

4. Nutrition - Methods of Assessing Nutritional Status

Friday, 4 October 2019 08:36



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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

1. Identifying individuals or sub-groups (e.g. women / children) in a community who are malnourished or at risk of developing malnutrition
2. Specifying the nature and magnitude of nutritional challenges / problems facing a group or community
3. Establishing extent to which an intervention, treatment or program has had the intended effect or impact
4. Monitoring or assessing trends and changes over time in the nutrition situation of country or region (surveillance)
5. Support diagnosis

Components of Nutritional Assessment

1. Nutrition 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**
 - **KDHS - Kenya Demographic and Health Services - is the Kenyan Nutrition Surveillance method that collects information every 5 years**
 - *Questionnaire - what would you want to know from the community to help you assess nutrition and why there is poor nutrition in a community*
 - *Infant feeding habits - breastfeeding if present*
 - *How many are actually breastfeeding, how many on formula*
 - *Frequency of breast feeding*
 - *Duration of exclusive breastfeeding*
 - *Duration of combined breastfeeding with complementary feeding*
 - *Maternal Diet - including supplementation (e.g. Vitamin A)*
 - *How the baby is fed - method of feeding (bottle feeding is bad for hygiene)*
 - *Other health concerns that affect breastfeeding- e.g. is a mother HIV positive and how they are feeding the baby*

- *Complementary Feeds*
 - *Frequency - number of feeds a day frequency*
 - *Quality feeds (what they eat and diversity of foods and nutrients)*
 - *Diversity - animal foods, fruits of some kind for micronutrients, milk (and other high value foods),*
 - *Hygiene and Safety Issues - handling of food*
- *Prevalence of Disease in the community -*
 - *e.g. is there a prevalence of round worm in the community that hinders nutrition*
- *Knowledge levels*
 - *What are their attitudes and beliefs towards nutrition and what are the influencers towards nutrition*
 - *Sources of information - healthcare / community elders / radio?*
- *Socio-economic Status*
 - *How does it affect what they can afford and what they are able to feed their child.*

2. Nutritional Screening

- Comparison of an individual's measurement with predetermined risk levels or cut off points, using certain measurements (weight, height, circumference)
- Serves to identify individuals requiring nutritional intervention. Can be at an individual level or on sub-population considered to be at risk.
- Risk Factors which would necessitate a more comprehensive assessment / screening
 - Weight <80% or >120% of ideal weight
 - A history of unintentional weight loss of >4.5 kg
 - Serum Albumin concentration of <3.5 g / dl
 - A history of illness
 - Symptoms or factors associated with nutritional depletion or inadequate nutrient intake or absorption

3. 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 cause (determinant)
- Data from nutrition surveys are largely concerned with the prevalence of certain conditions
- *Random NB: Types of Studies: Cross sectional / cohort / case studies / longitudinal studies*
- *NB: difference between incidence and prevalence. Prevalence is the number of existing cases present, while incidence is looking at the population at risk.*

Nutrition Status of children is a reflection of the whole community. WHY?

- Children are most vulnerable to inadequate food intake and diseases, the major underlying causes of malnutrition
- Infants and young children within the first 2 years have rapid growth, high nutrient requirements. Thus, inadequate diets, a time of continuous stress from bacterial, viral and parasitic infections impact growth of children with long lasting implications

METHODS OF ASSESSMENT

- A comprehensive nutritional assessment includes
 - Dietary history and intake information
 - Physical examination for clinical signs
 - Anthropometric measures
 - Laboratory tests
- Choice of method (s) is determined by:
 - The objectives of the survey
 - Availability of resources
 - Uses to which the data collected will be put to
 - Time allocated and available to do all the tests
- 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
 - *E.g. looking for edema in PEM (Kwashiorkor vs Marasmus)*
 - *E.g. looking for vitamin A, Iodine to identify other clinical issues*

ABCD of Nutritional Assessment - SUMMARY

- *A - Anthropometric Measurements*
- *B - Biochemical or Laboratory Assessment*
- *C - Clinical Assessment (Observation)*
- *D - Dietary Assessment*

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.
 - *E.g. Skin - dark pigmentation (kwashiorkor), hair loss*
 - *E.g. Eyes - sunken eyes (Marasmus) from extreme deprivation, pallor in anaemic patient, Bitot spots, cirrhosis, ulceration of cornea*
- Method is most useful during advanced stages of nutritional deprivation as clinical signs are late manifestations of malnutrition - when overt disease is present
 - *E.g. eyes - night blindness (xerophthalmia and Vit A def)*
 - *E.g. Edema on limbs / face - localised (Marasmus)*
 - *E.g. Scurvy as a result of Vit C deficiency*
- Relatively inexpensive method and with careful training and continuing supervision, junior personnel can be taught to recognise certain crucial clinical signs
- Clinical assessment includes checking visible signs such as bilateral pitting oedema, wasting, hair loss, and other nutritional deficiencies
- It also involves checking symptoms of infections such as fever, diarrhoea and vomiting
- In children, it includes history of growth patterns

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 (*e.g. clinical evaluation of eyes that see vital spots, but need confirmation*)

- Biochemical tests are costly and time consuming to carry out - collection, transportation, laboratory analysis and interpretation
 - *Need skilled professionals who know how to draw blood as well as have the necessary equipment*
 - *Need to transport these samples from the field to a laboratory*
- How? Sub-sampling or choosing subjects considered on clinical evidence to be deficient
- Findings should be correlated with all other findings - clinical, anthropometric, dietary and ecological issues
- Laboratory Indicators of Nutritional status include
 - Haemoglobin
 - Haematocrit
 - Cholesterol
 - Triglycerides
 - Serum Albumin levels
 - Glucose and total protein levels

Dietary Assessment

- Examination of food intake - Types 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 and is less precise and more subjective than other methods
- 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
 - Retrospective methods of dietary assessment
 - Measure food intake from the past
 - Includes
 - 24 hour recall (may include volumes of food and drink)
 - Food frequency questionnaires (*how many times have you eaten meat, have you had any vegetables? Etc*)
 - Keeping of a food diary
 - Dietary history since early life
 - Prospective Methods of dietary assessment
 - Assess current food intake
 - Includes:
 - Food records
 - Observed food consumption
- Details about the dietary Assessment methods
 - 24 hour dietary recall
 - Involves completing a questionnaire or being interviewed about everything consumed within the last 24 hours
 - This is the most commonly used method
 - Food Frequency Questionnaire
 - Questionnaire provides information on the number of times in a day, week, or month certain food items are consumed
 - Usually complements the 24 hour dietary recall method
 - Dietary History
 - Aims to discover the usual food intake pattern

- Prospective methods
 - Food Diaries
 - Respondent records details of foods and beverages consumed during a specific period.
 - Provide information on portion size: Weights or household portions
 - Observed food consumption
 - A trained observer / caregiver records food and beverages consumed
 - Most unused in clinical practice; It is only recommended for research

- *Interpretation of Dietary Data*
 - The amount of energy and specific nutrients can then be calculated using food composition tables (www.kilimo.go.ke/wp-content/uploads/2018/10/KENYA-FOOD-COMPOSITION-TABLES-2018.pdf)
 - The daily intake can be compared to recommended daily intake (RNI) or recommended dietary allowance (RDA)

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 under-nutrition, principally from inadequate intake of protein and calories in early childhood

- Key Measurements
 - Facilitate assessment of body mass
 - Weight
 - Height
 - Body composition and reserves of proteins, subcutaneous fat and muscle
 - Triceps skinfolds thickness
 - Mid upper arm circumference

- 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 weight 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

 - *BUT FIRST - make sure you take consent from the mother / child if they are old enough*
 - *AND create a rapport with the mother and child to ensure cooperation*

- Weight Measurement
 - Electronic Scale - accurate however, it may not be easy to carry a heavy electronic scale up and down hills to the community

 - Salter Scale - with 2 hooks and a diaper/holder/thing in different sizes + Laminated sheet with instruction + MUAC tape + Rope to hang the scale on a tree.
 - Salter scale measuring up to 25kg with a special bag - form children < 6 years old. For infants <6 months, there is a different cloth that is used

- 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 0.1kg
- If they do, a third reading should be taken and the closest pair of values recorded (not more than 0.1kg)
- Alternative - Electronic Scale - up to 100 kg

- *NB: This should be done with as little clothes on as possible*
- *DEMONSTRATION ON HOW TO USE A SALTER SCALE*

- Procedure for Salter Scale
 - Hang the scale from a tree or beam from a ceiling, roof beam so that the scale can be read at eye level
 - As 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 till they are hanging
 - Take two or three measurements and record those that do not differ by more than 0.1kg

- MUAC measurement
 - Insertion Tape

- Height Measurement
 - Encampment length / height