
UNIT 2 ADAPTATION OF THERAPEUTIC DIETS

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2.1 INTRODUCTION

In the first unit we discussed the role of a clinical dietitian and the various steps or processes necessary for rendering effective nutritional care.

This unit deals with therapeutic diets and the ways in which the normal diet of an individual can be modified to suit therapeutic needs. The clinical dietitian is educated and trained to interpret the science of nutrition to enhance the quality of life of individuals and groups in health and disease. Each diet prescribed for an individual has its own rationale and purpose. You as a dietitian should have the knowledge, skills and attitudes to ensure quality of work.

In this unit, we shall learn about different therapeutic diets that are available in hospital for specific disease conditions. Also, we shall deal with the different modes of feeding, through oral enteral and parenteral route. Let us first understand what a therapeutic diet is and what purpose does it serve.

Objectives

After studying this unit, you will be able to:

- discuss the purpose(s) of therapeutic diet adaptations,
- explain the different ways by which the normal diet can be modified to suit therapeutic needs,

- plan a diet prescription,
- describe the principles of general hospital diets – normal, liquid and soft diets, and
- elaborate on the different modes of feeding.

2.2 THERAPEUTIC DIETS

Therapeutic diets are *adaptations of the normal or regular diet*. In other words, it is a diet for a patient suffering from a specific disease such as heart failure, hypertension, renal failure, diabetes etc. Why do you think that the diet has to be changed in these conditions? What changes must be frequently made? These are a few issues which we shall deal in this subsection.

Well, you already know that there are certain diseases which can be cured by food or nutrient concentrates, such as deficiency diseases. In diseases such as diabetes, making alterations in the diet can help to control the extent of the disease and prevent the onset of complications. Similarly, in genetic diseases (about which you have studied in Nutritional Biochemistry Course (MFN 002, Unit 12), simple dietary modifications can keep a check on the progression of the disease and symptoms which otherwise could be fatal. The disease process also influences both the quality and quantity of the diet. The other aspects that may require changes include meal frequency. These changes result as a consequence of the following reasons:

- loss of appetite and therefore low intake,
- feel more hungry and therefore an increase in the intake, and
- problems with mastication, swallowing, digestion or absorption of food or specific nutrients (due to structural and/or functional changes) leading to changes in types of food that can be tolerated, as well as, feeding frequency.

Let us next have a look at the purpose of dietary adaptations.

Purpose of Therapeutic Dietary Adaptations

A therapeutic diet is a quantitative/ qualitative modified version of a basic nutritious diet which has been tailored to suit the changing nutritional needs of a patient/ disease condition. The regular or normal diet may be modified for one or more of the following reasons:

- to maintain or restore optimum nutritional status,
- to provide rest or relieve an affected organ (e.g. soft or liquid diet in gastritis),
- to adjust to the body's ability to digest, absorb, metabolize or excrete (e.g. a low fat diet for fat malabsorption),
- to adjust to tolerance of food intake by mouth (e.g. tube feeding for patients with cancer of oesophagus),
- to adjust to mechanical difficulties (e.g. soft diet for patients with denture problems), and
- to increase or decrease body weight/body composition (e.g. high calorie, low calorie etc.).

While going through the above points you must have come across the terms like soft diet, liquid diet, tube feedings etc. What are these and what do we mean by these? Don't panic, we shall get to know about these terms later in this unit.

The modified diet may reduce symptoms, make the patient more comfortable or improve the quality of life. The types of dietary adaptations for therapeutic needs are reviewed next.

2.3 TYPES OF DIETARY ADAPTATIONS FOR THERAPEUTIC NEEDS

Normal nutrition is the foundation upon which therapeutic modifications are based. We have already discussed in previous sections about the purpose of dietary adaptations. The adaptations of the normal diet to suit therapeutic needs may take the following forms:

- Change in consistency of foods, such as liquid diet, soft diet, low fibre diet, high fibre diet.
- Increase or decrease in energy value of the diet such as low calorie diet for weight reduction, high calorie diet for burns.
- Increase or decrease in specific nutrients or type of food consumed, such as sodium restricted diet, lactose restricted diet, high fibre diet, high potassium diet.
- Elimination of spices and condiments, such as bland diets.
- Omission of specific foods such as allergy diets, gluten free diet.
- Adjustment in the ratio and balance of proteins, fats and carbohydrate such as diabetic diet, ketogenic diet, renal diet and cholesterol-lowering diets.
- Rearrangement of the number and frequency of the meals such as diabetic diet, postgastrectomy diet, diet for peptic ulcer disease.
- Test diets: These are single meals or diets lasting one or few days that are given to patients in connection with certain tests e.g. the fat absorption test used to determine if steatorrhoea is present.
- Change in feeding intervals i.e., meal frequency.

Having reviewed the types of dietary adaptations next let us get to know the losses of planning therapeutic diets.

2.4 NORMAL NUTRITION: A BASE OF THERAPEUTIC DIET

Normal nutrition is the foundation upon which the therapeutic modifications are based. The primary principle of diet/nutrition therapy is that it is based on the patient's normal nutritional requirements. Any therapeutic diet is only a modification of the normal nutritional needs of an individual to suit what his/her specific condition requires. A person's 'diet' is defined as that person's intake of food and drink.

All detailed dietary modifications should be presented with choices, clear guidelines, menu guidance and supporting information as to alternatives possible. Patients should be encouraged to understand the key relationship between a food and a diet. The value of a food depends on the amount of nutrient in the food and the frequency with which the food is consumed. Dietary changes necessary are more likely to be followed if clear explanations and simple instructions are provided as to why the diet has to be changed. The Recommended Dietary Allowances (RDA) are often used as a basis for evaluating the adequacy of therapeutic diets. Nutrient requirements specific to a particular disease state or a disorder must be kept in mind when planning the diet. As a dietitian, you also need to remember that an individual's diet is affected by various factors such as lifestyle, income, knowledge, taste preferences, religious beliefs and various other socio cultural factors. Failure to account for these could result in an impractical therapeutic diet planning.

What is therapeutic diet planning or diet prescription? We will get to know about this in the next section. But, first let us recapitulate what we have learnt so far.

Check Your Progress Exercises 1

1. What is a therapeutic diet? Discuss the purpose behind modifying a normal or regular diet.
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2. List the types of dietary adaptations to meet therapeutic needs.
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3. Normal nutrition is a basis for a therapeutic diet. Discuss.
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2.5 DIET PRESCRIPTION

The diet prescription designates the type, amount and frequency of feeding based on an individual's disease process and disease management goals. The disease may require a calorie level or other restriction to be implemented. It may also limit or increase various components of the diet such as carbohydrate, protein, fat, vitamins, minerals, fibre, phytonutrients or water. Another aspect which the dietetic prescription takes into account includes the economic status, food habits (such as vegetarian, ovo-vegetarian, non-vegetarian), food intolerances (such as lactose intolerance, gluten-sensitive enteropathy), allergy (such as milk, eggs), occupation of the patient and meal timings. Next, let us have a look at each of these.

- *Economic Status* : It is one of the important practical considerations to be kept in mind while formulating a diet prescription. During an acute illness, a few expensive items may be permissible but for more prolonged or chronic illnesses like diabetes or peptic ulcer, the recommended foods must be within the means of the patient.
- *Food Habits*: These must be known so that the diets can be recommended keeping in mind the food preferences of the patient. Whether a person is a vegetarian or not, must be known. If vegetarian, then the degree of vegetarianism should be assessed. For instance, ovo-vegetarians eat egg but no flesh; egg and fish vegetarians eat just egg and fish but not animal flesh. While home-vegetarians prefer to remain vegetarian at home but consume meat/chicken at a restaurant or a party.
- *Food Intolerances* : The intolerances of the patient for specific food items must be assessed. For example, milk may lead to diarrhoea in some people while constipation in others. Those with colonic disorders are likely to get flatulence with whole pulses. Hence, while prescribing the diet, the food intolerances must be clearly indicated and known to the dietitian.
- *Allergy* : Food allergies manifest themselves as urticaria, abdominal cramps or bleeding asthma and angioedema. Many are found to be allergic to milk or egg and these foods may have to be excluded from the diet of the patient as you will

learn later in Unit 6 in this course. Gluten enteropathy (celiac disease) may result as a consequence to gluten (a protein fraction in cereals and millets) sensitivity and colitis in young children due to milk consumption.

- *Occupation and Meal Timings*: The occupation and the time at which the meal is consumed daily must be considered. A factory worker who works on different shifts requires more detailed information for a peptic ulcer diet than a manager whose hours of work are fixed.

Next, let us, get to know how assessment of nutrient intake is done based on the patient's state of health.

Energy Allowance: The patient's requirement for energy varies with the physical activity and physiological condition. For instance, consider a person confined to bed. He tends to consume less than the one undergoing physical exertion. An example of a physiological state that leads to an increase in caloric needs is fever. A diet high in calories is indicated for under nourished patients. They are advised to take more of energy-dense foods such as starchy foods, sweets, cereals, butter and oils. While a low-calorie diet is indicated for all obese patients. The patient is encouraged to eat small and frequent nutrient dense meals and to avoid calorie-dense foods. These consist of raw and cooked vegetables, fruits, egg, meat, fish, chicken and skimmed milk with a low intake of cereals. An individual's energy requirement can be determined calculating either:

- required number of Kcal/kg/day OR
- percentage increase over basal metabolic demands.

You can estimate the basal energy expenditure (BEE) from anthropometric data using the following Harris-Benedict formula:

$$\text{For men: BEE} = 66 + (13.7 \times W) + (5 \times H) - (6.8 \times A)$$

$$\text{For women: BEE} = 655 + (9.6 \times W) + (1.85 \times H) - (4.7 \times A)$$

where, W = kg body weight, H = height in cms and A = age in years.

An additional factor is added depending on the activity level of the patient. Another factor may also have to be added if the patient is under physiologic stress. You will learn more about this concept later in Unit 5 in this course.

Mild stress – 20% over BEE

Acute infections or burns – may require 100% over basal.

You should determine the actual energy requirements based on the assessment of the individual, his/her activity and his/her medical condition.

Carbohydrates: Carbohydrates provide bulk to the diet and along with fats, form the chief source of calories. The comparatively inexpensive form of carbohydrates in a high calorie diet can include chapaties, bread and biscuits. In a low-calorie diet these must be used sparingly.

Protein: Once the energy requirements have been estimated, protein requirements can be addressed. The aim is to achieve nitrogen balance. There are several factors influencing protein requirements and these include total energy intake, the metabolic state of the patient and protein losses. However, it is important to keep in mind that protein synthesis requires energy. The RDA for protein is 0.8 g to 1.0 g/kg body weight for adults. The actual minimum amount of protein needed to maintain nitrogen balance in healthy adults is 0.5g/kg. The requirement varies with specific disease states or protein needs related to specific conditions or illnesses. For instance, a larger amount of proteins may be needed during severe protein wasting, such as

enteropathy or extensive drainage from wounds and fistulas. Protein restriction may be needed in acute renal failure or hepatic insufficiency as you would read later in Unit 15 and 16.

Patients who require high protein diets are encouraged to drink 600-800 mL of milk a day. Now, you must be wondering how one can consume such a large portion of milk daily. Can you suggest a few ways by which the patients get the required amount of protein comfortably? Well, this can be done by a number of methods. Of these, one could be giving a different flavour to the milk by addition of coffee, ovaltine, chocolate or consuming milk as milk shakes, ice-creams, yoghurt. Another way could be consuming proteins from a different source such as egg, cheese, sausages etc.

Patients on protein-restricted or low protein diets include the ones with portal systemic encephalopathy, CRF etc. In such cases, the diet is based upon a daily allowance of protein foods with an emphasis on high class proteins. A few examples of low protein foods include beetroot, carrots, cabbage, mushrooms, tomatoes, turnips and most of the fruits.

Fats: As you are already aware, fats are reservoir of calories. In addition to carbohydrates, fats can also be an important source of needed calories. In certain therapeutic conditions, fat is necessary to prevent essential fatty acid deficiency. A high calorie diet should contain fatty foods (such as cream, butter, ghee and oil) while a low calorie diet contains a little or no fat.

Patients requiring low animal fat diets must restrict their total fat consumption to less than 30% of their energy needs and ideally $\frac{2}{3}$ rd of this must be in the form of polyunsaturated fatty acids (PUFA) and monosaturated fatty acids (MUFA). This can be achieved by avoiding foods that are rich in saturated fatty acids (SFAs) such as all fried meats and fish, whole milk, fried eggs, cream, cheese, and nuts (peanuts, coconut) chocolates, butter etc. While food products such as poultry, white fish, egg whites, cottage cheese, skimmed milk, wholemeal cereals, fruits and vegetables, wholemeal bread, meringues, plain biscuits and fatless sponge require no restriction.

Mineral and Vitamins: The requirements for vitamins such as ascorbic acid and B-complex vitamins and minerals such as zinc may need to be increased to promote wound healing. Also in cases of long-term nutrition support, a careful assessment of vitamin and mineral status is essential to prevent the development of deficit or toxicities. You should consider the following factors to determine an appropriate vitamin and mineral intake:

- i) the requirements for healthy individuals,
- ii) nature of disease and injury,
- iii) body stores of specific nutrients,
- iv) normal and abnormal losses through the skin, urine or intestinal tract, and
- v) drug – nutrient interactions.

Next, let us have a look at sodium and potassium.

Sodium (Na): In sodium-restricted diets (50 mmol Na), foods containing high Na content must be avoided and the examples include processed or cured meats, tinned or smoked fish, tinned vegetables and soups, dehydrated and pre-packed meals, salted biscuits, nuts and crisps. There are very low Na diets as well which contain 20 mmol Na. These are much less palatable since no added salt is used at the table or during cooking. Unsalted butter is used and milk is restricted to 250 mL. We will learn more about these diets later in Unit 11.

Potassium (K) : Potassium restricted diets are important for patients with advanced renal failure undergoing conservative treatment or haemodialysis. The high potassium foods such as wholegrain breakfast cereals, vegetables e.g. beetroot, beans, broccoli, leeks, mushrooms, spinach, tomatoes, dry and split peas, lentils, fruits e.g. prunes, dates, currants, grapefruit, oranges, banana etc. must be avoided. Vegetables should not be eaten raw rather they require leaching before consumption. The patients must also be aware of and warned against using salt substitutes as you will learn later in Unit 16, sub-section 16.11.3

Fluids : Fluid diets are given to patients with more advanced dysphagia or fractured jaws. The diet may include fruit juices, thin strained porridge with milk, egg in milk, strained soups, thin milk pudding, ice-cream or yoghurt. Also, whole protein polymeric liquid feeds can be given. Since such diets lack bulk and can cause colonic dysfunction, these are available with fibre supplements.

A normal healthy adult at rest needs 1800 to 2500 mL/ fluids day (or approximately 1mL/Kcal consumed). If sufficient water is not consumed, it can lead to constipation. Optimal convalescence requires adequate tissue hydration. The water intake must be liberal to ensure passage of light coloured urine. Additional fluids must be added to replace water lost by excessive perspiration, vomiting, diarrhoea, tube drainage or other conditions marked by increased water loss. If sufficient water is not obtained through fluid intake and food, it must be supplied parenterally, usually along with electrolytes. Fluid restriction is needed in cases when excretion is impaired as in acute nephritis and kidney failure. Fluid requirements per day are calculated as 500 ml a day to replace the insensible loss in perspiration and sweating plus the volume of urine passed during the previous 24 hours.

During certain clinical conditions such as renal failure when the fluid intake can be detrimental to the prognosis of the disease; the fluid allowance is calculated by using the formula:

$$\text{Fluid allowance} = \begin{array}{l} 500 \text{ ml} \\ (24 \text{ hrs.}) \end{array} + \begin{array}{l} \text{urine output in previous 24 hours} \\ (\text{insensible losses}) \end{array} + \begin{array}{l} \text{Fluid lost due to} \\ \text{diarrhoea/} \\ \text{vomiting} \\ (\text{if any}) \end{array}$$

High fibre diets: The patients are advised to eat high fibre cereals as whole grain flour and bread, whole grain breakfast cereals, whole wheat pasta and brown rice, all kinds of fruits and vegetables (with their-edible peels). Unprocessed bran can also be added to cereals or soups to give more fibre. Look up Unit 12 for more details on dietary fibres.

Gluten-free diet: It is a diet recommended for the patients with gluten enteropathy. Gluten is present in wheat, rye, barley and oats. Thus, foods containing these should not be eaten. A number of gluten free products are available on prescription and these include gluten-free flour, bread and biscuits. Unit 18 presents details on this.

Elimination diets: This type of diet is used in a patient with suspected food intolerance, food allergy or Crohn's disease. You will read about this subsequently in Unit 6.

Exclusion diets: Specific dietary exclusion becomes a necessity in case of food allergy or food intolerance. The therapeutic use of such diets requires a detailed discussion between the patient and the dietitian. Each patient is provided with a list of foods that are permissible and avoided. Also, the need of scrutinize the ingredient lists in all convenience and manufactured foods is emphasized. The examples of these diets include:

- **Wheat free diet :** Here, foods to be avoided are ordinary bread, biscuits, cakes, pastries, pasta and spaghetti and all wheat-containing breakfast cereals.
- **Milk free diet :** As the name implies, all foods containing milk protein must be avoided such as cheese, yoghurt, cream, ice-cream and butter.

- *Egg free diet:* In this, eggs and all products containing eggs are excluded from the diet such as beef burgers, pies, cakes, meringues as well Bournvita and ovaltine.
- *Additive free diets:* Additives here include permitted food colours such as tartrazine, sunset yellow, ponceus 4R and preservatives such as benzoic acid salicylates etc.
- *Ketogenic diet:* It is occasionally used to facilitate the control of epilepsy. Here, the patient is initially fasted for 48 hours and thereafter, half the energy requirement is provided as MCT (medium chain triglyceride) oil. Energy intake from ordinary food must be restricted to prevent the suppression of ketones. Unit 17 presents details on ketogenic diets.
- *Diabetic diets:* These are therapeutic modifications in the quantity/ quality of various macronutrients particularly carbohydrates. We will read more about this in unit 12.

The discussion so far is focussed on diet prescription and the factors which need to be considered while presenting diets. Next, we shall get to know about how to construct therapeutic diets.

2.6 CONSTRUCTING THERAPEUTIC DIETS

You could do this by either using qualitative methods or quantitative methods. At times a combination of both may also be required. What do we mean by these methods? How are these carried out? Let us read the following section and find out. We shall begin with the qualitative methods.

- a) *Qualitative Methods:* This is where you give the individual choices, clear guidelines, menu guidance and supporting information such as advice on suitable manufactured products. You should encourage the patient to understand the key relationship between a food and a diet. The value of a food depends on the amount of nutrient in the food and the frequency with which the food is consumed. The various qualitative methods include:
 - Guidelines issued for healthy eating
 - The Food Guide Pyramid
 - List of Desirable Food Choices, and
 - Elimination diets
- b) *Quantitative Methods:* These are often essential for constructing therapeutic diets. The two ways by which this could be done are as follows:
 - i) Using an exchange system which delivers a fixed amount of nutrient per food portion. An example of this is the carbohydrate exchange system used in planning diets for insulin dependent diabetics. The desired level of intake is specified and the diet is constructed from an exchange list.
 - ii) Quantifying the portion size of foods and the frequency of their consumption. This diet is constructed from normal sized portions of foods but those foods which have the highest content of a particular nutrient per portion are excluded from the diet. We learnt about this aspect earlier also, where we got to know about fat, Na and K restricted diets. We also had a look at the permitted and excluded food items based on their nutrient content.

Frequency of consumption of the various types of foods should also be considered. This method is used typically when a diet is a key component of a multifactorial condition e.g. coronary heart disease.

Check Your Progress Exercise 2

1. A male patient is admitted to the hospital whose weight is 70 kg, height 170 cms and age 60 years. Calculate his basal energy expenditure.
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2. Enlist any five therapeutic diets. What do you mean by exclusion diets?
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3. What are the different dietary adaptations that are made to meet the therapeutic needs?
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4. Discuss quantitative method used for constructing therapeutic diets.
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So you are clear about diet prescription and how to construct a therapeutic diet. Next, we shall learn about the routine hospital diets.

2.7 ROUTINE HOSPITAL DIETS

The most common diets that are prescribed or ordered in hospital situations are enumerated in this section and in Figure 2.1 Let us review them one by one.

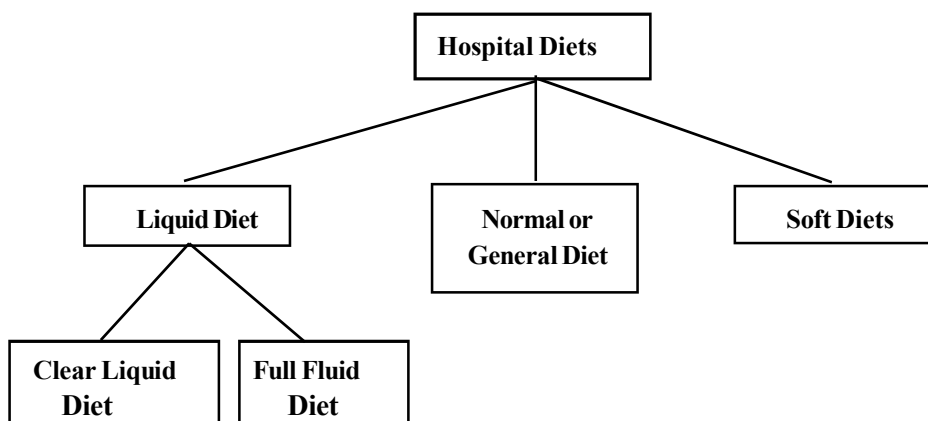


Figure 2.1: Routine hospital diets

2.7.1 Normal or General Diet

This diet is planned to be consistent with the Recommended Dietary Allowances (RDAs) of nutrients and is based on the food groups. It is usually based on cyclic menus planned according to the region, type of hospital and clientele. Nutritional adequacy depends on the patient's selection of food, as well as, the patient's intake of food. It is the responsibility of the clinical dietitian to monitor food selection and food intake to ensure adequate nutritional intake. The general diet is intended for the hospitalized patient whose medical condition does not warrant a therapeutic modification. A sample diet plan for your reference is given here in Table 2.1.

Table 2.1: A Day's Normal Diet for an Adult

Foods	Quantity (g)	Energy (g)	Protein (g)	Carbohydrates (g)	Fats
Cereals and cereal products	370	1386.62	37	277.5	9.25
Milk and milk products (3% fat)	300	174	9	14.4	9
Pulses and legumes	75	250	17.48	42.48	2.25
Roots and Tubers	200	100	3	20	0.6
Green Leafy vegetables	100	30	3	2.5	0.5
Other vegetables	200	60	4	7	0.6
Fruits	100	45	1	10	-
Fat	25	225	-	-	25
Sugar	20	80	-	20	-
Total		~2350	~75	~394	~47

Source: Dietary Guidelines for Indians, 2011, National Institute of Nutrition, Hyderabad, India

Approximate food value: Calories = 2350 Kcal; Carbohydrates= 394 g, Proteins= 75g, Fats= 47 g.

For Non vegetarians: 1 egg = ½ cup of milk; mutton/chicken 75 g = 1 bowl of pulse + a bowl of curd

This diet is used for all patients who do not require specific diet therapy.

2.7.2 Liquid Diets

A liquid diet is the one which consists of foods that can be served in liquid or strained form at room temperature. These are usually prescribed after certain kinds of surgery. The two major types of liquid diets include – Clear liquids and Full liquids.

Clear Liquid Diet: It is composed of foods with low residue content which help to minimize the load of food needing digestion in the intestines. The clear liquid diet provides foods and fluids that are clear and liquid at room temperature. The type of liquid provided may vary depending upon the clinical condition of the patient, the diagnostic test or procedure, or specific surgery a patient is undergoing. The purpose of the clear liquid diet is to provide fluids and electrolytes to prevent dehydration. The diet is inadequate in calories and in essential nutrients. The clear liquid diet should not be the sole source of nourishment for more than 1 to 3 days without protein, calorie, vitamin and mineral supplementation. The clear liquid diet leaves minimal residue in the gastrointestinal tract. It also minimizes stimulation of the gastrointestinal tract.

The diet is used as an initial feeding progression between intravenous feeding and a full liquid or solid diet that follows surgery. It could be used as a dietary preparation for

bowel examination or for surgery. It is also useful at times of acute disturbance of gastrointestinal function. It has application in many illnesses characterized by a high fever.

Recommended food items include:

- clear, fat free soups/broths
- light coffee, tea (without milk or cream)
- strained fruit juices
- tender coconut water, whey water, barley water
- gelatin, fruit ice, popsicle
- sugar and salt added to liquids
- carbonated beverages as tolerated
- commercial high protein high calorie supplements (to be dissolved in a beverage or water), and
- honey.
- ice
- do not use any other food

Small amounts of fluids are offered at frequent intervals (50-100 mL every hour or two). The nutrient composition of the clear liquid diet will vary depending upon the types and amount of liquids provided and consumed by the patient. Do not use any solid food.

Full Liquid Diet: This diet provides foods and fluids that are liquid or semiliquid at room temperature. The type of food provided may vary depending upon the clinical condition of the patient. It is used as a step between a clear liquid diet and a regular diet.

The purpose of the diet is to provide an oral source of fluids for individuals who are incapable of chewing, swallowing or digesting solid food. It is used as an intermediate progression to solid foods following surgery, in conjunction with parenteral nutrition or in the presence of chewing or swallowing disorders or certain procedures such as jaw wiring. It is also used in the presence of oesophageal or gastrointestinal strictures, during moderate gastrointestinal inflammations and for acutely ill patients. Do not use any solid food.

Recommended food items include:

- soups and broths
- cereal porridges (refined cereals)
- milk and milk beverages, yoghurt
- coffee, tea, fruit juices, carbonated beverages
- butter, cream and oil added to foods
- plain puddings, custard, ice-cream, jelly, and
- sugar, honey, salt and mild flavourings.

The nutrient composition of the diet will depend upon the type(s) and amount(s) of liquids the patient can consume. The diet is low in iron, vitamin B₁₂, vitamin A and thiamine. By careful planning the diet can be made adequate for maintenance requirements, except for fibre. Liquid nutritional supplements or blenderized foods could be added to improve nutritional adequacy. The feeds are usually given at 2-4 hour intervals. Because this diet generally is inadequate in fibre, constipation may result from prolonged use. If it has to be used for long periods, vitamins, iron or liquid nutritional supplements must be added.

2.7.3 Soft Diets

The soft diet provides soft whole food that is lightly seasoned and moderately low in fibre. The foods have a soft texture and are easy to digest. Small volume meals are offered until the patient's tolerance to solid food is established.

The soft diet provides a transition between a liquid and a normal diet. It may be ordered for post operative cases, for patients with acute infections, gastrointestinal conditions or chewing problems. The soft diet should be individualized according to the clinical diagnosis, surgery, the patient's appetite, food tolerances, previous nutritional status, and chewing and swallowing ability.

The soft diet can be nutritionally adequate provided the patient is able to consume adequate amounts of food. Supplements or between meal feedings could be used to increase nutrient intake.

Foods allowed in soft diet include:

Soups	–	mildly flavoured – broths and cream soups.
Beverages	–	all
Meat	–	moist, tender meat, fish or chicken, cottage cheese, eggs (except fried)
Fat	–	butter, cream, oil, salad dressing.
Milk	–	milk, milk beverages, yoghurt
Cereals	–	soft cooked refined cereals – rice, pasta, bread, porridges.
Vegetables	–	soft, cooked vegetables.
Fruits	–	cooked and soft fruits, fruit juices
Desserts	–	custard, ice-cream, jelly, cake (sponge), puddings without nuts
Sweets	–	sugar, honey, plain candies

Foods to avoid include:

- fried foods and nuts,
- rich pastries and desserts,
- raw vegetables,
- heavily spiced foods,
- gas-forming vegetables,
- skin and seeds of vegetables and fruits.

Avoid rich gravies, sauces, pickles, fried foods, rich cakes and nuts.

The *mechanical soft* diet is a normal diet that is modified only in texture for ease of mastication. This is used when a patient cannot chew or use the facial muscles, for a variety of dental, medical or surgical conditions. The foods in the diet may be liquid, chopped, pureed or regular foods with a very soft consistency. Having reviewed the various hospital diets, we shall finally look at the different modes of feeding used for therapeutic purpose.

2.8 MODE OF FEEDING

As a clinical dietitian you may also have to decide the method of feeding to be adopted. The method used will depend upon the patient's condition. The diet of an individual could be managed by using oral, tube, peripheral vein or total parenteral feeding. Sometimes, the patient may require assistance in feeding. The dietitian should understand the limitations of the patients and enlist the help of the nurse or patient's

relative. The challenge is to be innovative and responsive. It is the clinical dietitian's responsibility to provide a combination of emotional support and technical nutrition advice on how to best achieve each patient's goals. Individuals who are hospitalized are sick and often have to be motivated or encouraged to eat. The food should be hygienically and attractively served. The food should be at the proper temperature and served in portions appropriate for the patient. The server should be pleasant. A correctly planned diet is successful only if it is eaten. There should also be effective communication between the physician, dietitian and nurse.

The different feeding methods include:

2.8.1 Oral Feeding

This is the preferred and most palatable method of feeding for meeting the increased nutritional demands of catabolism, it should be used as long as possible. If needed, nutrient supplements could be added to the oral diets.

2.8.2 Tube or Enteral Feeding

Ideally the patient must be fed orally, but in cases where the patient is unable to take solid foods, a part or all of intake is usually given by the tube. These are the cases where the gastrointestinal tract is functioning and can be used. Here, an alternate form of enteral feeding by tube provides nutritional support. Enteral nutrition can be provided by supplying intact, semi or completely hydrolyzed formulas through nasogastric/ duodenal/ jejunal routes or by the help of gastrostomies/ jejunostomies. These conditions include oral surgery, gastroeintestinal surgery, dysphagia, unconsciousness, anorexia or oesophageal obstruction. Various commercial formulas are available for enteral tube feeding. Special formulas can also be calculated and blends prepared but these have a greater risk of contamination. We will learn in detail about enteral feeding later in Unit 4.

2.8.3 Peripheral Vein Feeding

Intravenous feeding is a method of providing parenteral nutrition when a patient cannot take in food or formula through the gastrointestinal tract. Various solutions of dextrose, aminoacids, vitamins, minerals and lipids can be fed through peripheral veins. But in this method the nutrient and kilocalorie intake is limited. It is used only when the nutritional need is not extensive or long term, where it is provided peripherally as a mixture of 5-10% glucose, a 3.5-5% amino acid solution and 10-20% lipid emulsion. The total fat intake should not exceed 2.5 g/kg/day. Vitamins, minerals and electrolytes are added as necessary, based on requirements and intake. The osmolarity of the solution should not be greater than 600 mOsm/L. What do you understand by this? Well, it simply means that large amounts of solution are needed to meet nutritional requirements. It is also used as a supplement to oral feeding in patients who cannot meet nutritional requirements completely by the oral or enteral route.

2.8.4 Total Parenteral Nutrition (TPN)

It is a method of providing, complete nutritional support in which the gastrointestinal (GI) tract is bypassed by introducing assimilable nutrients into a central vein. This is done in cases where a patient's nutritional need is great and assisted feeding is required for a longer time. You might wonder why specifically a central vein (mostly superior vena cava) is used. Well, this is because it is the central vein which can tolerate a hyperosmolar solution and hence nutritional support can be provided in a form that will meet all nutritional needs. Total Parenteral Nutrition (TPN) is a special surgical procedure in which special nutrient solutions are administered by a nutrition support team which includes the physician, dietitian, pharmacist and nurse. The patient needs special care and support. We shall learn more about parenteral and enteral nutrition later in Unit 4 of this course. Let us now attempt the check your progress exercise mentioned below.

Check Your Progress Exercise 3

1. State whether the following statements are True or False:
 - a) A full liquid diet will not meet the normal nutritional requirements of an adult.
 - b) TPN is the preferred mode of feeding for a sick individual whose GI tract is functioning.
 - c) The normal diet of an individual is the basis for planning his therapeutic diet.
 - d) Cream of tomato soup is a good item to include in a clear fluid diet.
 - e) In times of physiologic stress the energy requirement of an individual is increased.
2. How is a clear liquid diet different from a full liquid diet?
.....
.....
.....
3. What is a mechanical soft diet? List any five foods to be avoided in a soft diet.
.....
.....
.....
4. What are the various modes of feeding a patient? Which one of these is most preferred?
.....
.....
.....

2.9 LET US SUM UP

Therapeutic nutrition refers to the role of food and nutrition in the treatment of various diseases and disorders. In this unit, we learnt what are therapeutic diets, and the different types of dietary modification done in a normal diet to meet the therapeutic needs of a patient. We also learned that all therapeutic diets are modifications of the normal diet.

Then we discussed the purposes for dietary modifications and the various types of therapeutic adaptations possible. These included liquid diets, soft diets and various modes of feeding such as oral feeding, tube feeding, peripheral vein feeding and total parenteral nutrition. Nutritional support is an integral part of medical therapy. As a clinical dietitian accurate perception and sensitivity is essential to translate nutrition knowledge into a language appropriate for the individual client's need. Adequate knowledge, skills and proper attitudes are required to achieve or maintain optimal nutrition status.

2.10 GLOSSARY

- Acute Renal failure** : renal failure associated with burns or other trauma or with acute infection or obstruction of the urinary tract.
- Angio-edema** : swelling of the mucous membranes, tissues beneath the skin or an internal organ due to an allergic reaction.

Crohn's disease	:	a chronic, recurrent disease characterized by patchy inflammation of any portion of digestive tract from the mouth to anus.
Portal Systemic Encephalopathy	:	a syndrome associated with advanced liver disease.
Fistulas	:	an abnormal opening between an internal cavity and another cavity or the surface.
Haemodialysis	:	removal of chemical waste from the blood using blood flow through an artificial kidney.
Urticaria	:	a skin condition characterized by the development of itchy, raised white lumps surrounded by an area of red inflammation.
Osmolarity	:	The osmotic concentration of a solution expressed as osmoles of solute per unit of solution.

2.11 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- Therapeutic diet is the adaptations of the normal or regular diet. (quantity/quality to meet the altered nutritional requirements of a patient). The diet may be modified for one or more of the following reasons as enumerated in section 2.2. Read the section and write the answer.
- Several forms of dietary adaptations can be made to meet the changing therapeutic needs of a patient. The modifications can be both quantitative and/or qualitative.
Quantitative adaptations such as: sodium restricted diet (hypertension), high energy high protein diet (nephrotic-syndrome, weight gain, PEM), protein restricted weight reduction diet (Gout).
Qualitative adaptations such as: changes in consistency i.e. soft, semi-soft, full fluid, clear fluid, oral/ tube feeds and modifications in meal frequency to suit the altered structure/functional capacity of an organ/gland.
- Health promotive/ effective therapeutic diets are generally prepared by keeping the recommended dietary intake as the base. The amount of nutrients recommended for a healthy human being can be used as standards/ benchmarks, above or below which the dietary intake of a patient can be computed. Adhering to the principles of normal nutrition can help in preventing the development of toxicity or deficiency during the treatment of excess/deficiency of a nutritional/ metabolic disorder.

Check Your Progress Exercise 2

- $$\begin{aligned} \text{BEE} &= 66 + (13.7 \times W) + (5 \times H) - (6.8 \times A) \\ &= 66 + (13.7 \times 70) + (5 \times 170) - (6.8 \times 60) \\ &= 66 + 959 + 850 - 408 \\ &= 1467 \text{ Kilo calories.} \end{aligned}$$
- Any five of the following: Na-restricted diet, K-restricted diet, high fibre diet, gluten-free diet, elimination diet, exclusion diet, wheat free, milk free, egg free, additive free, ketogenic, diabetic. An exclusion diet refers to the dietary management requiring restrictions/omissions in the intake of certain nutrients food's.
- The different dietary adaptations that are made to meet the therapeutic needs include changes in energy requirement, carbohydrates, protein, fat, mineral, fluid, fibre intake etc. Look up section 2.5 for greater details.

4. Quantitative methods are often essential for constructing therapeutic diets. This could be done by using an exchange system which delivers a fixed amount of nutrient per food portion and quantifying the portion size of foods and the frequency of their consumption.

Check Your Progress Exercise 3

1.
 - a) True
 - b) False
 - c) True
 - d) False
 - e) True

2. The purpose of the clear liquid diet is to provide fluids and electrolytes to prevent dehydration. The diet is inadequate in calories and in essential nutrients.

The purpose of the full liquid diet is to provide an oral source of fluids for individuals who are incapable of chewing, swallowing or digesting solid food. Full fluids can provide good amount of energy, macro and micro-nutrients. Unlike clear fluids; full fluids contain good amount of residue and fibre.

3. The mechanical soft or a mechanically bland diet is a normal diet that is modified only in texture for ease of mastication. This is used when a patient cannot chew or use the facial muscles, for a variety of dental, medical or surgical conditions.

The foods to be avoided include fried foods and nuts, rich pastries and desserts, raw vegetables, heavily spiced foods, gas-forming vegetables, and skin and seeds of vegetables and fruits, bran and husk of whole cereals/pulses.

4. Oral tube, peripheral vein and TPN are the modes of feeding a patient. Oral feeding is most preferred.