

(20A27704) HUMAN NUTRITION  
(OPEN ELECTIVE - III)

UNIT-1

CONCEPTS AND CONTENT OF NUTRITION

(1) (a) what is Nutrition?

Nutrition refers to the study of how food affects the body and provides the necessary nutrients for growth, maintenance, and repair.

It involves the consumption of various types of food, such as carbohydrates, proteins, fats, vitamins, and minerals, in the right amounts and balance to support a healthy lifestyle.

The development of human health is dependent mainly on nutrition. Improved nutrition boosts the immune system, increases mental alertness, and lowers the risk of chronic diseases such as diabetes, cardiovascular disease, etc.

(2) Importance of Good Nutrition?

- (1) Reduces the risk of diseases like heart diseases, cancer, stroke, osteoporosis etc.
- (2) Improves your well-being.
- (3) Improves your immunity to fight off the illnesses.
- (4) Improves your ability to recover from injuries or illnesses.
- (5) Increases your energy levels.
- (6) Good nutrition helps with better education and performances.
- (7) Good nutrition is important in order to execute body functions properly.
- (8) When food is nutrition rich medicine is of no need.
- (9) Nutrition can make you live longer.
- (10) Enhances your quality of life.

(3) Types of nutrition:-

Nutrition is classified mainly into two types, namely

(1) Micro nutrients

(2) Macro nutrients.

The micronutrients include calcium, iron, vitamins and other nutrients required for the body's metabolic activity. These micronutrients help to repair and build damaged tissues to support organs and their functioning.

Macronutrients are essential for providing energy to the body when the food items are broken down during digestion. Compounds like fats, proteins and carbohydrates are called macronutrients.

## ② (4) NATIONAL AGENCIES OF NUTRITION:-

(i) National Institute of Nutrition (NIN)

(2) Indian Council of Medical Research (ICMR)

### → (i) NATIONAL INSTITUTE OF NUTRITION (NIN) :-

\* The National Institute of Nutrition (NIN) is one of the permanent research institutes of the Indian Council of Medical Research under the ministry of health and family welfare, Government of India.

\* It was founded in 1918 as part of Coonoor Pasteur Institute.

\* It is located in Hyderabad, India.

\* The objectives of National Institute of Nutrition are to:

(i) Identify various dietary and nutrition problems prevalent among different segments of the population and continuously monitor diet and nutrition situation of the country.

(ii) evolve suitable methods of prevention and control of nutrition problems through research, keeping the existing economic, social and administrative set up in view.

(iii) Investigate nutritional deficiencies, nutrient interactions and food toxicities at basic level for understanding the biochemical mechanism involved.

(iv) provide training and orientation in nutrition to key professionals.

(v) advise Government and other organizations on problems of nutrition.

## → (2) INDIAN COUNCIL OF MEDICAL RESEARCH (ICMR):-

- \* The Indian Council of Medical Research (ICMR) is the apex body in India for the formulation, coordination and promotion of biomedical research. Intra mural research is carried out currently through the council's 21 permanent research institutes.
- \* They do research on specific areas such as tuberculosis, leprosy, cholera and diarrhoeal diseases and viral diseases including AIDS. They also do research on malaria, kalaazar, nutrition and food and drug toxicology, reproduction, immunohaematology, oncology and medical statistics.
- \* Research is also done on major metabolic diseases, occupational health and non communicable diseases.
- \* In recent years, the ICMR is also intensifying research in non communicable diseases such as cardiovascular diseases, metabolic disorders, mental health problems, neurological disorders, blindness, liver diseases and cancer.
- \* Medical information is strengthened to meet the growing needs and demands of the community.
- \* The headquarters of ICMR is in New Delhi.

## (5) ROLE OF NUTRITION AGENCIES:

Concerning human health, the agency evaluates the nutritional and functional properties of foods as well as all the risks that individuals may be exposed to in the workplace, in the environment in general and through food.

## ③ (6) NUTRITION OF COMMUNITY:

- ↳ Community nutrition is the science related to practical application of the nutritional knowledge in the field to identify and solve nutritional problems of population groups in community.
- ↳ Community nutrition is the study of assessing food and nutrition situation in terms of identification of food and nutrition problems, causative factors and possible solutions both for prevention and cure of the problems.

- community nutrition is a discipline that works to prevent disease and improve the health, nutrition, and well-being of individuals and groups within communities.
- community nutrition incorporates the study of nutrition and the promotion of good health through food and nutrient intake in populations.
- community nutrition includes nutritional surveillance; epidemiological studies of diet; and also the development, implementation, and evaluation of dietary recommendations and goals.
- Community Nutrition aims to prevent problems related both to food insufficiencies and excesses, and to promote well-being through a secure and safe food supply and healthful eating habits.
- Community Nutrition (CN) strives to improve the health and well-being of individuals and groups within the community.

## (7) COMPONENTS OF COMMUNITY NUTRITION:-

### (i) COMMUNITY DIAGNOSIS:-

It is the identification and quantification of health problems in a community in terms of mortality and morbidity areas.

Food, nutrition and health problems are combined to diagnose the causative factors.

#### • OBJECTIVES OR GOALS OF COMMUNITY DIAGNOSIS:-

\* Analyze the health status

\* Evaluate the health resources, services, and systems of care.

\* Assess attitudes toward community health services and issues.

\* Identify priorities, establish goals, and determine courses of action to improve health status.

\* Establish epidemiologic baseline for measuring improvement over time.

#### → (2) ACTIONS PLAN OF NUTRITION SURVEILLANCE:-

- \* Health information collected with help to plan suitable actions to overcome these problems.
- \* continuous monitoring or watching over of nutrition situation of a community. It involves data collection, processing, analysis, interpretation and communication/ dissemination.

#### \* OBJECTIVES OF NUTRITIONAL SURVEILLANCE:-

Objectives of nutritional surveillance are

- \* To provide information so that decision can be more favorable to nutrition.
- \* To increase the allocation of resources to improve the nutrition of the malnourished in drought and famine condition.

#### → (3) EVALUATION OF ACTION:-

Evaluating the results will show whether the bad practices and also the right behaviours which keep people healthy.

In community nutrition, evaluation has been defined as the systematic collection and delineation and use of information to judge the correctness of the situation analysis, critically assess the resources and strategies selected, to provide feedback on the process of implementation and to measure the effectiveness.

#### → what is the importance of community nutrition?

Community nutrition is a field of public health that focuses on improving the nutritional status of individuals and populations through various programs and interventions. The importance of community nutrition lies in its ability to promote health and prevent disease through the provision of healthy food options, nutrition education, and promotion of healthy behaviors.

We will discuss the importance of community nutrition and how it can benefit individuals and communities.

## (1) Improved Nutritional Status:

One of the primary benefits of community nutrition is the improvement of nutritional status among individuals and communities. Adequate nutrition is essential for overall health and well-being, and a lack of proper nutrition can lead to a range of health problems, including malnutrition, obesity, and chronic diseases.

Community nutrition programs, such as school nutrition programs, food banks, and community gardens, provide access to healthy food options and can help address these issues.

## (2) Disease Prevention:

Community nutrition programs can also help prevent chronic diseases such as obesity, diabetes, and cardiovascular disease. These programs promote healthy eating habits and behaviors, which can reduce the risk of developing chronic diseases.

## (3) Improved Access to Healthy Foods:

Many individuals and communities lack access to healthy food options due to factors such as income, location, and transportation.

Community nutrition programs, such as farmers' markets, community gardens, and food banks, can help address these issues and provide individuals with access to healthy foods.

## (4) Health Equity:

Community nutrition programs can help address health disparities by ensuring that all individuals and communities have access to healthy food options and nutrition education.

## (5) Cost savings:

Community nutrition programs can also result in cost savings for individuals and communities. For example, programs that promote healthy eating habits and behaviors can reduce healthcare costs associated with chronic diseases such as obesity and diabetes.

## (6) sustainable food systems:

Community nutrition programs can also promote sustainable food systems by supporting local farmers and reducing food waste. This can have a positive impact on the environment and contribute to the long-term health and well-being of individuals and communities.

## ④ → NATIONAL NUTRITIONAL POLICY: AND THEIR IMPLEMENTATION:

- Early 1993 India adopted the National Nutritional policy (NNP).
- The policy in India is under the guidance of the department of women and child development.
- It is comprehensive policy covering all the areas and aspects that affect the nutrition of the people.
- It is also provide linkage between the nutritional status of the population and the development and well being of the nation.

### \* General objectives of NNP:

- To improve the nutritional status of the people.
- Promote practices favorable to the improvement of nutritional status.
- Reduce the prevalence of disease linked to nutritional deficiencies & excess.
- Assure adequate treatment of malnutrition
- provide nutritional care & support for people living with HIV/AIDS

→ It have two intervention

(1) Direct Intervention

(2) Indirect Intervention.

### → (1) DIRECT INTERVENTION:-

- Universalize the ICDS scheme by year 2000, by extending it to the children in the age group of 0-6 years.  
ICDS - Integrated Child Development services.
- Reduce the incidence of severe and moderate malnutrition in children by half by year 2000.
- Improving nutritional status of adolescent girls through iron & folic acid supplementation.

- fortification of essential food with adequate nutrients.
- popularization of low cost nutritious foods.
- controlling micronutrient deficiencies.
- Reducing anemia.
- distribution of iodized salt should cover all areas of the country.

→ (2) INDIRECT INTERVENTION:-

- Food security Act 2013,
- Ensuring per capita availability of 215 kg of food grains per person per year by producing 230 million tons of food grains per year by 2000 AD.
- Improvement of dietary pattern through production & demonstration.
- public distribution
- Improving purchasing power.
- Health & family welfare
- land reforms.
- policies to improve the income of rural & urban poor people.
- Knowledge of basic health & nutrition.
- Improvement of the status of women's health.

→ what are the nutrition policies in India?

with an aim to decrease malnutrition, India has implemented several nutrition interventions in the last half century, including the National food security Act 2013, NIPCCD, ICDS and the mid-day meal scheme.  
NIPCCD - National Institute of public cooperation and child development

→ Over the last 45 years, India has implemented several nutrition interventions with the aim to decrease malnutrition (with the aim to decrease malnutrition). With the formulation of integrated child development services (ICDS), and the nationwide execution of the mid-day meal scheme and the national food security act (2013), India has aimed at improving the country's nutritional situation.

- Apart from that, the GOI launched several other schemes to nurture women and children's health, including the POSTHAN - ABHIYAAN, Anganwadi service scheme, and the pradhan Mantri Matru Vandana Yojana (PMMVY), under the ICDS.

### (5) → NUTRIENT:-

Nutrients are chemical compounds in food that are used by the body to function properly and maintain health. Examples: proteins, fats, carbohydrates, vitamins, and minerals.

<u>NAME OF THE NUTRIENT</u>	<u>SOURCES</u>	<u>FUNCTIONS</u>
(1) Carbohydrates (energy giving food)	Rice, potato, wheat, sugar	Provides energy
(2) fats (energy giving food)	Butter, ghee, milk, cheese	Gives more energy compared to carbohydrates.
(3) vitamins and minerals (protective food)	Fruits and vegetables	Required for normal growth and development
(4) proteins (body building food)	Milk, eggs, meat, fish soyabean	Helps in building and repair of body.

### → Stages of Nutrition:-

The stages of nutrition in humans are ingestion, digestion, absorption, assimilation, and egestion.

#### (1) INGESTION:-

- Ingestion is the process in which the food is taken inside the body through the mouth.
- In the mouth, food is broken down into small pieces and chewed and churned by teeth. Saliva is mixed with food by the tongue. In saliva, salivary amylase enzyme is present which helps in the digestion of carbohydrate. Thus, initial digestion takes place in the mouth by saliva.

- When saliva is mixed with food called bolus.
- The bolus passes into the stomach through the oesophagus.
- In oesophagus, no digestion occurs.

## (a) DIGESTION:-

### ⑥ (a) In stomach:

- Break down of food into nutrients and waste is called digestion.
- Now bolus passes into the stomach.
- The walls of the stomach secrete a juice called gastric juice. (hydrochloric acid, pepsin and mucus)
- HCl: It kills the germs present in the food and makes the food medium acidic so pepsin can work.
- Pepsin: It helps in the digestion of protein. It converts protein into peptones and proteases.
- Mucus: It forms the inner lining of the stomach so HCl does not harm the stomach.
- When gastric juice is mixed with the bolus, then it converts into a soup-like medium called chyme.

### (b) In small intestine:

- The chyme passes into the small intestine, where bile juice, pancreatic juice, and intestinal juice, are secreted.
- \* Bile Juice: It is produced by liver, stored in gall bladder, and secreted in small intestine. Bile juice makes the food medium alkaline and emulsifies the fats.
- \* Pancreatic Juice: It is secreted by pancreas. In pancreatic juice, three enzymes are present - trypsin, lipase and amylase, which are essential for digestion of most of the protein, fat, and carbohydrate in the food.
- \* (a) Trypsin: It converts proteins into peptides or pentoses.

(b) Lipase : It converts fat into fatty acids and glycerol.

(c) Amylase : It converts (starch) carbohydrates (starch) into maltose.

\* Intestinal Juice : (succus entericus) secreted by small intestine in which many enzymes are present which digest the food completely.

### ② (3) ABSORPTION :-

- The separated nutrients get absorbed in the blood is called absorption.
- In this process, a finger-like projections called villi help.

### ③ (4) ASSIMILATION :-

- The absorbed nutrients utilized by the body cells or tissues is called assimilation.

### ④ (5) EGESTION :-

- The undigested waste expelled out from the body through anus is called egestion.

### → DIGESTION OF CARBOHYDRATES :-

- The principal sites of carbohydrate digestion are the mouth, stomach and small intestine. The dietary carbohydrate consists of
  - \* polysaccharides : starch, glycogen and cellulose
  - \* disaccharides : sucrose, maltose and lactose
  - \* Monosaccharides : mainly glucose and fructose.
- Monosaccharides need no digestion prior to absorption, whereas disaccharides and polysaccharides must be hydrolyzed to simple sugars before their absorption.

## → ABSORPTION OF CARBOHYDRATES:-

- Carbohydrates are absorbed as monosaccharides from the intestinal lumen.
- Two mechanisms are responsible for the absorption of monosaccharides.
  - (a) Active transport, against a concentration gradient, i.e. from a low glucose concentration to a higher concentration.
  - (b) Facilitative transport, with concentration gradient, i.e. from a higher concentration to a lower one.

### • Active Transport:-

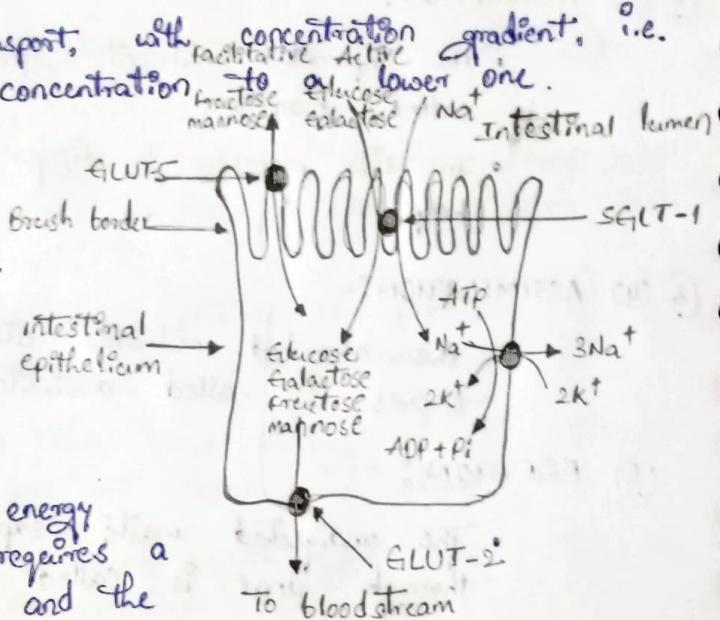
\* The transport of glucose and galactose across the brush border membrane of mucosal cells occurs by an active transport.

\* Active transport is an energy requiring process that requires a specific transport protein and the presence of sodium ions.

\* A sodium dependent glucose transporter (SGLT-1) binds both glucose and  $\text{Na}^+$  at separate sites and transports them both through the plasma membrane of the intestinal cell.

\* The  $\text{Na}^+$  is transported down its concentration gradient (higher concentration to lower concentration) and at the same time glucose is transported against its concentration gradient.

\* The free energy obtained from the sodium pump that expels  $\text{Na}^+$  from the cell in exchange of  $\text{K}^+$  required for this active transport is hydrolysis of ATP linked to an a



- **facilitative transport:-**

- \* fructose and mannose are transported across the brush border by a  $\text{Na}^+$  independent facilitative diffusion process, requiring specific glucose transporter, GLUT-5.
- \* The same transport can also be used by glucose and galactose if the concentration gradient is favorable.

(9) → **TRANSPORT OF CARBOHYDRATES:-**

The sodium independent transporter, GLUT-2 that facilitates the transport of sugars out of the mucosal cells, thereby entering the portal circulation and being transported to the liver.

(10) → **PROTEINS AND FATS IN HUMAN BEINGS:-**

- **PROTEIN:-**

protein is essential for growth and repair and keeping cells healthy.

protein also provides energy:

1 gram of protein provides 4 kcal (17kJ).

- **STRUCTURE OF PROTEIN:-**

protein is made up of building blocks called amino acids. Different foods contain different amounts and different combinations of amino acids.

protein from animal sources (e.g. meat, fish, eggs and dairy products) contains the full range of essential amino acids needed by the body.

protein from plant sources (e.g. pulses and cereals) typically contain fewer essential amino acids.

- **SOURCES OF PROTEIN:-**

Animal

meat

fish

eggs

milk

cheese

plant

nuts

seeds

pulses, e.g. beans, lentils

mycoprotein

soya products

- **FAT:-**

fat provides fat-soluble vitamins A, D, E and K, and is necessary for their absorption. It is also important for essential fatty acids the body cannot make.

fat is an essential nutrient that boosts absorption of vitamins and help protect organs.

fat provides a concentrated source of energy;  
1g/gram of fat provides 9 kcal (37KJ) of energy.

foods that contain a lot of fat provide a lot of energy.

- **STRUCTURE OF FAT:-**

fat is made up of different types of fatty acids and glycerol.

The structure of the fatty acids determines:

- their effect on our health.

- their characteristics, e.g. melting point.

Depending on their chemical structure, fatty acids are usually classified as:

- saturated

- monounsaturated

- polyunsaturated.

- **SOURCES OF FATS:-**

Some important sources of fats are

- (1) oils

- (2) meat

- (3) bakery products like cream and cheese

- (4) Junk food

- (5) Butter

- (6) Ghee

## → METABOLIC FUNCTION OF NUTRIENTS:-

Metabolism refers to all the chemical processes going on continuously inside your body that allow life and normal functioning (maintaining normal functioning in the body is called homeostasis). These processes include those that break down nutrients from our food, and those that build and repair our body.

- Building and repairing the body requires energy that ultimately comes from your food.
- The amount of energy, measured in kilojoules (kJ), that your body burns at any given time is affected by your metabolism.
- Achieving or maintaining a healthy weight is a balancing act. If we regularly eat and drink more kilojoules than we need for our metabolism, we store most of it as fat.
- Most of the energy we use each day is used to keep all the systems in our body functioning properly. This is out of our control. However, we can make metabolism work for us when we exercise. When you are active, the body burns more energy (kilojoules).

## → TWO PROCESSES OF METABOLISM:-

Our metabolism is complex — but simply it has two parts, which are carefully regulated by the body to make sure they remain in balance.

- Catabolism
- Anabolism

## → CATABOLISM:-

The breakdown of food components (such as carbohydrates, proteins and dietary fats) into their simpler forms, which can then be used to provide energy and the basic building blocks needed for growth and repair.

## → ANABOLISM:-

The part of metabolism in which our body is built or repaired. Anabolism requires energy that ultimately comes from our food. When we eat more than we need for daily anabolism, the excess nutrients are typically stored in our body as fat.

## UNIT-2

### WATER AND ENERGY BALANCE

#### → WATER:-

water is often called the "forgotten nutrient." water is needed to replace body fluids lost primarily in urine and sweat. A person can survive weeks without food but only days without water. water makes up 70 percent of body weight and is found in every cell in the body. it is the medium through which nutrients are transported from the digestive tract to the cells where they are needed.

#### → ENERGY BALANCE:-

Energy balance is defined as the state achieved when the energy intake equals energy expenditure. This concept may be used to demonstrate how bodyweight will change over time in response to changes in energy intake and expenditure. When the body is in energy balance, bodyweight is stable.

#### → WATER INTAKE AND LOSSES:-

Loss of water from the body is continuous. The body loses water.

1. via kidney as urine;
2. via the skin in the form of insensible perspiration and as sweat;
3. via the lungs in the expired air;
4. to a small extent via the large intestines in the faeces and
5. through milk during lactation. water is taken in food and also as drinking water.

In addition, water is formed in the tissues by the oxidation of hydrogen released during fat, carbohydrate and protein metabolism.

- water intake and source of body water: water is taken as drinking water, about 1500ml (in temperate climate), through food, 1000ml; and from oxidation of carbohydrates, fats and proteins in tissues, 300ml.

- water loss: The body loses water through urine, about 1500ml; via skin 800ml; via lungs 400ml and in faeces 100ml. In a normal individual, the water intake is approximately equal to water lost from the body and thus the water balance of the body is maintained fairly constant.
- water is an essential nutrient for all known forms of life and the mechanisms by which fluid and electrolyte homeostasis is maintained in humans are well understood.
- water plays a key role in elimination of body wastes and regulation of body temperature.
- Dehydration is the adverse consequence of inadequate water intake.
- Excess of water in the body may cause water intoxication or hyponatremia as suggested by the studies done by researchers.

#### → BASAL METABOLIC RATE (BMR):—

The amount of energy required by a person who is awake but he is nearly as possible as at complete mental and physical rest and has no food for 12-14 hours.

Where does the energy that makes life possible come from? Humans obtain energy from three classes of fuel molecules:

- ✓ carbohydrates
- ✓ proteins
- ✓ fats/lipids.

The potential chemical energy of these molecules is transformed into other forms, such as thermal, kinetic, and other chemical forms. Upon metabolism, carbohydrates give 4 kcal, protein 4 kcal and fats give 9 kcal.

#### • principal factors which influence the rate of metabolism.

- Body size
- Age
- Sex
- Climate
- The type of clothing worn and the nature of the work.
- Individual activity.

Basal metabolism is the metabolism that goes on when the body is at absolute rest. When the body is at complete rest the energy requirement is at its lowest. This is called basal metabolic rate.

BMR is calculated by measuring the amount of heat produced in the body, either directly, in a respiratory chamber or indirectly, by measuring the amount of carbon dioxide produced, and calculating from it the quantity of oxygen used.

#### \* factors affecting BMR: -

- (1) Body surface area: The larger the surface area of the body in relation to bulk, the greater is the heat lost by radiation. E.g. a tall man will have a greater surface area of the body than a short fat man and will lose more heat by radiation and his BMR will be higher. This may explain why a thin man often eats more than a fat man of the same weight.
- (2) Age: Growing children and adolescents have higher BMRs in relation to their weight than adults.
- (3) Diseases: Some diseases especially of the thyroid gland may raise or lower BMR. A rise in body temperature of one degree is found to increase BMR by about 7%. This is important to remember during fever.
- (4) Under prolonged or chronic under nutrition, the BMR is decreased.
- (5) Psychological tension caused by worry or stress will increase the BMR.

#### \* BODY SURFACE AREA: -

The variable that correlates most with the BMR is the surface area of the body. Thus in case of both boy and man the BMR is around 1000 kcal/m<sup>2</sup> body surface/day.

In case of human beings body surface area can be calculated by the following formula:

$$S = 0.007184 \times W^{0.425} \times h^{0.725}$$

where,

$s$  = surface area in sq. metres

$w$  = body weight in kg and

$h$  = height in cm.

- **Genetics (Race):**

Some people are born with faster metabolism and some with slower metabolism.

- **Gender:**

Men have a greater muscle mass and a lower body fat percentage. Thus men have a higher basal metabolic rate than women. The BMR of females declines more rapidly between the ages of 5 and 17 than that of males.

- **Age:**

BMR reduces with age i.e. it is inversely proportional to age. Children have higher BMR than adults.

- **Weight:**

The heavier the weight, the higher the BMR, ex. the metabolic rate of obese women is 25 percent higher than that of thin women.

- **Body surface area:**

This is a reflection of the height and weight. The greater the body surface area factor, the higher the BMR. Tall, thin people have higher BMRs.

- **Diet:**

Starvation or serious abrupt calorie-reduction can dramatically reduce BMR by up to 30%. BMR of strict vegetarians is 11% lower than that of meat eaters.

- **Exercise:**

Physical exercise not only influences body weight by burning calories, it also helps raise the BMR by building extra lean tissue.

- **Pregnancy:-**

The BMR is not changed during pregnancy. The higher value of BMR in late pregnancy is due to the BMR of the foetus.

## → CLASSIFICATION OF BALANCED DIET:-

### \* Balanced diet:-

→ A balanced diet contributes toward maintaining a healthy life. A diet is the inclusion of different necessary nutrients that impact a body's growth and development. A balanced nutrition diet contributes to maintaining good health by balancing nutrients. This type is extremely crucial to getting the right nutrients and determines good health and growth.

→ A balanced diet containing all the essential nutrients like carbohydrates, proteins, vitamins, fats, minerals, and water in the correct proportion.

→ A balanced diet is important for our body's normal growth and development.

→ A balanced diet can be achieved by eating a variety of food items since there is no single food item with the correct amount of all the essential nutrients.

Eating a balanced diet requires a certain amount of knowledge and planning.

The nutrition group of ICMR (Indian Council of Medical Research) has recommended the composition of a balanced diet for Indians.

The major components of balanced diet includes cereals (like rice, wheat, and jawar), pulses, roots and tubers, fruits, milk, and dairy products, fats, and oils, sugar, and groundnuts. They also recommended an intake of meat, fish, and eggs for non-vegetarians.

### \* Balanced diet -for various groups:-

There are five food groups. They are

(1) Bread group.

(2) vegetable group

(3) fruit group

(4) Milk group

(5) Meat group.

## (b) FATS - OIL groups:

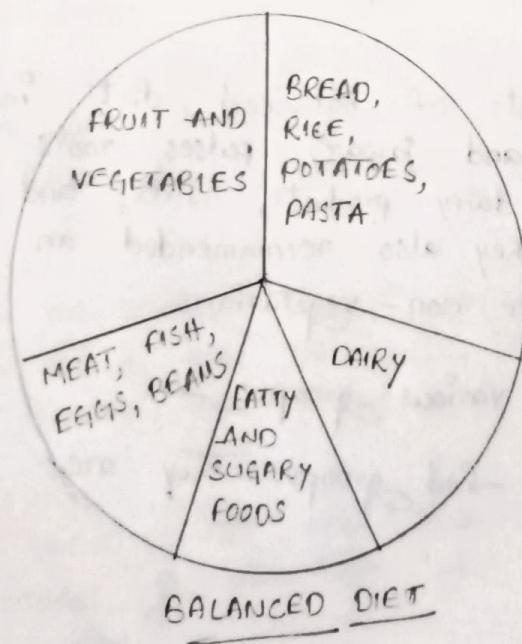
- Bread group contains grains (wheat, rice, corn, maize), starchy vegetables, beans. These have starch, iron & vitamin B.
- Vegetable group have vitamins & minerals.
- fruit group have rich in vitamins.
- Milk group rich in high quality protein, calcium & riboflavin.
- Meat group meat, poultry, fish, egg, beans & nuts are protein rich food.
- Oil-fat group must be used sparingly.

## → DIETS AND DISORDERS:-

### \* Diet:

A diet is all that we consume in a day. And a balanced diet is a diet that contains an adequate quantity of the nutrients that we require in a day.

A balanced diet includes six main nutrients, i.e., fats, protein, carbohydrates, fibre, vitamins, and minerals. All these nutrients are present in the foods that we eat.



## \* Disorders:

These disorders are described in the American psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders.

Eating disorders are a range of psychological conditions that cause unhealthy eating habits to develop. They might start with an obsession with food, body weight, or body shape.

Different types of eating disorders have different symptoms, but each condition involves an extreme focus on issues related to food and eating, and some involve an extreme focus on weight.

> Mental and behavioral signs may include:

- dramatic weight loss
- excuses to avoid mealtime
- refusing to eat certain foods
- denying feeling hungry
- excessively exercising

> physical signs may include:-

- dizziness
- feeling cold all the time
- sleep irregularities
- dry skin
- thinning hair
- muscle weakness
- poor wound healing

> Types of eating disorders:-

• Anorexia nervosa:

Anorexia nervosa is likely the most well-known eating disorder.

It generally develops during adolescence or young adulthood and tends to affect more women than men.

people with anorexia generally view themselves as overweight, even if they're dangerously underweight. They tend to constantly monitor their weight, avoid eating certain types of foods, and severely restrict their calorie intake.

Common symptoms of anorexia nervosa include:

- Very restricted eating patterns
- intense fear of gaining weight or persistent behaviors to avoid gaining weight, despite being underweight.
- unwillingness to maintain a healthy weight.

• Bulimia nervosa:-

Bulimia nervosa is another well-known eating disorder.

Like anorexia, bulimia tends to develop during adolescence and early adulthood and appears to be less common among men than women.

- people with bulimia frequently eat unusually large amounts of food in a specific period of time.

Symptoms may appear very similar to those of the binge eating or purging subtypes of anorexia nervosa. However, individuals with bulimia usually maintain a relatively typical weight rather than losing a large amount of weight.

Common symptoms of bulimia nervosa include:

- recurrent episodes of binge eating with a feeling of lack of control.
- self-esteem overly influenced by body shape and weight.
- a fear of gaining weight, despite having a typical weight.

• Binge eating disorder:-

Binge eating disorder is the most prevalent form of eating disorder and one of the most common chronic illnesses among adolescents.

It typically begins during adolescence and early adulthood, although it can develop later on.

Individuals with this disorder have symptoms similar to those of bulimia or the binge eating subtype of anorexia.

for instance, they typically eat unusually large amounts of food in relatively short periods of time and feel a lack of control during binges.

common symptoms of binge eating disorder include:-

- \* eating large amounts of food rapidly, in secret; and until uncomfortably full, despite not feeling hungry.
- \* feelings of distress, such as shame, disgust, or guilt, when thinking about the binge eating behavior.

- Pica:-

pica is an eating disorder that involves eating things that are not considered food and that do not provide nutritional value

Individuals with pica crave non-food substances such as ice, dirt, soil, chalk, soap, paper, hair, cloth, wool, pebbles, laundry detergent, or cornstarch.

pica can occur in adults, children, and adolescents.

Individuals with pica may be at an increased risk of poisoning, infections, gut injuries, and nutritional deficiencies. Depending on the substances ingested, pica may be fatal.

- Rumination disorder:-

Rumination disorder is another newly recognized eating disorder.

it describes a condition in which a person regurgitates food they have previously chewed and swallowed, re-chews it, and then either re-swallows it or spits it out.

This rumination typically occurs within the first 30 minutes after a meal.

This disorder can develop during infancy, childhood, or adulthood. In infants, it tends to develop between 3 and 12 months of age and often disappears on its own. Children and adults with the condition usually require therapy to resolve it.

If not resolved in infants, rumination disorder can result in weight loss and severe malnutrition that can be fatal.

- Avoidant/restrictive food intake disorder:-

-Avoidant/restrictive food intake disorder (ARFID) is a new name for an old disorder.

The term has replaced "feeding disorder of infancy and early childhood," a diagnosis previously reserved for children under age 7.

Individuals with this disorder experience disturbed eating due to either a lack of interest in eating or a distaste for certain smells, tastes, colors, textures, or temperatures.

Common symptoms of ARFID include:-

- avoidance or restriction of food intake that prevents the person from eating enough calories or nutrients.
- eating habits that interfere with typical social functions such as eating with others.
- weight loss or poor development for age and height.
- nutrient deficiencies or dependence on supplements or tube feeding.

→ RECOMMENDED DIETARY ALLOWANCES (RDA):-