B.Sc. NUTRITION LAB MANUAL

3rd Semester

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Nutrition

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Diet therapy

Diet therapy is a broad term for the practical application of nutrition as a preventive or corrective treatment of disease that usually involves the modification of an existing dietary lifestyle to promote optimum health. However, in some cases an alternative dietary lifestyle plan may be develop for the purpose of eliminating certain foods in order to reclaim health. For example the latter kind of diet therapy is often recommended for those who suffer from allergies including those that are not food related. Elimination diet therapy is often found to be helpful in improving systems associated with attention deficit disorder and hyperactivity in children.

There is also a number of diet therapy models that are intended to target or promote greater resistance to specific conditions. Often these diets ate named after a particular region or culture that regularly consume certain kinds of foods and are relatively free of certain diseases.

Principle of diet therapy

Following principle are important in diet therapy:-

- It is essential to determine the die in accordance to disease otherwise it may have adverse effects e.g.- low carbohydrate diet in diabetes air fibrous food in case of constipation.
- The diet should be planed after determining the duration the disease weather it is long or short duration. In long duration diseases that theft planning should not be always same. Mackie changes from time to time is very important.
- The amount and type of food should be charged after analyzing the modification required in food products.
- The food habits, liking and disliking, meal timings, economic conditions, availability of food etc. should be obtained and diet should be planed.
- Diet should take care the psychological factors of the patients.

Objectives of diet therapy

Objective of diet therapy are as follows

- To increase or decrease the body weight
- To rest a particular organ
- To adjust the diet to the body's ability's to use certain foods
- To produce a specific effect as remedy (e.g.- regulation of blood sugar in diabetes)
- To overcome deficiencies by the addition of foods rich in some necessary element (e.g.- supplementing the diet with iron in treating macrocytic anemia).
- To provide case of digestion by omitting irritating substances such as fibre, spices or high fat foods.

Advantage of diet therapy

- With this type of weight management programme the user may be able to remedy more severe medical condition
- The diet therapy approach is geared towards each individual separately, which can be helpful when it comes to body type and eating.
- A professional will likely be consulted with diet therapy.

Disadvantage of diet therapy

- A programme such as diet therapy may be more involved than some people care to deal with (required more time and effort).
- When choosing something like professional diet therapy, there is likely to be a greater expense than with more convenient supplements that's can be purchased online.
- There are plenty of over the counter diet pills and supplements that are more convenient than this approach.
- A meal plan and exercise regimen will likely have to be designed for this type of weight management.

Planning and preparation of normal diet

Introduction:

A regular hospital diet is a meal plan that includes a variety of foods from all the food groups listed below. A healthy meal plan is low in unhealthy facts. Salt and sugar added. Follow this meal plan it we do not have any health problems that require a special diet.

Guideline for regular hospital diet

1. Choose and prepare foods and drinks with less salt and added sugars. Use the nutrition information on food level to help you make healthy choices. The percent of daily value listed on the food level tells you weather a food is low or high in certain nutrients. A percent daily value of 20% of more means that the food is high in a nutrient.
2. Get 2 hours and 30 minutes or more of physical activity that each week. Such as brisk walking get 1 hour and 15 minute of physical activity each effort such as running speed physical activity throughout the week. Talk to your care given about the best exercise plan to you.

   Some example of hospital diets are given free diet, dairy free diet, sugar constituent, vegetarian diet, wheat free diet, low fat diet, low sodium diet.

Personal data

Name -

Age –

Sex -

Body weight -

Body height -

BMI -

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type -

Nutritional Requirement

Energy requirement:

EER=TEE

For male:

662-9.53×Age (yr) + P.A× [15.91×Body weight(kg) + 539.6 × Body height(m)]

For female:

Macronutrient and Micronutrient (according to RDA-2010)

Nutrient analysis of consumed food stuff

Balance sheet

Menu planning

Interpretation

Planning and Preparation of Clear fluid diet

Introduction:

Clear fluid die which are liquid upon reaching the stomach provide calorie and electrolyte and fluid without stimulating extensive digestive process, prevent dehydration and reduced caloric residue to a minimum. This diet is very low in calorie and will result in muscle wasting. If continue in definitely. This diet may provide nutrient below the RDA requirements. It should not be continue for more than 24 - 48 hours.

Planning of clear fluid diet:

I. Clear fluid diet is made up of clear liquids that leave more residue and non-gas forming, non-irritating and non- stimulating to peristaltic action.
II. The amount of fluid is usually restricted to 30 – 60 ml/hour at first with gradually increasing amounts being given as the patients tolerance improves.
III. In acute illness nausea, vomiting, in acute inflammatory condition of G.I tract, anorexia, diarrhea and many other cases clear fluid diet suggested.
IV. In average clear fluid diet contains 400 – 500 kcal/day.

Content of clear fluid diet

Type of food	Food allowed
Cereals	Barley water
Pulses	Dhal water
Vegetable and fruits	Clear strained fruit juice
Milk	Whey water
Fats and oils	-----
Meat and fish	-----
Egg	Egg white well beaten in fruit juice
Sugar and jaggaery	Sugar and glucose
Nuts and oil seeds	None
Beverages	Tea, coffee(without milk), coconut water
Soups	Fat free broth
Desorts	Plain gelatin

Personal Data

Name -

Age –

Sex -

Body weight -

Body height -

BMI –

BMR –

BSA -

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type

Calculation of Energy requirements:

Analysis of Nutritive Value:

Balance Sheet

Menu planning

Interpretation

Suggestion:

Planning and preparation of full fluid diet

Introduction :

A full fluid diet is bridge in between clear liquid diet and eating solid foods. The full fluid diet is designed for patients who are unable to chewing , swallow or digest solid food. A full fluid diet includes clear fluids and milk products such as soup, ice-cream, pudding, but not all solid food.

The diet is s modification in the consistency or texture of the normal diet and free from mechanical irritants. The diet is used following operation in acute gastritities, acute infection and in diarrhea. This diet is given 2-4 hours intervals. It is easy to digest and leaves little food in the stomach and intestine.

Planning of full fluid diet :

1. The average full fluid diet contain 1350-1500 kcal(according to national library of medicine and the nation institute of health)
2. The full fluid diet given at 2-4 hour interval
3. It should not be used for 4-5 days
4. This diet is used in following condition – in acute gastritis, dental problem, acute infection operation, diarrhoea.
5. Full fluid diet is made up of full fluids that leave more residue and non-gas forming, non-irritating and non-stimulating to peristaltic action.

Content of full fluid diet

Type of food	Food allowed
Cereals	Gruels, poridges, kanji, ragi,malt
Pulses	Dal soup
Vegetable and fruits	strained juices, cooked and pureed fruits
Milk	Milk and milk beverage, milk shake, lassi
Fats and oils	Butter , oil and cream
Egg	Only in beverages
Sugar and jaggaery	Sugar and glucose
Nuts and oil seeds	None
Beverages	Tea, coffee(without milk), non- carbonated beverage
Soups	Strained
Desorts	custards, ice-cream, plain gelatin .

Personal data

Name -

Age –

Sex -

Body weight -

Body height -

BMI –

BMR –

BSA -

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type -

Calculation of Energy requirements:

Analysis of Nutritive Value

Balance Sheet

Menu Planning

Interpretation

Suggestion:

Planning and Preparation of Soft Diet

Introduction:

A soft diet is one where all the food is smashed, purried or placed in a souce for easy swallowing. This type of diet is usually recommended after surgery. Post-operative stage as well as after the insfallation of new dental breas. It bridges the gap between acute illness and convalescence. This is one of the most frequently used routine diets, many hospital patients are placed on this until a diagnosis is made. The soft diet is made up of simple, easily digested food and contents no harsh fibre, low in fat and no rich highly seasonal food. Most raw fruits, vegetable and course bread and cereals are eliminated.

Preparation of Soft Diet :

1. This diet is moderately low in cellulose and low in residue.
2. The soft diet may also be used for post-operative patients, dental patients who is too ill to tolerate a general diet.
3. This diet is used for post-operative stage.
4. Soft diet is contain 180 – 2000kcal/day energy.
5. Soft diet given for 2 – 3 hour interval
6. This diet contain low fat, no raw fruits and vegetable
7. This diet is given before regular diet
8. Fried food, pork should be avoided from this diet.
9. Refined cereal, pulses included to this diet chart.

Content of Soft Diet

Type of food	Food allowed
Cereals	Refined, finely ground, whole grain
Pulses	All dals
Vegetable and fruits	Juices, pureed, cooked and smashed, baked, ripe banana
Milk	Milk and milk products, cheese, fine cream
Fats and oils	Butter , oil, cream, margarine
Meat and fish	All except pork, minced fish, poultry
Egg	All exceped fried
Sugar and jaggaery	All
Nuts and oil seeds	None
Beverages	All
Soups	All
Desorts	Custareds, kheer, puddings

Personal Data

Name -

Age –

Sex -

Body weight -

Body height -

BMI –

BMR –

BSA -

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type -

Calculation of Energy Requirement

Nutritive analysis of consumed food stuff

Balance sheet

Menu planning

Interpretation

Suggestion:

Planning and preparation of Low Calorie Diet

Introduction:

Low calorie diet provides less calories than the total energy requirements for the day thus it provides for depletion of body fat. It is used in cases of obesity, cardiac disturbances and hyper tension in overweight individuals.

Principle:

The following foods should be avoided while formulating the diet-

- Sweets, chocolates, jiggery, jam, honey, preserves, pudding cake etc.
- Root and tuber
- Fried food
- Dried fruits and nuts
- Alcoholic drinks and soft drinks unless they contain artificial sweeting agent instead of sugar.
- Cream and free fats.
- Fruits like banana, custard apple, sapota, dates etc.

Personal data

Name -

Age –

Sex -

Body weight -

Body height -

BMI –

BMR – $\frac{\mathbf{REE}}{\mathbf{24 \times BSA}}$

BSA – (According to Dubois Dubois)

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type -

Calculation of Energy requirement by specific activity

Macro and Micronutrient requirement (according to RDA, 2010)

Analysis of nutritive value of the consume food stuff

Balance Sheet

Menu planning

Interpretation

Suggestion:

Introduction of Diabetes Mellitus

Diabetes mellitus is a chronic metabolic disorder that prevents the body to utilizes glucose completely or partially. It is characterized by raised glucose concentration in the blood and alteration in carbohydrate, protein and fat metabolism. This can be due to failure in the formation of insulin.

Type of Diabetes Mellitus:

There are two types of diabetes mellitus known as-

- Type -I Diabetes Mellitus
- Type - II Diabetes Mellitus

Type -I Diabetes Mellitus

Type –I diabetes mellitus generally insulin dependent diabetes mellitus of IDDM. This means that insulin exogenous insulin level in blood in this type of diabetes is low. Therefore exogenous insulin can able to cure the pathophysiological alteration of type-I and hence it is known as insulin dependent diabetes mellitus. Possible causes are –

- Particular or total destruction of β-cell by microbial infection
- Destruction of β-cell by some congenital abnormalities
- Destruction of β-cell by auto immune reaction where antibodies developed against prepro-insulin or pro-insulin.
- Genetical mutation of preproinsulin gene with its down regulation for expression.
- In intracellular conversion from preproinsulin to proinsulin in β-cell has been dereased.
- There is interference in stimular secretion coupling of β-cell or desensitization of β-cell against blood glucose.

Type - II Diabetes Mellitus

This is known as non-insulin dependent diabetes mellitus or NIDDM that means blood level of insulin is normal in this condition. In spite of that diabetic abnormalities are noted and hence it is not dependent on insulin. It has several causes-

- Low number of insulin receptor in target cell due to low rate of expression of insulin receptor gene.
- Mutation of insulin receptor gene that produce mutant insulin receptor having low sensitivity to bind with insulin.
- Internationalization of insulin receptor in target cell due to alteration in the composition of cell membrane.
- High level of glucagon or non-epinephrine is another cause for tis diabetes.
- High level of insulinase activity in liver or metabolic alteration of insulin is noted at high level.

Symptoms of Diabetes Mellitus

1. **Polyuria:**
   Micturition frequency is increased and volume of urine is also increased. Urine become diluted in type and glucose is present in urine. The polyuria is due to high intake of water as well as high glucose level in renal tubule.
2. **Polyphagia:**
   Food intake tendency in this patient increased due to interference of glucose transport in satiety is not existed that stimulated the feeding centre and result polyphagia.
3. **Polydipsia:**
   High level of thrust and high level of water intake known as polydipsia. This is due to the high osmotic pressure of blood due to high level of glucose. As a result water contain in tissue fluid is decreased that develop shrinkage of central osmotic receptor in hypothalamus. This shrinkage stimulate the thirst centre of hypothalamus and therefore water intake is increased.

Guideline for Diabetes Patients

1. Take a healthy diet in the breakfast without skipping or post ponded dietary schedule
2. Take regular small amount of meal/day.
3. Some people take morning breakfast and night dinner low amount of diet and take the bulk amount of meals in the lunch.
4. Avoid the type of diet process. Avoid all energy drinks include alcoholic drinks and smoking, tobacco products. The lower amount of calorie vegetarian diet is recommended instead of non-vegetarian diet.
5. Completely avoid honey, trans fat, HDL, cholesterol, sodium diet etc.
6. Water therapy also helps to control and acts as remedy of diabetes.
7. Take a high amount of fibre and slowly released carbohydrates.
8. Slowly released carbohydrate can helps to keep blood glucose level normal.
9. Take low calorie sugar, present most of the brands with “0” calorie sugar pills are available in the market. Take fibre and the protein diet of the vegetables. But avoid animal protein and fibre diet.
10. Avoid refined (polished) white rice, take brown rice.
11. Avoid all fruit juice, take raw fruits directly.
12. Avoid oily foods and midnight super diet.
13. Use olive oil and sunflower oil instead of other oil.
14. Go to bed early as early as possible and wake up soon.
15. Take food slowly with pleasure without any tension.

Avoid food for Diabetic Patient

- **Sugar:**
  White sugar, honey, jaggary, cakes, jelly, jam, can juice, pie, cream etc. should be avoided for diabetic patients.
- **Fry food:**
  Do not fry food instead bake, sauté or boil in a pan. Otherwise you can steam vegetable.
- **Salad dressings:**
  Limit the use of dressings, such as mustard, salads dressing, mayonnaise. They are high in sodium.
- **Cheese:**
  Try to limit the use of cream, cheese, butter, cottage cheese and margarine.
- **Refined flour:**
  Another important food avoided in diabetes is refined flour, pasta, white bread, maida, pizza and processed food.
- **Fruits:**
  Fruits such as mango, grapes, strawberry, dates, should be avoided to lower the diabetes.
- **Starchy vegetable:**
  Avoid starchy vegetable such as potato, carrot, beets.
- **Fruit juice:**
  Limit the use of fruit juice.
- Smoking and alcohol should be avoided.
- Avoided those food item which are rich in cholesterol like – egg yolk, head part of the fish, high fat meat, poultry and high fat dairy products.
- **Oils:**
  Avoid hydrogenated oils must be use olive oil, sunflower oil, saffola oil.

- **Other foods:**
  Olive, became, yam, dried fruits, junk foods and nut should be avoided in diabetes. Include some nut which is the rich source of MUFA such as almonds and walnut.

Personal data

Name -

Age –

Sex -

Body weight -

Body height -

BMI –

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type -

Calculation of Energy Requirements:

REE (Resting Energy Expenditure):

Male:

{(10 × body in kg) + (6.25× height in cm) – (5×age in year)} + 5

Female:

{(10 × body weight in kg) + (6.25 × height in cm) – (5 × age in year) + 5} - 161

Micro and Macro-nutrient (According to RDA, 2010)

Composition of diet chart

Analysis of Prepare a diet chart

Balance Sheet

Menu planning

Interpretation

Introduction of Cardiovascular Disease

Coronary heart disease of coronary artery disease is the condition arise when the artery that supply artery muscle with blood become blocked. If the blockage is temporarily due to increase activity and the boy's increase demand for oxygen the person may experience angina pectoris or severe pain and a sense of construction about the heart. Rest and the administration of vasodilating medications commonly produce relief, but a changes in diet and lifestyle are necessary to stave of heart damage.

But if the vessel is blocked by atherosclerosis plaque by a thrombus (blood clot) or by an embolus beyond the point of obstruction receive no $\mathbf{o}_2$ and nutrients. When this happens the person exhibits signs and symptoms of a coronary occlusion or a heart attack. When the blood supply can not be restored quickly, myocardial Celestin the affected area die. The medical diagnosis then becomes myocardial infraction (MI).

Principle:

A low calorie, low fat, low carbohydrate, normal protein adequate amount of minerals and vitamins are suggested.

Personal data

Name -

Age –

Sex -

Body weight -

Body height -

BMI –

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type -

Nutritional Requirement of CHD Patients

Calorie requirement:

The calorie intake should be just adequate to meet the requirement. For obese patients its may be necessary to reduce calorie intake.

REE (Resting Energy Expenditure)

Male:

{(10 × body in kg) + (6.25× height in cm) – (5×age in year)} + 5

Female:

{(10 × body weight in kg) + (6.25 × height in cm) – (5 × age in year) + 5} - 161

Micro and Macro nutrient (According to RDA, 2010)

Nutrient analysis of consumed food stuff

Balance sheet

Menu planning

Dietary guideline

- Patients maintain the body weight lower than the standard weight. Accordingly total calorie should be restricted. Calories intake and physical activity should be balanced to maintain a healthy body weight.
- He / she should take salt in low amount
- Egg yolks contain cholesterol. So egg should be restricted to 2-3 eggs/ weeks. Cholesterol containing food should be limited in the diet.
- Foods rich in antioxidant containing carotenoids and vit-E protect from CHD.
- Five serving of fruits and vegetables should be included in the diet only to meet the nutritional requirements but also to meet antioxidant and fibre.

Interpretation

Introduction of Peptic Ulcer

Peptic ulcer disease refers to painful sores of ulcer in the lining of the stomach or first part of the small intestine called duodenum as a result of caustic effects of acid and pepsin in the lumen. Histologically peptic ulcer is identified as necrosis of the mucosa most common ulcer of an areas of the gastrointestinal tract that is usually acidic and thus extremely painful.

Causes of peptic ulcer:

No single cause has been found foe ulcers. However it is now clear that an ulcer is the end result of an imbalance between digestive fluids in stomach and duodenum.

Ulcers can be caused by –

Infection with a type of bacteria called helicobacter pylori.

Use a painkiller called NSAIDS (Non steroids anti-inflammatory drugs) such as aspirin , naproxen etc.

Excess acid production from gastronomists of the acid producing cells of the stomach that increase acid output (Seen in Zollinger – Ellison Syndrome).

Symptoms:-

An ulcer may or may not have symptoms. When symptoms occur they may include –

- Hart burn
- Nausea / vomiting
- Bloating
- A burning in the middle or upper stomach between meals or at night.

In severe cases symptom can include:-

- Dark or black stool(due to bleeding)
- Vomiting blood (that can look like coffee ground)
- Weight loss
- Severe pain in the mid to upper abdomen
- Low plasma protein levels are often present and delay rapid and complete healing of the ulcer.

Dietary guideline for Peptic Ulcer

- Whether a patient is on bland diet or regular diet he needs to know which foods are needed for a nutritionally adequate diet and the importance of including these daily.
- He / she should select food from a wide variety of foods omitting these foods known to be distressing to the patient.
- Moderate use of seasonings are permitted
- In between meals protein rich snakes should be taken.
- Regularity of meal time is essential. The patient gets benefited by small and frequent meals.
- Moderate amount of food should be taken. Heavy meals are avoided. Volume of foods sufficient to exert astral pressure against the stomach wall stimulates gastric secretion through the gastrin mechanism.
- Foods should be eaten slowly and chewed well. How one eats is more important than what one eats because fast eating provokes gastric feeding reflex.

Avoid foods for peptic ulcer

- **Sugar:**
  Pastries, cakes, heavy sweets like – halwa, barfi should be avoided
- **Fry food:**
  All fry foods are avoided from diet chart.
- **Raw vegetables:**
  Raw vegetables like – onions, radish, and tomatoes should be avoided.
- **Fruits:**
  Raw unripe fruits should be avoided from this diet chart.
- **Spices:**
  Gravies, pickles, spices (all) chilies, curries, condiments should be avoided
- **Beverages:**
  Alcohol, strong tea, coffee cola beverages avoided from this diet chart
- **Smoking:**
  Smoking should be avoided particularly on an empty stomach.

Personal data

Name -

Age –

Sex -

Body weight -

Body height -

BMI –

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type -

Calculation of Energy Requirement

REE (Resting Energy Expenditure)

Male:

{(10 × body in kg) + (6.25× height in cm) – (5×age in year)} + 5

Female:

{(10 × body weight in kg) + (6.25 × height in cm) – (5 × age in year) + 5} - 161

Micro and Macro- nutrient (According to RDA, 2010)

Composition of diet chart

Analysis of prepare diet chart

Balance Sheet

Menu planning

Interpretation

Introduction of Anaemia

Anaemia is a decrease in number of red blood cells (RBCs) or less than the normal quantity of Haemoglobin in the blood. Anaemia may also be diagnosed where there is decrease oxygen building ability of each haemoglobin molecule due to deformity of lack in numerical development as in some other types of haemoglobin deficiency. Anaemia is the most common disorder of the blood.

Definition:

Anemia is a condition in which the number of red blood cells or their oxygen carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking and pregnancy status.

Types of anaemia

1. **Macrocytic anemia**
   The term macrocytic anemia is form Greek words meaning “large cell”. A macrocytic class of anemia is an anemia (define as blood with an insufficient concentration of hemoglobin) in which the red blood cells are larger than their normal value.
2. **Microcytic anemia:**
   Microcytic anemia is any of several types of anemia characterized by small red blood cells called microcytic anemia.
3. **Normocytic anemia:**
   Normocytic anemia is common issue that occurs for men and women typically over 85 years old. A normocytic anemia is define as an anemia with a mean corpuscular volume(MCV). The haematocrit and haemoglobin is decreased.
4. **Pernicious anemia:**
   Pernicious anemia is one of many types of the larger family of megaloblastic anemias.
5. **Sickle cell anemia:**
   Sickle cell anemia is an inherited disorders that affect Africa, America. Red blood cells become crescent shaped because of a genetic defect.
6. **Iron deficiency anemia:**
   Iron deficiency anemia is a condition where a lack of iron in the body leads to a reduction in the number of red blood cells.

Causes:

Causes of anemia are-

- Excessive blood loss
- Due to lack of iron in our diet
- Due to an inability to absorb iron
- In condition of pregnancy

Sign and symptoms:

Iron deficiency anemia is characterized by –

Fatigue

Dizziness

Paleness of the skin

Hair loss

Weakness

Headache

Brittle or grooved nails

Dietary supplements:

Iron:

- Iron supplements can correct low iron levels within months.
- Take iron supplement only as doctors prescribe
- Good sources of iron include
    - fortified breads and cereals
    - Pulses, peas, lentil, white, red and baked beans soyabean and chick peas.
    - Tofu
    - Dried fruits such as purse raisins and apricots.

Food sources of Iron

Personal data:

Name -

Age –

Sex -

Body weight -

Body height -

BMI –

Occupation –

Socioeconomic condition –

Food habit –

Physical activity –

Disease type -

Nutrient requirement of the patient

Energy requirement:

EER=TEE

For male:

662-9.53×Age (yr.) + P.A× [15.91×Body weight (kg) + 539.6 × Body height (m)]

Female:

354 – 6.91 × age in year + PA× [(9.36 × wt in kg) + (726 × ht in m)]

Micro and Macro- nutrient (According to RDA, 2010)

Composition of diet chart

Nutritive analysis of consumed food stuff

Balance sheet

Menu planning

Interpretation