Chapter 1

Therapeutic Modification of the Normal Diet–Their Uses in Dietary Treatment

The normal diet may be modified:
- to provide change in consistency as in fluid and soft diets.
- to increase or decrease the energy values–reducing diets.
- to include greater or lesser amounts of one or more nutrients–high protein and low fibre diets.
- to increase or decrease bulk–high and low fibre diets.
- to provide foods bland in flavour.
- to include or exclude specific foods as in allergic conditions.
- to modify the intervals of feeding.

1.1 MODIFICATION IN CONSISTENCY
These diets are used in the treatment of gastrointestinal tract. They can be from a very low residue diet to a very high fibre diet. Method of feeding is by mouth, unless otherwise indicated.

DIETS WITHOUT SOLIDS
Liquid Diets
Liquid diets consist of a variety of foods that are liquid or liquify at room temperature. These diets are used in:
- Febrile states
- Post operative conditions
- Wherever the patient is unable to tolerate solid food.

Liquid diets are of two types namely
- Clear fluid diet
- Full fluid diet

Clear Fluid Diet
This diet is indicated in:
- Acute illness
- Surgery
- Gastrointestinal disturbances.
A clear fluid diet is usually used for 1 or 2 days. After that a more liberal liquid diet is given. The amount per feeding is 30 – 60 ml/hour. As the patients tolerance improves, the amounts can be increased.

**Foods Permitted**
- Tea with lemon and sugar
- Coffee
- Fat free broths.
- Carbonated beverages
- Cereal waters.

**Full Fluid Diet**
This diet is indicated when a patient is:
- Acutely ill.
- Unable to chew or swallow solid food.
- This diet includes all foods which are liquid at room temperature.
- It is free from cellulose and irritating condiments.
- Iron is provided at inadequate levels.
- Six or more feedings can be given daily.
- The protein content of the diet can be increased by incorporating whole egg, egg white, nonfat dry milk in beverages and soups.
- The calorie value of the diet can be increased by adding butter to cereal gruels and soups, glucose in beverages and using ice creams, dessert.
- If decreased volume of fluid is desired, non fat dry milk can be substituted for the part of the fluid milk.

**Foods Allowed**
- Beverages — Cocoa, coffee or tea.
- Cereal — Fine or strained gruels.
- Dessert — Soft custard, gelatin.
- Eggs — Raw in broth with fruit juices or milk.
- Fruit — All strained juices.
- Meat — Strained in soups.
- Vegetables — Puree, soups.
- Miscellaneous — Butter, cocoa, sugar, salt.

**Commercial Liquid Formulas**
These are used to supplement other external diets.
These formulas vary in composition and source of nutrients.
Most of the formulas are milk based.
For persons who cannot tolerate milk, protein source is meat, soy or casein hydrolysate.
Fat and carbohydrate composition and proportions also vary to accommodate persons with different needs and restriction.

**Criteria for Selection of Appropriate Formulae**
- The protein sources
- The composition and proportion of fats and carbohydrates
- The osmolality
- The palatability
- The cost.
DIETS WITH SOLIDS

Soft and Low Fibre Diets

Soft diet is between liquid diet and normal diet. Soft diet includes both liquid and solid foods which contain restricted amount of indigestible carbohydrates and no tough connective tissue. The diet can be made mechanically soft by cooking, mashing, pureeing the foods used in a normal diet. Further reduction in indigestible carbohydrate can be achieved by the use of refined breads, cereals immature vegetables and fruits.

The skin and seeds of fruits have to be removed.

Soft fruits like banana can be used as it is.

Tough connective tissue can be reduced, by selecting tender meat and cooking very soft.

Meat and meat broths have to be restricted because the nonprotein nitrogen products such as creatine, creatinine, purines and other products which are present in muscle tissue is extracted into the gravy which stimulates gastric juice.

Strong flavoured vegetables such as onions, radish, dried beans, cabbage, cauliflower have to be omitted if necessary.

With proper cooking (Short cooking time, vessel uncovered, serving immediately) it is desirable to eliminate those vegetables which the individual patient cannot tolerate.

It is not necessary to eliminate all spices, only gastric irritants like black pepper, chilli pepper, cloves etc., can be eliminated.

This diet is nutritionally adequate.

It is soft in texture and bland in flavour.

Low Residue Diets

The diet is made up of foods which can be completely absorbed, thereby leaving little or no residue for formation of faeces. This diet provides insufficient minerals and vitamins.

It must be supplemented.

Foods high in fibre should be omitted.

Food which contain residue but not fibre such as milk are also omitted or restricted.

Two cups of milk may be permitted per day. Strained fruits and vegetables without skins are usually permitted.

Meat should be tender or ground to reduce connective tissue.

The Diet is Usually Used in

- Severe diarrhoea to afford rest to the gastrointestinal tract.
- Acute phases of diverticulitis.
- Ulcerative colitis in initial stages.
- Operations.
- Partial intestinal obstruction.
- Whenever necessary to reduce bulk in the gastrointestinal tract.

High Fibre Diets

Dietary fibre plays a significant role in colonic function.

High fibre diet is mainly used for atomic constipation and diverticulosis.

This is a normal diet with fibre increased to 15–20 gms daily.

Fluid intake is also increased.

Concentrated foods should be replaced by those of greater bulk.
Foods which can be included in the diet are plenty of long fibered vegetables, salads, fruits and whole cereal grains.
Highly refined and concentrated foods, excessive amounts of rough brans and excessive seasoning should be avoided.
Intervals of feeding should be three meals daily.

### Table 1.1: Foods Allowed and Avoided in Low Residue Diet

<table>
<thead>
<tr>
<th>Foods allowed</th>
<th>Foods avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beverages</strong></td>
<td>Milk or curds in excess of two cups.</td>
</tr>
<tr>
<td>Coffee, tea, fruit and vegetable juices, carbonated beverages, milk (2 cups/day) curds.</td>
<td>Whole grain bread or cereals, brown or white rice.</td>
</tr>
<tr>
<td><strong>Cereals</strong></td>
<td></td>
</tr>
<tr>
<td>Refined wheat bread, refined cereals and millets, dry cereals that are not whole grain, spaghetti, macaroni, noodles, rice.</td>
<td>All deserts containing coconut, nuts, seeds, fruits, jams, preserves, milk sweets.</td>
</tr>
<tr>
<td><strong>Desserts</strong></td>
<td></td>
</tr>
<tr>
<td>Simple pudding made from milk allowance, plain ice cream, plain gelatin deserts, plain cakes, cookies and pies and sweets made from allowed foods.</td>
<td>Fried foods, high fat gravy, spicy salad dressings.</td>
</tr>
<tr>
<td><strong>Fats</strong></td>
<td></td>
</tr>
<tr>
<td>Cooking oils, butter, cream, mayonnaise.</td>
<td>All others fruits with seeds and skins.</td>
</tr>
<tr>
<td><strong>Fruits</strong></td>
<td></td>
</tr>
<tr>
<td>Fruit juices, peeled apricots, cherries, baked apple, ripe banana, orange and citrus fruits without membrane.</td>
<td>Fried and highly seasoned, smoked or pickled meat, fish or poultry.</td>
</tr>
<tr>
<td><strong>Meat/Meat Substitutes</strong></td>
<td></td>
</tr>
<tr>
<td>Tender chicken, fish, lamb, liver pork, eggs, cottage cheese.</td>
<td>Soups made with vegetables not allowed.</td>
</tr>
<tr>
<td><strong>Soups</strong></td>
<td></td>
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<tr>
<td>Plain cream soup made from milk allowance, clear broth, noodles or rice.</td>
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</tbody>
</table>

### 1.2 Modification in Nutrients

**High Calorie Diets**

These diets are prescribed for
- Weight loss
- Fever
- Hyperthyroidism
- Burns.

This is a normal diet with an increase in the calorie level to 3000 or more. If appetite is poor, small servings of highly reinforced foods are given.
The diet may be modified in consistency and flavour, according to specific needs. Excessive amounts of bulky low calorie foods, fried foods or others which may interfere with appetite should be avoided.

**Low Calorie Diet**

These diets are prescribed for weight reduction in

- Diabetes Mellitus
- Cardiovascular diseases
- Hypertension
- Gout
- Gall bladder disease
- Preceding surgery.

This is a normal diet with energy values reduced to 1500, 1200 or 1000 calories. Protein levels should be at 65 to 100 gms. Supplements of Vitamin A and thiamine are usually required for diets below 1000 calories.

**High Protein Diet**

High protein diet of 100 – 125 g per day may be prescribed for a variety of conditions like

- Fever
- Hyper thyroidism
- Burns
- Nephrotic syndromes
- Haemorrhage
- After surgery
- Diarrhoea
- Ulcerative colitis
- Sprue
- Celiac disease
- Cystic fibrosis
- Infective hepatitis
- Elderly
- Alcoholics.

**Low Protein Diet**

Low protein diets are usually prescribed for conditions like

- Hepatic encephalopathy
- Acute and chronic glomerulonephrites
- Nephrosclerosis
- Acute and chronic renal failure
- In-born errors of metabolism.

In severe liver disorders, protein cannot be used for synthesis, the amino acids are catabolised and excess ammonia cannot be converted to urea for excretion and the patient develops hepatic coma. In this situation protein levels must be decreased or completely restricted for a few days. Patients with Kidney diseases such as acute and chronic glomerulonepritis, neprosclerosis, acute and chronic renal failure require low protein diets since the kidney cannot excrete nitrogenous wastes. Diets containing 18 to 22 gms of high biological value protein may be needed for the chronic uremic patients who is not being dialysed.
Low protein diets are also prescribed for patients with in-born errors of metabolism that result from lack of enzymes of the urea cycle.
In celiac disease, the protein gluten in wheat and rye brings out a metabolic defect in the intestinal mucosal cells.
The protein gluten is composed of two fractions glutenin and gliadin.
The latter protein causes the difficulty.
Treatment involves the removal of this protein from the diet. (Gliadin free diet).
The amino acid composition of the diet may need to be modified in cases of an inborn error of metabolism in which the amino acid content cannot be metabolized normally and as a result other metabolites are accumulated which are toxic.
In such cases, the amino acid from the diet is either decreased or completely eliminated.

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Metabolic Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenylalanine</td>
<td>Phenylketonuria</td>
</tr>
<tr>
<td>Methionine</td>
<td>Homocystinuria</td>
</tr>
<tr>
<td>Valine</td>
<td>Hypervalinemia</td>
</tr>
</tbody>
</table>

The treatment of maple syrup urine disease is difficult since the amount of three essential amino acids must be regulated namely valine, leucine and isoleucine.

Protein free diet
Is also recommended in cases like hepatic come, acute aneuria.

Fat Controlled Diet
Since steatorrhoea occurs in gall bladder diseases and malabsorption syndrome the amount of fat is restricted.
Usually fat controlled diets are prescribed for—
- Gall bladder diseases
- Nontropical sprue
- Celiac disease
- Cystic fibrosis
- Atherosclerosis
- Myocardial infarction
- Hyperlipidemisa etc.
Fat controlled diets regulate the amount and type of fat allowed.
The calories from fat should provide about 30% and 35% of the total calories with 10% from saturated fat and 12 – 14% from poly-unsaturated fats.
Even the intake of cholesterol also is reduced from the average daily intake of 600 to 300 mg.
Medium chain triglycerides are useful for individuals with those disorders that result in impairment of fat digestion or absorption.
Medium chain triglycerides do not require bile salts or miscelle formation for absorption.

Low Sodium Diet
The mineral content of the diet may also be modified.
Four levels of sodium restriction are most often used — 250, 500, 1000 and 2400 – 4500 mgs.
The first diet is a severe restriction that excludes salty foods and salt in cooking and at the table.
This diet is used both to prevent and treat edema.
Therefore, it is prescribed for congestive heart failure, hypertension, toxemia of pregnancy, liver and renal diseases.
Some renal patients may not be able to regulate sodium excretion and become hyponatremic.
Then sodium must be added back by means of the diet. In renal patients with chronic uremia it may be necessary to also restrict potassium and phosphorous.

Guidelines for reduction of phosphorous:
- Omit milk, yoghurt and ice cream. Use non dairy cream substitutes.
- Use meat poultry and fish only in amounts compatible, with high biological value protein intake.
- Exclude dried beans and peas.
- Omit cola beverages.
- Following above guidelines diets will contain about 15 mg phosphorous per 1 g protein. For example a 50 g protein diet will contain about 750 mg phosphorous.

**Food High in Phosphorus**
Cheese (Processed, Cheddar) liver, fish, egg, milk and milk products, whole grain cereals, lima beans, mushrooms, peas (cooked) etc.

**Food Allergies and Food Intolerances**
Specific foods may cause an immunologically mediated response in certain individuals. Those foods which cause a known reaction are eliminated from the diet. Common offenders are milk, egg, wheat, chocolate and many other foods. Diagnoses of foods to which the individual has an allergic response can be accomplished through diaries, use of elimination diets, use of skin tests and use of laboratory tests.
Foods intolerance result in symptoms associated with the intake of that food but are not immunological responses.
A common example of food intolerance would be lactose intolerance. Food with milk are eliminated from the diets.
Lactose deficient subjects can tolerate lactose predigested milk products.
Modification in nutritional requirements in therapeutics do not occur in isolation. In some disorders, based on the patients condition many nutrient modifications need to be done. Dietitian has an important role in translating these diet prescription to meet the nutritional needs of the patients.

**Table 1.2: Foods Allowed and Avoided in Fat Restricted Diet**

<table>
<thead>
<tr>
<th>Foods allowed</th>
<th>Foods avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beverages</strong></td>
<td>Whole milk, beverage with cream or ice cream.</td>
</tr>
<tr>
<td>Skim milk, coffee, tea, fruit juices.</td>
<td></td>
</tr>
<tr>
<td><strong>Cereals</strong></td>
<td></td>
</tr>
<tr>
<td>All cooked cereals without bran, macaroni, noodles, spaghetti.</td>
<td></td>
</tr>
<tr>
<td><strong>Breads</strong></td>
<td></td>
</tr>
<tr>
<td>All kinds except those with added fat.</td>
<td></td>
</tr>
<tr>
<td><strong>Desserts</strong></td>
<td></td>
</tr>
<tr>
<td>Fruit pudding, gelatin, cereal puddings using part of milk allowance.</td>
<td></td>
</tr>
<tr>
<td><strong>Eggs</strong> - 3 per week</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contd...
### Foods allowed

<table>
<thead>
<tr>
<th>Fat</th>
<th>Vegetable oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meats</td>
<td>Boiled, baked, roasted or stewed without fat, lean chicken, lamb, fish.</td>
</tr>
<tr>
<td>Seasonings</td>
<td>In moderation — Salt, pepper, spices, herbs, flavouring extracts.</td>
</tr>
<tr>
<td>Soups</td>
<td>— Clear</td>
</tr>
<tr>
<td>Sweets</td>
<td>Jam, jelly, marmalade sugars, sweets, with limited fat.</td>
</tr>
<tr>
<td>Vegetables</td>
<td>— All kinds</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Cooking fats, cream, salad dressing.</td>
</tr>
</tbody>
</table>

### Foods avoided

- Cooking fats, cream, salad dressing.
- Fatty meats, poultry or fish bacon, duck, goose, fish canned in oil, organ meats, smoked or spiced meats.
- Sometimes not tolerated — Pepper, meta sauced, excessive spices, vinegar.
- Cream soups.
- Sweets with excessive fat, nuts and chocolate.
- Strongly flavoured vegetables — Cabbage, cauliflower, cucumber, onion, radish, beans, dried cooked peas.
- Fried foods, gravies, nuts, butter, pickles, relishes, popcorn.

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**Table 1.3: Foods Avoided and Recommended on a Low Salt Diet**

<table>
<thead>
<tr>
<th>Foods allowed</th>
<th>Foods avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cereals</strong></td>
<td>Breads, crackers with salted tops, salted snack foods.</td>
</tr>
<tr>
<td>Salt free bread, rice, wheat, millets, biscuits, muffins</td>
<td>Smoked, salted pickled meat, fish, poultry, beef etc.</td>
</tr>
<tr>
<td><strong>Meat/Meat substitutes</strong></td>
<td>Butter milk, instant cocoa mixes.</td>
</tr>
<tr>
<td>Fresh or frozen lamb, liver, pork, chicken, fresh fish, salt free cheddar cheese, cottage cheese and peanut butter, egg.</td>
<td>Softened water.</td>
</tr>
<tr>
<td><strong>Milk</strong></td>
<td>Meat extractives, highly salted salad dressings.</td>
</tr>
<tr>
<td>Skim milk, milk.</td>
<td>Brine cured vegetables, tomato pastes, sauces, purees, commercially canned vegetables, frozen peas, carrots frozen, lima beans.</td>
</tr>
<tr>
<td><strong>Beverages</strong></td>
<td>Fruits with sodium preservative, dried figs and raisins.</td>
</tr>
<tr>
<td>Tea, coffee, carbonated beverages, wine, beer.</td>
<td><strong>Fats</strong></td>
</tr>
<tr>
<td><strong>Vegetables</strong></td>
<td><strong>Fruits</strong></td>
</tr>
<tr>
<td>Green beans, cabbage, cucumber, mushrooms, onions, peas, potato, pumpkin, radish, tomato</td>
<td><strong>Deserts</strong></td>
</tr>
<tr>
<td><strong>Beverages</strong></td>
<td>Butter milk, instant cocoa mixes.</td>
</tr>
<tr>
<td>Tea, coffee, carbonated beverages, wine, beer.</td>
<td><strong>Fats</strong></td>
</tr>
<tr>
<td><strong>Vegetables</strong></td>
<td><strong>Fruits</strong></td>
</tr>
<tr>
<td>Green beans, cabbage, cucumber, mushrooms, onions, peas, potato, pumpkin, radish, tomato</td>
<td><strong>Deserts</strong></td>
</tr>
</tbody>
</table>
**PRACTICAL ASSIGNMENT**

**AIM**: To discuss the characteristics of the following modified diets and also to highlight on which disease conditions they can be used.

Table 1.4: Modified Diets and their Uses

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Type of diet</th>
<th>Characteristics of the diet</th>
<th>Indications for use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Potassium restricted diet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Acid ash diet</td>
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<tr>
<td>3.</td>
<td>Alkaline ash diet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>High protein, high calorie diet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Low protein, low sodium diet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Low purine diet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. List 6 recipes suitable for the following modified diets.

   I. Clear liquid diet

   II. Semi solid diet

   III. Bland diet

   IV. Low residue diet

   V. Low calorie diet