabetes requires insulin he/she is insulin dependent. In addition, the condition tends to be very unstable. Slight changes in the activity level or intake of food can have serious consequences. The maintenance of control between acidosis on the one hand and hypoglycaemia on the other is often difficult because of the greater frequency of infections and the lower degree of control over activity and even emotions. Dietary intakes and insulin dosage need close monitoring.

Check Your Progress 3

Saraswati is a 9 year old girl who has been hospitalised and found to suffer from insulin depend out diabetes.

1) What points would you communicate to Saraswati and her parents? List any four.

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2) What foods would you tell Saraswati to avoid at a birthday party?

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5.4 LET US SUM UP

This unit discussed dietary management in specific conditions such as endocrine disorders, surgery, cancer, fevers and infections, neurological disorders, complications in pregnancy and inborn errors of metabolism.

The main points about dietary management can be summarised as follows:

- In diabetes, restriction of certain carbohydrates is required e.g. refined carbohydrates and sugar. Saturated fats must be restricted and replaced by unsaturated fats. If there is insulin shock (hypoglycemia due to excess insulin/eating less than recommended), prompt administration of glucose is required or intake of some easily digestible carbohydrates. On the other hand, if blood sugar has gone up too much and the person is in acidosis due to accumulation of ketone bodies, insulin injections is required. These complications must be attended to immediately.
- Depending on the type of surgery and the organ or body part affected, tube feeding or parenteral nutrition required. When special feeding is stopped then first fluids are given by mouth, and slowly progressing to a soft and then a normal diet.
- Anorexia in cancer patients is a major problem to be tackled and individual tolerance and food likes have to be considered. Cancer therapy is also associated with various nutritional effects.
- In acute fevers a full fluid diet is prescribed which is high in calories, protein, water and electrolytes. In chronic fevers also a high calorie, high protein diet is recommended with plenty of fluids and electrolytes. The diet is usually soft and normal. Easily digested foods are emphasized.
- Psychological problems have to be considered in some neurological disoreders; diet therapy does not otherwise have a significant role.
- Complications in pregnancy, such as severe vomiting, are treated with intravenous fluids to prevent dehydration. If there is fluid accumulation in the body as in toxaemia, sodium restriction becomes necessary.
- Inborn errors of metabolism are tackled by eliminating the particular substance from the diet which tends to accumulate because of lack of a particular enzyme which is needed for its breakdown.

In addition to these aspects, we emphasized the special care required in the case of sick children so that rate of growth is not affected and lasting ill effects and malnutrition avoided.

5.5 KEY WORDS

Catabolism : Breakdown of complex substances into simpler substances accompanied by release of energy.

Hypoglycaemia : Low levels of sugar (glucose) in the blood.

Overload : Excessive amount of nutrients or substance that can be handled by a particular oran .

Pureed foods : Cooked and mashed fruits and vegetables, served without skin or peels.

Turnover : Rate at which a substance is used and replaced by the body for use.

5.6 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Moderate amounts of complex carbohydrates, high fibre, low cholesterol, moderate unsaturated fat type; protein normal or higher.

   Insulin dependent patients need diet regulation according to insulin dose.

2) High calorie, high protein, full fluid diet is prescribed during the acute phaseof illness

   and a soft low fibre diet is given during convalescence. Fluid and electrolyte intake is liberal with mineral and vitamin supplemention.

3) High calorie, high protein intake with plenty of fluid and electrolytes. Mineral and vitamin supplements are usually necessary.

Check Your Progress 2

1) List foods which are rich in carbohydrates, fats and protein.

2) Carbohydrate and fat supply energy to replenish fat stores in the body; protein helps growth and repair and replace lost tissues

3) Low calorie diet means consumption of less food. This also means lower intake of vitamins and minerals. Though calorie needs are lower, vitamin and mineral needs remain the same. Hence the need for mineral and vitamin supplements

4) Two points are : identifying diet-related problems such as taste alterations and assessing response to diet therapy and medication/other interventions

5) a) Meals would have to be small. Protein excretion would not be so efficient. B_{12} absorption would be afeceted.
   b) Poor absorption of several minerals, of carbohydrates, fats and protein
   c) High nutritional needs which cannot be met by usual diet

Check Your Progress 3

1) Nature of diabetes and need for insulin, relationship of insulin dosage to diet and exercise; diet patterns and types of foods permitted and those that need to be restricted; how to administer the insulin injections. You can add more to this list.

2) She can eat the savoury foods but not the sweet ones. A limited intake of some sweet foods may be possible if insulin dosage can be adjusted. Since Saraswati may find it difficult to control her intake exactly it's better to avoid sweet foods.