

METHODS OF ASSESSING NUTRITIONAL STATUS

MbchB 5

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Nutritional status

Definition: Balance between dietary intake and metabolic requirements

- **Metabolic requirements** - Function of age, gender, physiological status, occupation and health status

Nutritional Assessment

- **Optimal nutritional status:** Achieved when sufficient nutrients are consumed to support day-to-day body needs and any increased metabolic demands due to growth, pregnancy or illness.
- **Nutritional assessment:** Process of estimating the Nutritional position/status of an Individual or group at a given point in time by using indirect (Proxy) measurements of nutritional adequacy.

Purposes of carrying out a nutritional assessment

- Identifying individuals or sub-groups in a community who are malnourished or at risk of developing malnutrition.
- Specifying the nature and magnitude of nutritional problem (s).
- Establishing extent to which an Intervention, treatment or program has had the intended affect – impact.
- Monitoring or assessing trends and changes over time in the nutrition situation of a country or region (surveillance)

Components of Nutritional Assessment

Nutritional surveillance: Continuous monitoring of the nutrition status of selected population subgroups

They identify the possible causes of malnutrition, and therefore be used to formulate and initiate intervention measures. Used for decision making by governments.

Nutrition Screening: Comparison of an individual's measurement with predetermined risk levels or cut off points. Serves to identify individuals requiring nutritional intervention. Can be at individual level or on subpopulation considered to be at risk.

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Risk factors which would necessitate a more comprehensive nutritional assessment include:

. Weight <80% or >120% of ideal weight

. A history of unintentional weight loss of >4.5 kg

. Serum albumin concentration of <3.5g/dl

. A history of illness

. Symptoms or factors associated with nutritional depletion or inadequate nutrient intake or absorption.

Nutrition Surveys: Epidemiological investigation into the nutritional status of a population together with an evaluation of the causative ecological factors -

Typically prevalence studies, cross sectional in nature. Used to collect baseline data to determine population subgroups at risk of malnutrition.

Purpose - **Community diagnosis:** to identify the principal deficiency diseases in a community in different age groups as well as the probable causes.

Data from nutrition surveys are largely concerned with the prevalence of certain conditions

- Nutritional status of children is a reflection of the whole community. Why?
- Children most vulnerable to inadequate food intake and diseases, the major underlying causes of malnutrition.
- Infants & Young Children: Rapid growth, High nutrient requirements, Inadequate diets, A time of continuous stress from bacterial, viral and parasitic infections.

Methods Of Assessment

- A comprehensive nutritional assessment includes dietary history and intake information, physical examination for clinical signs, anthropometric measures and laboratory tests.
- Choice of method(s) is determined by the objectives of the survey, availability of resources and uses to which the data collected will be put to.
- Different methods are aimed at assessing diverse aspects of human nutrition. They permit a wider understanding of the causes and effects of malnutrition in an area.

Clinical Evaluation of Nutritional Status

- Based on examination of specific changes believed to be related to inadequate nutrition that can be seen or felt in superficial epithelial tissues especially the skin, eyes and hair, or in organs near the surface of the body such as the parotid and thyroid glands.
- Method is most useful during advanced stages of nutritional deprivation as clinical signs are late manifestations of malnutrition - when overt disease is present.
- Relatively inexpensive method and with careful training and continuing supervision, junior personnel can be taught to recognise certain crucial clinical signs.

Biochemical Assessment

- Laboratory tests used to detect subclinical deficiency states of micronutrient deficiencies.
- Provide an objective means of assessing nutritional status
- Used to confirm subjective findings.
- Laboratory procedures can also be used to supplement other methods of nutritional assessment

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- Biochemical tests are costly and time consuming to carry out - collection, transportation, laboratory analysis and interpretation of data.
- How? Sub-sampling or choosing subjects considered on clinical evidence to be deficient.
- Findings should be correlated with all the other findings - clinical, anthropometric, dietary and ecological.
- Laboratory indicators of nutritional status include haemoglobin, haematocrit, cholesterol, triglycerides serum albumin levels, glucose and total protein levels.

Dietary assessment

- Examination of food intake - Type and quantities of food consumed, either by direct observation or using recall methods.
- Nutritional adequacy is then determined with regard to required daily intake.
- Method requires significant staff training and supervision & is less precise and more subjective than other methods

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Purposes of dietary assessment:

-) Essential for investigating diet health relationships
-) Formulating policies to reduce health risks,
-) Predicting adequacy of the food supply
-) Monitoring trends in food use
-) Assessing exposure to contaminants and compliance with dietary guidelines.

Dietary assessment methods

1. 24 hour recall
2. Food frequency questionnaires
3. Keeping of a food diary.

24 hour dietary recall: Involves completing a questionnaire or being interviewed about everything consumed within the last 24 hours in ** Most commonly used method.

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- **Food Frequency**: Questionnaire provides information on the number of times in day, week or month certain food items are consumed. Usually complements the 24 hour recall method.
- **Food diaries** of records require asking an individual or family member to write down everything consumed for a certain period of time.

Anthropometric Measures

- Anthropometry: Measurement of the variations of the physical dimensions and gross composition of the human body.
- Parameters influenced by nutrition in the rapidly growing period of early childhood.
- Methods and measurements vary in complexity – determined by survey objectives.
- Assessment of growth failure and undernutrition, principally from inadequate intake of protein and calories in early childhood.

Anthropometric measurements

Key measurements: Facilitate assessment of body mass:

- Weight
- Height
- Body body composition & reserves of proteins and calories - Subcutaneous fat and muscle –
 - Triceps skinfolds thickness
 - Mid upper arm circumference.

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Summary

The ABCD of Nutritional Assessments

- **A**nthropometric Measurements
- **B**iochemical or Laboratory assessments
- **C**linical assessments (Observation)
- **D**ietary assessments

How to take Measurements of Weight, height and Length

- Accurate weight, Length and Height measurements are essential to a successful assessment.
- Mother/Guardian should understand why the measurements are being taken
- Measurements should be taken after admin of questionnaire
- Begin with the oldest child
- Do not weigh or measure children if they appear sick or upset, if the mother refuses, or if the child has a deformity that would invalidate the measurement, especially length

ANTROPOMETRIC MEASUREMENTS & INDICATORS

Weight Measurement

- Salter scale measuring up to 25 kg with a special bag– For children < 6 years old.
- Easy to carry, durable and accurate
- Hanging scale should be suspended at eye level
- Two readings should be taken, and these should not differ by more than 0.1 kg
- If they do, a third reading should be taken and the closest pair of values recorded.
- Alternative - Electronic scale – 100kg

Procedure

- Hang the scale from a tree, roof beam so that the scale can be read at eye level.
- Ask the mother to undress the child. If the child must be weighed with more than light weight underwear, then subtract the weight of an average set of clothes from the measurement.
- With the pants hanging from the scale, adjust the scale to zero.
- Place the child in the pants, hang the child on the scale hook and lower the child gently.
- Take 2 measurements or 3 & record those that do not differ by more than 0.1kg

Anthropometric Measurements

Height

- ***For infants & children < 2 years old***, the supine length (*Lying down* on back of the body: crown-heel length) should be take.
- ***For older children and adults***, take the height/stature –*the standing distance* from crown of the head to the bottom of the feet (heel).

Procedure

- Ensure that the child is under 24 months.
- Place the measuring board on a hard flat surface.
- Lay the child on the board with the top of the head pressed firmly against the fixed end of the board.
- One enumerator should cup hands over the child's ears so that the child is looking straight up
- The other enumerator should kneel at the right side of the child to easily read the tape as well as to hold the sliding foot piece with the right hand.
- Ensure that the child is lying flat and in the centre of the board.

Anthropometric Measurements

Mid Upper Arm Circumference

- The **circumference** of the left **upper arm**, measured at the **mid**-point between the tip of the shoulder and the tip of the elbow (olecranon process and the acromium using a flexible tape.
- Major determinants of MUAC, arm muscle and sub-cutaneous fat, are both important determinants of survival in starvation.
- In children aged 6 to 60 months, the *mid-upper arm circumference* (MUAC), with simple cut-offs, is at least as predictive of death as WHZ

MUAC

For assessing acute malnutrition

It is simple and cheap.

It is more sensitive: MUAC is a better indicator of mortality risk associated with malnutrition than Weight-for-Height.

It is less prone to mistakes. Comparative studies have shown that MUAC is subject to fewer errors than Weight-for-Height (Myatt et al, 2006).

Anthropometric Measurements

- **Bilateral oedema:** assessed by the application of normal thumb pressure for at least 3 seconds to both feet. Record if only both feet are swollen.
- **Age:** Use the children's immunization cards for verification of the child's age. If not possible, estimate the child's age using local events calendar.

Anthropometric Indicators

Weight –for –Height/Length (W/H; WHZ)

- Compares weight of a child to the reference weight of a child of the same height (median weight)
- Reflects recent weight loss or gain
- Reflects a deficit of soft tissues - **an indicator of wasting, observed as thinness (acute/current malnutrition).**
- Assumes that weight and height are independent of age.

Height-for-age (H/A or HAZ)

- This compares the height or length of a child with that of a child of the same age (median height of reference population).
- Is a measure of **Stunting** (deficit in skeletal development) due to **chronic malnutrition** i.e. long term & persistent malnutrition normally associated with long term factors such as poverty or frequent illness.

Weight –for –Age (W/A or WAZ)

- Compares weight of a child to the reference weight of a child of the same age (median weight).
- **Is a measure of underweight**
- Useful for monitoring growth and development of children
- Reflects either wasting or stunting or a combination of both.

Mid Upper Arm Circumference

- MUAC < 110mm (11.0cm), RED COLOUR, indicates Severe Acute Malnutrition (SAM). The child should be immediately referred for treatment.
- 110mm (11.0cm) and 125mm (12.5cm) – Moderate Acute Malnutrition (MAM) ORANGE
- 125mm (12.5cm) and 135mm (13.5cm), YELLOW COLOUR – At Risk
- 135mm (13.5cm), GREEN COLOUR - NORMAL

END

