Unit-3

Community Nutrition

Objectives

➢ To understand the nutritional status and health condition.

➢ To study the assessment of nutritional status.

➢ To get acquainted with different methods of nutritional status assessment.

➢ To study the modification of existing dietary life style.

➢ To control various diseases by the diet therapy.

Public health can get improved through correct nutritional status and diet therapy

Nutritional status is an important component of preventive health care. An optimum level of nutrition is the amount of nutrient intake that promotes to the highest level of health. Individual nutritional levels are closely related to the status of health and disease. However, an excess calorie intake leads to obesity, whereas deficit intake of calorie results into a depletion of essential nutrients. Nutritional status is now recognized as one of the prime indicators of the health of an individual.

Normal nutrition is the foundation upon which the therapeutic modifications are based. The primary principle of diet nutrition therapy should be 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 (i.e solid and liquid).

Content

Assessment of nutritional status is concerned with malnutrition which is related to protein energy intake through food pattern. Nutritional status is assessed by the types, magnitude and distribution of malnutrition / health disorders. The risk group are identified in different regions according to their nutrition through the food intake. It helps the policy makers, planners, scientists, nutritionists, etc. to plan the project in that region to alleviate the disorders.

6.1 NUTRITIONAL STATUS :

Nutritional status is the current body status of a person or a population group related to their state of nourishment influenced by the intake and utilization of nutrients.

Definition:

The condition of health of a person influenced by the intake and utilization of nutrients is called nutritional status.

Human body receives all the nutrients in appropriate amounts so as to meet the needs of the body, health that is the state of good or optimum nutritional condition. An optimal nutritional status is a powerful factor for health and well being. It is a powerful requirement in promoting health, preventing diseases and improving the quality of life.
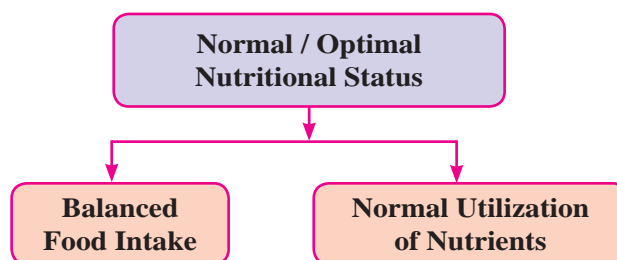
```
┌─────────────────────┐
│   Normal / Optimal  │
│  Nutritional Status │
└─────────────────────┘
     ↓           ↓
┌──────────┐  ┌──────────────────┐
│ Balanced │  │ Normal Utilization│
│Food Intake│ │   of Nutrients   │
└──────────┘  └──────────────────┘
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Figure 6.1 : Factors for normal nutritional status

Malnutrition:

When the diet does not provide all nutrients in optimum amount it results into ill health leading to malnutrition.

Malnutrition is defined as impairment of health resulting from deficiency, excess or imbalance of nutrients in the diet. There are two types of malnutrition i.e. under nutrition and over nutrition.
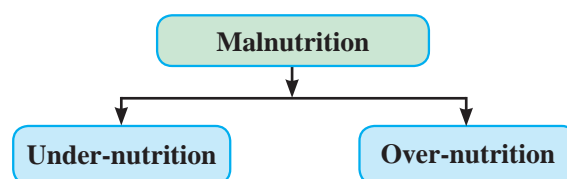
```
         ┌──────────────┐
         │ Malnutrition │
         └──────────────┘
         ↓             ↓
┌────────────────┐  ┌────────────────┐
│ Under-nutrition│  │ Over-nutrition │
└────────────────┘  └────────────────┘
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Fig. 6.3: Types of malnutrition

Under-nutrition refers to a deficiency of calories and/or one or more nutrients in the diet. An undernourished person is generally underweight.

Over-nutrition refers to an excess of calories and/or one or more nutrients in the diet. An excessive intake of calories results in overweight which can lead to obesity.

Malnutrition may increase risk of susceptibility to infection and chronic diseases.

- Under nutrition may lead to increased infections and decreased physical and mental development.

- Over nutrition may lead to obesity as well as to metabolic syndrome or type 2 diabetes.

Do you know ?

The world bank estimates that India is one of the highest ranking countries in the world for the number of children suffering from protein energy malnutrition (PEM)

Can you recall ?
- Protein energy malnutrition (PEM)
1. Kwashiorkor
2. Marasmus
- Vitamin deficiency malnutrition
1. Night blindness
2. Beriberi
- Mineral deficiency malnutrition
1. Anaemia, 2. Rickets, 3. Goitre

6.2 NUTRITIONAL STATUS ASSESSMENT

The process of determining the nutritional status of an individual or group is called nutritional status assessment. It is performed to estimate whether an individual or a community is well nourished, under nourished or over nourished.

Definition:

Nutritional assessment is the systematic process of collecting and interpreting information in order to make decisions about the nature and cause of nutrition related health issues that affect an individual and community.

Nutritional status can be assessed for:

- Individual
- Group
- Population (often used in health statistics data comparison with food/nutrient consumption data).

Goals of nutritional status assessment:

The goals of nutritional status assessment are as follow:

1. To identify individuals or population groups who are malnourished.

2. To identify individuals or populations groups at risk of becoming malnourished.

3. To assess the severity and geographical distribution of malnutrition.

4. To identify and analyze the ecological factors that is directly or indirectly responsible.

5. To develop suitable health care programs that meet the community needs which are defined by the assessment.

6. To measure the effectiveness of nutritional programs.

7. To provide factual evidence for the incidence of malnutrition to concerned authorities or policy makers to know the extent of the problem and make the decision on it.

6.3 METHODS OF NUTRITIONAL STATUS ASSESSMENT

The Nutritional status can be assessed by two methods:

I. Direct method:
(a) Anthropometry   (b) Biochemical
(c) Clinical   (d) Dietary

II. Indirect method:
(a) Ecological variables
(b) Economical factors
(c) Vital health statistics

I. Direct method:

(a) Anthropometry method:

The word anthropometry comes from two words: Anthropo means 'human' and metry means 'measurement'.

Anthropometric measurements are a series of quantitative measurements of the muscle, bone, and adipose tissue, used to assess the composition of the body. The core elements of anthropometry are indicated in table 6.1. Anthropometric measurements are used to assess either growth or change in the body composition in specific population groups, including newborn, children under age of five and adults. These measurements are important because they represent diagnostic criteria for under-nutrition and obesity.

The evaluation of nutritional status using anthropometry has been widely employed in field studies and nutritional surveillance programs.

The different measurements taken to assess growth and body composition are presented below:

Table 6.1 Elements of Anthropometry methods

• Height	• Mid-upper arm circumference (MUAC)
• Weight	• Skin fold thickness
• BMI (body mass index)	• Head circumference
• Waist to hip ratio	• Knee height
• Waist circumference	• Sitting height

Advantages:

1. Measures many variables of nutritional significance (like height, weight, skin fold thickness, waist to hip ratio, BMI etc).

2. Readings are numerical and gradable on standard growth charts.

3. Readings are reproducible.

4. Non-expensive and need minimal training.

Limitations:

1. Measurement inaccuracies. (Inter- observers errors in measurement)

2. Limited nutritional diagnosis.

3. Problems with reference in local standards i.e. Local versus International standards.

(b) Biochemical method:

A biochemical assessment method involves analysis of a person's blood, urine, or stool samples. These investigations are extremely helpful in detecting early changes in body metabolism and nutrient supply to the body before the appearance of apparent clinical signs. The results of the biochemical test must be compared with the standards of reference appropriate for age and gender.

Biochemical test provides information about:

- Protein-energy malnutrition

- Vitamin and mineral status

- Fluid and electrolyte balance

- Organ functioning

Nutrients generally examined biochemically are listed below:

Table 6.2 Biochemically examined nutrients

• Proteins	• Niacin
• Vitamin A	• Iron
• Vitamin C	• Folic acid
• Thiamine	• Vitamin B12
• Riboflavin	• Iodine

Advantages:

1. It is useful in detecting early changes in body metabolism and nutrition before the appearance of over clinical signs.

2. It is precise, accurate and reproducible.

3. Useful to validate data obtained from dietary methods e.g. comparing salt intake with 24-hour urinary excretion.

Limitations:

1. Biochemical investigations are expensive and time consuming.

2. They cannot be applied on large scale.

3. Needs trained personnel and facilities.

(c) Clinical method:

This is one of the most practical and important method of determining the nutritional status for individuals and community. It is based on observation on physical signs. It utilizes a number of physical signs that are known to be associated with malnutrition and deficiency of nutrients. It can be applied to a large group of the population

In clinical assessment special attention is given to hair, angles of the mouth, gums, nails, skin, eyes, tongue, muscles, bones, thyroid gland and parathyroid glands. Clinical methods of assessing nutritional status involves checking signs of deficiency at specific places on the body or asking the patient whether they have any symptoms that might suggest nutrient deficiency from the patient. The physical signs recorded must always be defined as precisely as possible. Clinical signs of a specific nutritional deficiency increase the diagnostic significance.

Advantages:

1. Fast and easy method.

2. It is an inexpensive method.

3. Non invasive (Specific equipment or a laboratory is not required).

Limitations:

1. It gives approximate information.

2. It is not effective tool to detect early cases of malnutrition

(d) Dietary method:

A dietary assessment is a comprehensive evaluation of a person's food intake. Assessing food and fluid intake is an essential part of nutrition assessment. It provides information on dietary quantity and quality, changes in appetite, food allergies and intolerance, and reasons for inadequate food intake during or after illness. The results are compared with recommended intake such as recommended dietary allowance (RDA).

Dietary intake of humans is assessed by four different methods. These are:

- 24 hours dietary recall

- Food frequency questionnaire

- Dietary history

- Food diary technique

- Observed food consumption.

i. **24 hours dietary recall:** This method was used to quantify the average dietary intake for a group of people, although it can be used to assess individual nutritional intake. A trained interviewer asks the subject to recall all food and drink taken in the previous 24 hours. It is quick, easy and depends on short-term memory, but may not be truly representative of the person's usual intake. The 24 hour recall method is employed at household level to assess the type of food and the quantities consumed in the last 24 hour.

ii. **Food frequency questionnaire:** A food frequency questionnaire is designed to obtain information on overall dietary quality rather than nutrition composition and intake. The food frequency questionnaire examines

how often someone eats certain foods, and sometimes the size of the portions. In this method the subject is given a list of around 100 items to indicate one's intake (frequency and quantity) per day, per week and per month. The food frequency questionnaire method helps in assessing meal patterns and dietary habits of people by identifying number of times a specific food item is consumed in a defined time-span. This method is quick and inexpensive but under-reporting is common.

iii. **Dietary history:** Dietary history is an interview method composed of two parts. The first part establishes the overall eating patterns and includes a 24 hr recall. Subjects are asked to estimate portion sizes in household measures with aid of standard spoons and cups, food photographs and food models. The second part is known as cross check. This is detailed list of foods that are checked with the subject. The information should be collected by a trained interviewer. Diet history estimates nutrients intake over a long period of time.

iv. **Food diary:** Food intake (types and amounts) should be recorded by the subject at the time of consumption. The length of the collection period range between 1-7 days. Food diary method is reliable but difficult to maintain.

Remember this

Direct methods of nutritional assessment are summarized as ABCD

- Anthropometric methods
- Biochemical methods
- Clinical methods
- Dietary methods

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v. **Observed food consumption:** In this method the meal consumed by the subject is weighed and the contents are exactly calculated. This method has high accuracy rate but is expensive and lengthy. This is most unused method in clinical practice but is recommended for research purposes.

II. Indirect method:

(a) **Ecological variables:** This method examines all components of the food chain and evaluates their effects from four main points of view: human health, environment, society and economy. The components of the food chain are those involved in the process of food production and consumption. The ecological factors related to nutritional status are:

- Food consumption
- Cultural factors like food habits, beliefs
- Food production-food cultivation, storage
- Socio-economic factors - family size, educational status, per capita income
- Health and nutritional services-immunization, feeding programmes

(b) **Economical factors:** Economic factors play a crucial role and could affect nutritional status and health. Economic factors such as food price and income do influence people's food choices. Moreover, food cost is a barrier for low-income families to have healthier food choices. Economic factors which are considered for assessment of nutritional status are household income, per capita income, population density, food availability and food prices.

(c) **Vital health statistics:** The term vital statistics signifies the data and analytical methods for describing the vital events occurring in communities. Vital statistics include the counts of births, deaths, illness,

movements and the various statistical techniques like rates and ratios obtained from them and utilized. Morbidity rates for various diseases (such as tuberculosis), maternal and prenatal mortality rates, life expectancy and other health statistics are influenced by malnutrition. They can thus be considered as indirect indicators of the nutritional status of the community.

For public health and nutrition, the vital statistics are most useful. The raw data of vital statistics are generally obtained through the sources of population census, sample surveys and vital statistic registers. Vital health statistics gives an overall picture of the nutritional status of a community and helps the government-making policy decisions.

Points to remember

➢ The nutritional status of an individual is usually a result of multiple factors that interact with each other at different level.

➢ Nutritional status can be assessed by
  • Direct methods
  • Indirect methods

➢ Direct methods of assessment are summarized as ABCD.

➢ Indirect methods of assessment are ecological variables, economic factors and vital health statistics.

➢ The use of any one method or a combination of methods is recommended depending on the purpose of the nutritional assessment.

➢ Nutritional status assessment helps the government in making policies for preventive and corrective measures for the nutritional problems in the community.

➢ Assessment of nutritional status aids in assessing the prevalence of nutritional disorders, planning corrective measures, and simultaneously evaluating the effectiveness of the implemented strategies.

➢ The use of any one method or a combination of methods is recommended depending on the purpose of the nutritional assessment

Q. 1 a. Select the correct option from the given choices.

i. Malnutrition refers to both over-nutrition and _____

    a. Deficiency   b. Normal-nutrition

    c. Obese   d. Under-nutrition

ii. Under-nutrition results due to _____ of one or more nutrients.

    a. Deficiency   b. Over-nutrition

    c. Obese   d. Malnutrition

iii. If you eat too much of energy rich foods, you may become _____.

    a. Normal   b. Over-nutrition

    c. Obese   d. Under-nutrition

iv. Eating balanced food and having normal utilization of nutrients leads to _____ nutritional status.

    a. Deficiency   b. Over-nutrition

    c. Obese   d. Normal

b. Match the correct pairs.

	A		B
i.	Anthropometry	a.	Food frequency questionnaire
ii.	Economical factors	b.	Blood and urine analysis
iii.	Biochemical methods	c.	Morbidity and mortality
iv.	Dietary method	d.	Body Mass Index (BMI)
v.	Vital health statistics	e.	Household income
		f.	Malnutrition

c. Do as directed.

i. Who am I ?

Clue : The meaning of this word is human measurement.

ii. Unscramble the underlined word

Clue : I am deficiency or excess of nutrients

RULAMNNTIOI

iii. Identify the odd one

Height, head circumference, 24 hr diet recall, weight.

iv. Fill in the box with the help of given clue

Clue: This method of assessment is based on observation on physical signs.

C						L	

v. By considering the first correlation complete the second correlation

Indirect method-Ecological variables, Direct method ------------- ?

vi. Who am I?

My investigations are helpful in detecting early changes in body metabolism ---------------

Q. 2 Answer the following questions briefly.

i. Explain the term nutritional status.

ii. Write the advantages and limitations of anthropometric methods.

iii. Differentiate between clinical method and biochemical methods.

iv. List different methods used to assess the nutritional status.

v. Classify the following under the given headings.

Headings:

1. Direct methods of nutritional assessment

2. Indirect methods of nutritional assessment.

(Biochemical method, ecological variables, clinical methods, anthropometry, vital health statistics, economical factors)

Q. 3 Write short notes on.

    i.   Goals of nutritional status assessment

    ii. Indirect methods of nutritional assessment

    iii. Malnutrition

    iv. Dietary assessment method.

Q. 4 Long questions.

    i.   Explain in detail direct methods of nutritional status assessment.

Project :

Assess any five children for their nutritional status and preapare report on it.

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