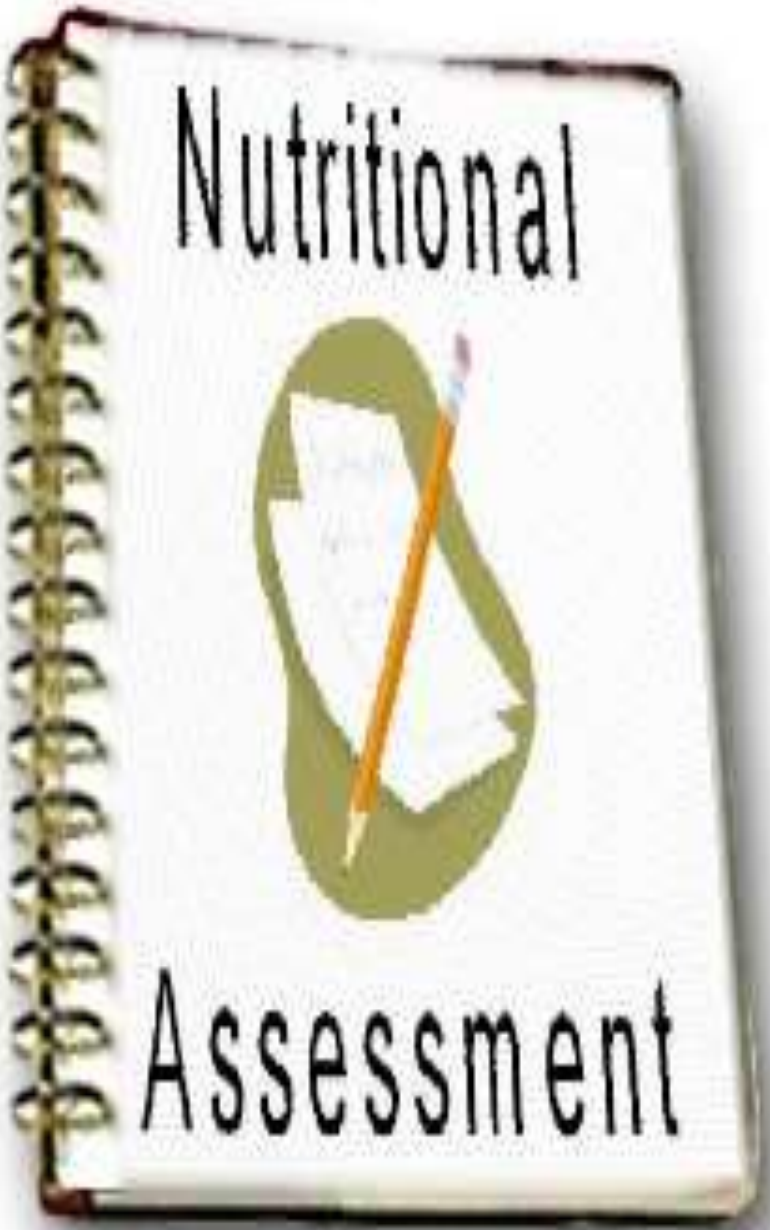


Prof Dr Najlaa Fawzi

Nutritional Assessment

Nutritional assessment is the evaluation of nutritional status [as the health condition of an individual is influenced by the food consumption and utilization].

To identify patients at risk for nutritional problems.

These include malnutrition, but also such nutrition related diseases as DM.

Nutritional Status: is the degree to which an individual's physiological need for nutrients is being met by the foods he/or she is eating.

It is the state of balance in the individual between the nutrient intake and the nutrient expenditure or need.

It can be affected by many factors including: disease, cultural patterns, eating behavior or habits, psychological stress, economic and nutrient absorption.

The goals of assessment are directed towards therapy.

The outcome of nutritional assessment should be a care plan for the patient who identifies the appropriate medical nutrition therapy, both in people requiring only modifications of a normal diet and in those who require aggressive nutritional repletion and support.

Purpose of Nutrition Assessment

- **Estimates functional status, diet intake and body composition compared to normal populations**
- **Body composition reflects calorie and protein needs**
- **Nutritional status predicts hospital morbidity, mortality, length of stay, cost**
- **Baseline body composition and biochemical markers determine if nutrition support is effective**

Assessment of nutritional status is usually under taken for the following reasons:

1. To confirm the diagnoses of malnutrition(under or over nutrition)

2. To identify the reasons for the presence of malnutrition

3. To provide a means of monitoring the effectiveness of nutritional support.

The evaluation of nutritional status is carried out by using the A, B, C, D approach (direct methods), and indirect methods.

Anthropometric measurements,

Biochemical tests,

Clinical observation,

Diet evaluation.

Anthropometric measurements:

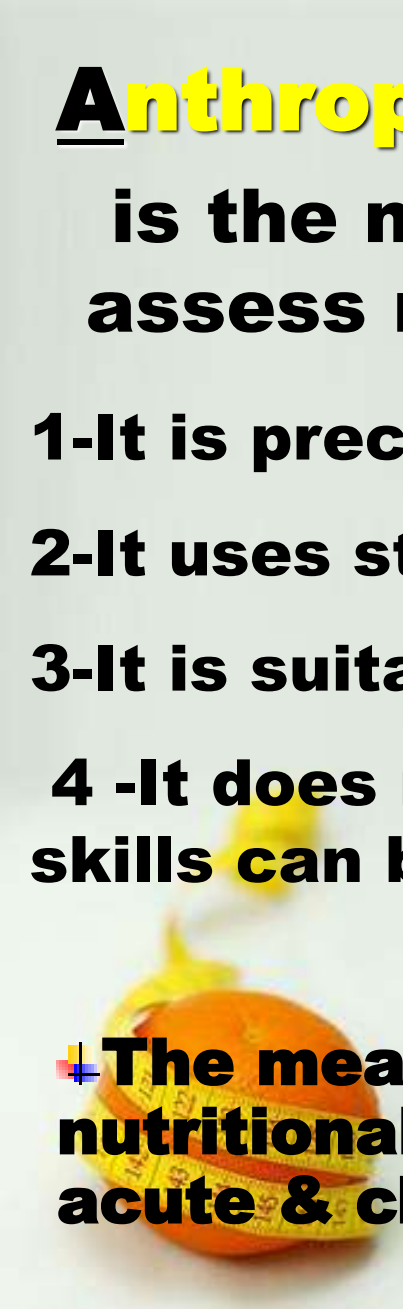
is the most frequently used method to assess nutritional status.

1-It is precise and accurate

2-It uses standardized technique

3-It is suitable for large sample sizes

4 -It does not require expensive equipment, and skills can be teach with short period



- **The measured values reflects the current nutritional status & don't differentiate between acute & chronic changes .**

Common indicators
Wt. for Height (W/H)
Ht. for Age (H/A)
Wt. for Age (W/A)
BMI

Height stature [length] is important in evaluating growth and nutritional status in children, in adults the height is needed for assessment of body size.

Weight: body weight is simple, give a gross estimate of body composition. Weight is one of important measurements in assessing nutritional status & is used to predict energy expenditure.

Body Mass Index [BMI]

Is a measure that describes relative weight for height, and is significantly correlated with total body fat content

BMI= WEIGHT [kg] / HEIGHT [meters²]

The desired BMI for a healthy adult is {18.5- 24.9}, which reflects a healthy weight for height.

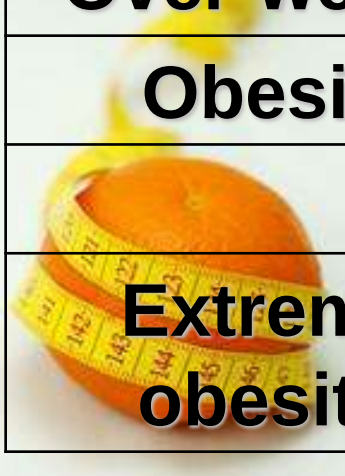
Person with BMI of [25-29.9], is at low risk for health problems.

Persons with BMI of (30-39.9) are at high risk, and BMI greater than 40 indicated very high risk for health problems associated with obesity and over- weight.

BMI of less than 18.5 is classified as under-weight, and is associated with risk factors as respiratory diseases, TB, digestive diseases and some cancers.

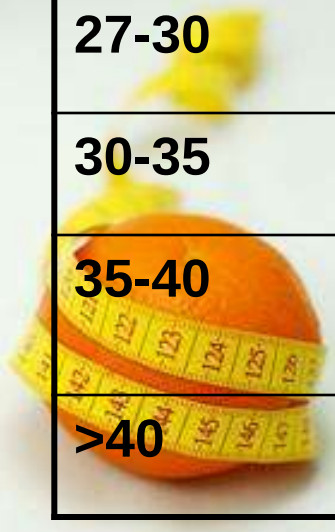
Classification of over –weight and obesity

	Obesity Class	BMI kg/m²
Under-weight		less than 18.5
Normal		18.5-24.9
Over-weight		25-29.9
Obesity	I	30-34.9
	I I	35- 39.9
Extreme obesity	I I I	more than 40



The following table can be used to identify health risk base solely on BMI or to identify the adjusted risk [based on BMI and the presence of 1 or more co- morbidities].

BMI CATEGORY	HEALTH RISK	ADJUSTED RISK
<25	Minimal	Low
25-27	Low	Moderate
27-30	Moderate	High
30-35	High	Very high
35-40	Very high	Extremely high
>40	Extremely high	Extremely high



BODY MEASUREMENTS:

SKIN FOLD THICKNESS: are often used to estimate subcutaneous fat stores or the pattern of fat distribution. This information can be used to help determine nutritional status. Skin fold sites typically measured are the: triceps, biceps, below the scapula and above the iliac crest.

In men, values of thickness less than [12.5mm] suggest under nutrition, and values over [20mm] suggest excess fat and over nutrition.

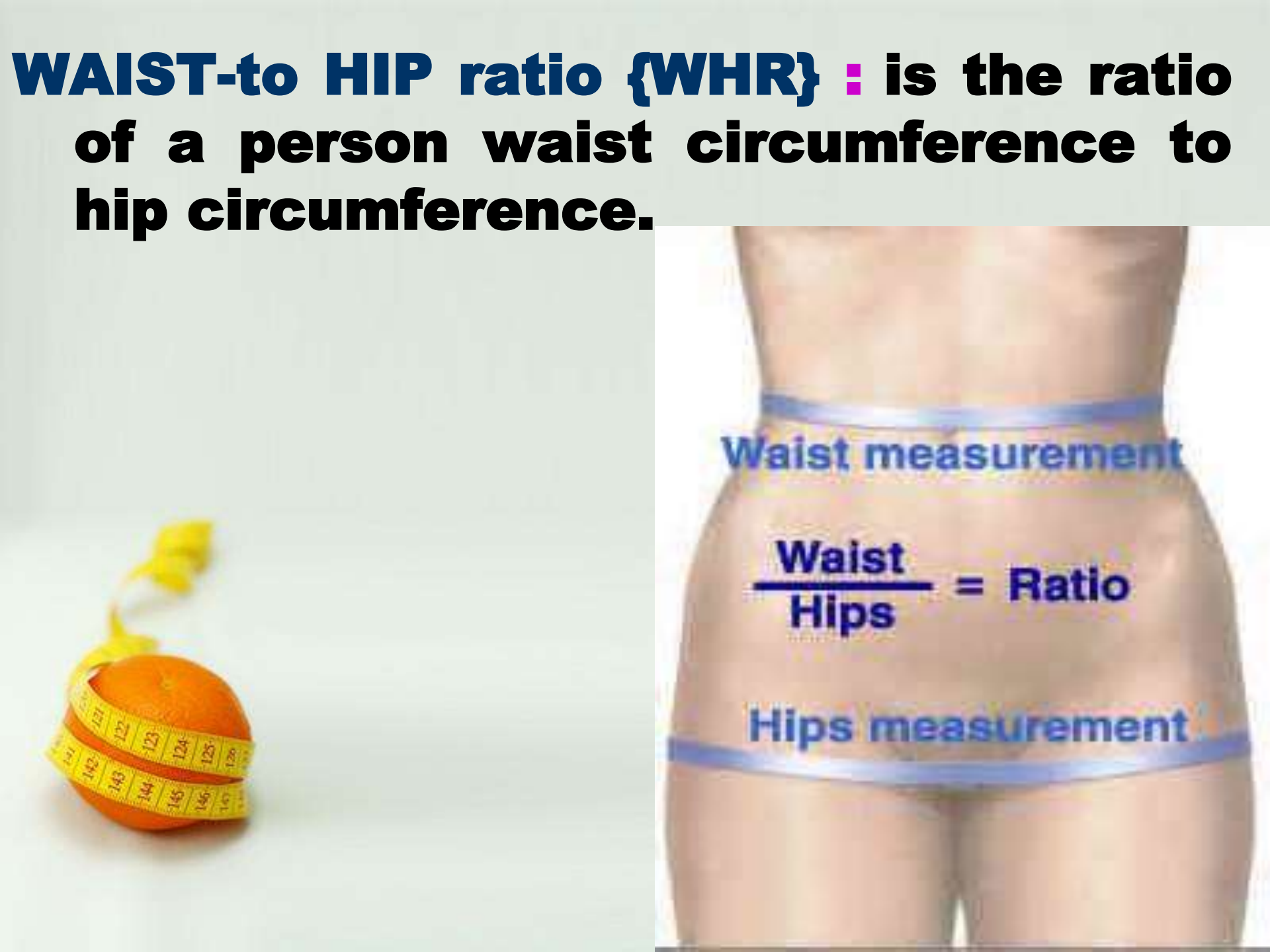
In women values less than [16.5mm] and values greater than [25mm], indicate under and over nutrition respectively.

WAIST CIRCUMFERENCE: is a common way to assess abdominal fat content, the presence of excess body fat in the abdomen when out of proportion to the total body fat is considered an independent risk factor for diabetes ,cardiovascular diseases and breast cancer.

Man who have a waist measurement greater than [102cm] and a woman with waist measurement greater than [88cm] are identified to have substantially increased risk of metabolic complications associated with obesity.

In Iraq, women exceeded standard measurements [91.9cm], while the men are within the acceptable standard [93.3cm].

WAIST-to HIP ratio {WHR} : is the ratio of a person waist circumference to hip circumference.

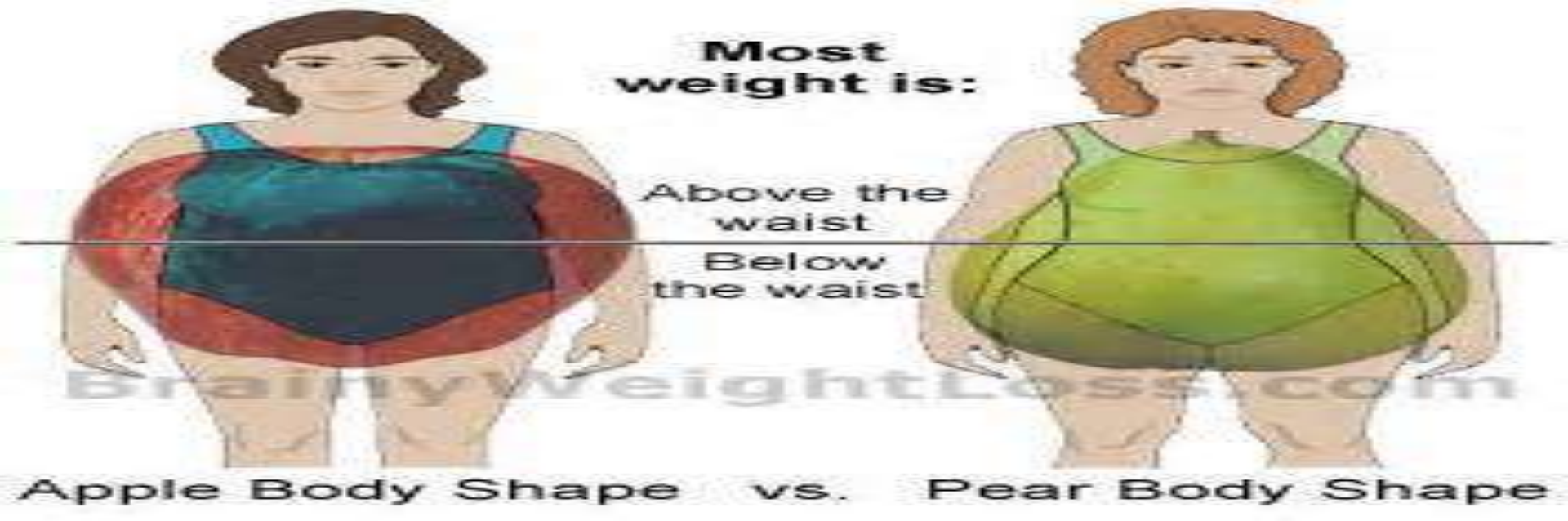


The WHR has been used as an indicator or measure of the health of a person, and the risk of developing serious health conditions.

Research shows that people with "apple-shaped" bodies (with more weight around the waist) face more health risks than those with "pear-shaped" bodies who carry more weight around the hips.

Those with apple shaped bodies have a greater risk of heart disease, breast cancer, diabetes, gallbladder problems, high blood pressure and colorectal cancer, according to the Mayo Clinic.

Pear shaped individuals are more likely to have osteoporosis, varicose veins and menopausal symptoms.



WHR has been found to be a more efficient predictor of mortality in older people than waist circumference or BMI.

If obesity is redefined using WHR instead of BMI, the proportion of people categorized as at risk of heart attack worldwide increases threefold.

WHR have been shown to be a better predictor of cardiovascular disease than waist circumference and body-mass index.

A WHR of 0.7 for women and 0.9 for men has been shown to correlate strongly with general health and fertility.

Women within the 0.7 range have optimal levels of estrogen and are less susceptible to major diseases such as diabetes, cardiovascular disorders and ovarian cancers.

Women with high WHR (0.80 or higher) have significantly lower pregnancy rates than women with lower WHRs (0.70–0.79), independent of their BMIs.

Men with WHRs around 0.9, similarly, have been shown to be more healthy and fertile with less prostate cancer and testicular cancer

Biochemical Assessment: laboratory evaluation can identify specific nutrition-related abnormalities such as anemia, iron deficiency, or protein deficiency.

The tests results of biochemical assessment provide useful information to determine the effects of nutritional factors and /or of medical conditions on the health status of patients.

- **Interference – drugs, sampling**
- **Nutrient-nutrient interactions, drug-nutrient interactions**
- **Be aware of hydration status**
- **Must interpret lab results with other nutritional parameters**

Initial Laboratory Assessment

- **Hemoglobin estimation is the most important test, & useful index of the overall state of nutrition.**
- **Beside anemia it also tells about protein & trace element nutrition.**

- **Stool examination for the presence of ova and/or intestinal parasites**

- **Urine dipstick & microscopy for albumin, sugar and blood**

Specific Lab Tests

Measurement of individual nutrient in body fluids (e.g. serum retinol, serum iron, urinary iodine, vitamin D)

Advantages of Biochemical Method

- It is useful in detecting early changes in body metabolism & nutrition before the appearance of overt clinical signs.
- It is precise, accurate and reproducible.
- Test result may reflect immediate intake (e.g. glucose) or long term status (HbA1c)

➢ Limitations of Biochemical Method

- Time consuming
- Expensive
- They cannot be applied on large scale
- Needs trained personnel & facilities

Clinical Assessment

includes collection data from several sources: medical history, social history, and physical examination.

Social or family factors may also affect nutrient intake and past or present medical conditions that may influence nutrient utilization.

Clinical issues to consider:

- **Medical history, treatment and medications**
- **Significant factors affecting nutritional intake**
- **Fluid balance – input and output, Bowel habits**
- **Physical assessment of nutritional status**
- **Clinical signs and symptoms**

Features associated with nutritional deficiency:

Face; pallor---- iron

Nails, spoon- shaped, brittle, ridged---- iron

Eyes: dry cornea, Bitot´s spots--- Vit A deficiency

Bleeding, spongy gums---- vit C deficiency

From "Fundamentals of Clinical Nutrition" by R. L. Weinsier copyright 1993 by Mosby-Year Book, Inc. N.Y.
Fig. 2-5 Periodontal disease seen in scurvy.

Goiter --- iodine deficiency

Bones [bow legs]--- vit D

Many physical signs and symptoms are also act as integral part of assessing nutritional status.

Clinical Signs and Symptoms

Signs

- Subjective, impression
- Descriptive, observation
- Appearance
- Visual examination
- Needs clinical judgement
- E .g. muscle wasting, malnutrition

Symptoms

- Recall, report by subjects
- Descriptive
- E.g. nausea, itchiness, diarrhea, anorexia

Historical findings: may include: alcohol abuse→ Calories, protein vit B1, B3, B6 and folate deficiencies.

Smoking →vit C, Folic acid

Malabsorption [diarrhea, weight loss, steatorrhea] →vitamins A,D,K; calories, protein ,Ca, magnesium, electrolytes.

Isolation, poverty and dental diseases →various nutrients

Blood loss→ iron

Fever →**calories**

Surgery, trauma, burns, infections→ **calories, protein, vit C, zinc**

Drugs→ **various nutrients**

Dietary Intake Assessment: dietary evaluation is an important adjunct to the other three assessments since it provides the description of dietary intake back ground which may help explain any observed clinical or biochemical abnormalities, and may suggest proper remedial steps.

There are several methods for collecting information regarding actual and habitual dietary intake.

What are the elements of a diet history ?

The diet history is specialized and focused medical history , it must include the following elements

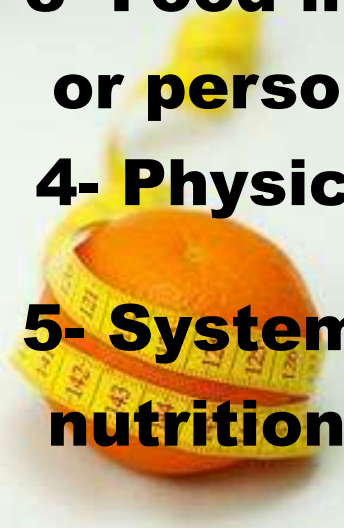
1- Weight history , emphasizing recent changes

2- Eating habits and food intake , emphasizing recent changes

3- Food intolerance , allergic ,and specific religious or personal exclusion

4- Physical activity and exercise

5- Systematic and endocrine diseases related to nutrition , such as diabetes



6- Gastrointestinal diseases

7- Evidence of poor nutrition , such as pressure sores and poor wound healing

8- Concurrent drug therapy , including nonprescription drugs and nutritional supplements

While not always necessary , a 3-day or 1-week food record can be helpful in dealing with particularly difficult problems.

24-hours Diet Recall

In this method, the patient is asked to report all foods and beverages consumed during the past 24 hours.

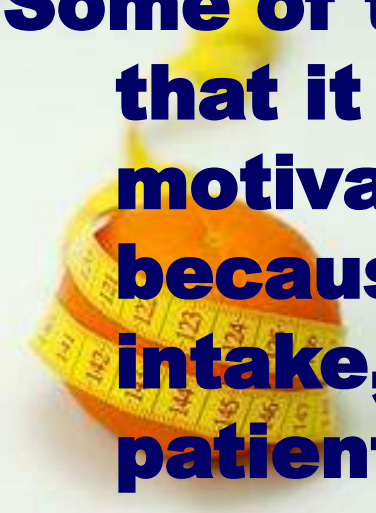
Detailed description of all foods, beverages, cooking methods, and supplements, along with portion size in common household measures are included.

Food models, measuring cups, life-size pictures, or abstract shapes [square, circle] are used to assist the patient in estimating correct portion sizes of food consumed.

This method is useful in screening or during follow-up to evaluate adaptation of or compliance with dietary recommendations.

The advantages of this method are that is quick [only 15-20 mints] are needed and it can be used with the most age groups.

Some of the drawbacks of this method are that it does rely on the memory, motivation, and awareness of the patient, because this is the only a single day's intake, may not be representative of the patient actual diet.



Food Records: estimated and /or measured food records can provide a more realistic picture of a patient's usual intake, all food, beverages snacks, and supplements are recorded by the patient, usually over a period of 1-7days, using a house hold measures.

To assure accuracy, the patient must trained with the food models, measuring cups, or other measuring devices that will help ensure recording of proper or actual portion sizes.

Cooking methods, recipe ingredients and descriptions need to be recorded as completely and accurately as possible.

A 3 days record [including two week days and one week end day] can be acceptable.

Obviously for this method of dietary data collection, patient must be literate, numerate, and well motivated.

The collection of data by any method provide information regarding intake, of calories, protein, CHO, fat, vitamins, minerals and fluid, which can be calculated manually using food composition tables or analyzed by computer soft ware.

This will allow medical professional to identify nutrient deficiencies, imbalances and excesses.

Indirect Methods of Nutritional Assessment

include the following categories:

1- Ecological variables including crop production.

2- Economic factors e.g. per capita income, population density& social habits.

3- Vital health statistics particularly infant, under five mortality & fertility index.

4-Morbidity data

Hospital or community morbidity surveys
PEM, Anaemia, Xerophthalmia,
Measles, Diarrheoa, Parasitic infestations

Assessment of the Nutritional Status of the Community

The nutritional status of a community is the sum of the nutritional status of the individuals who form that community.

The main objective of a "comprehensive" nutritional survey is to obtain precise information on the prevalence and geographic distribution of nutritional problems of a given community, and identification of individuals or population groups "at risk" or in

greatest need of assistance.

In the absence of this information, problems cannot be defined and policies formulated.

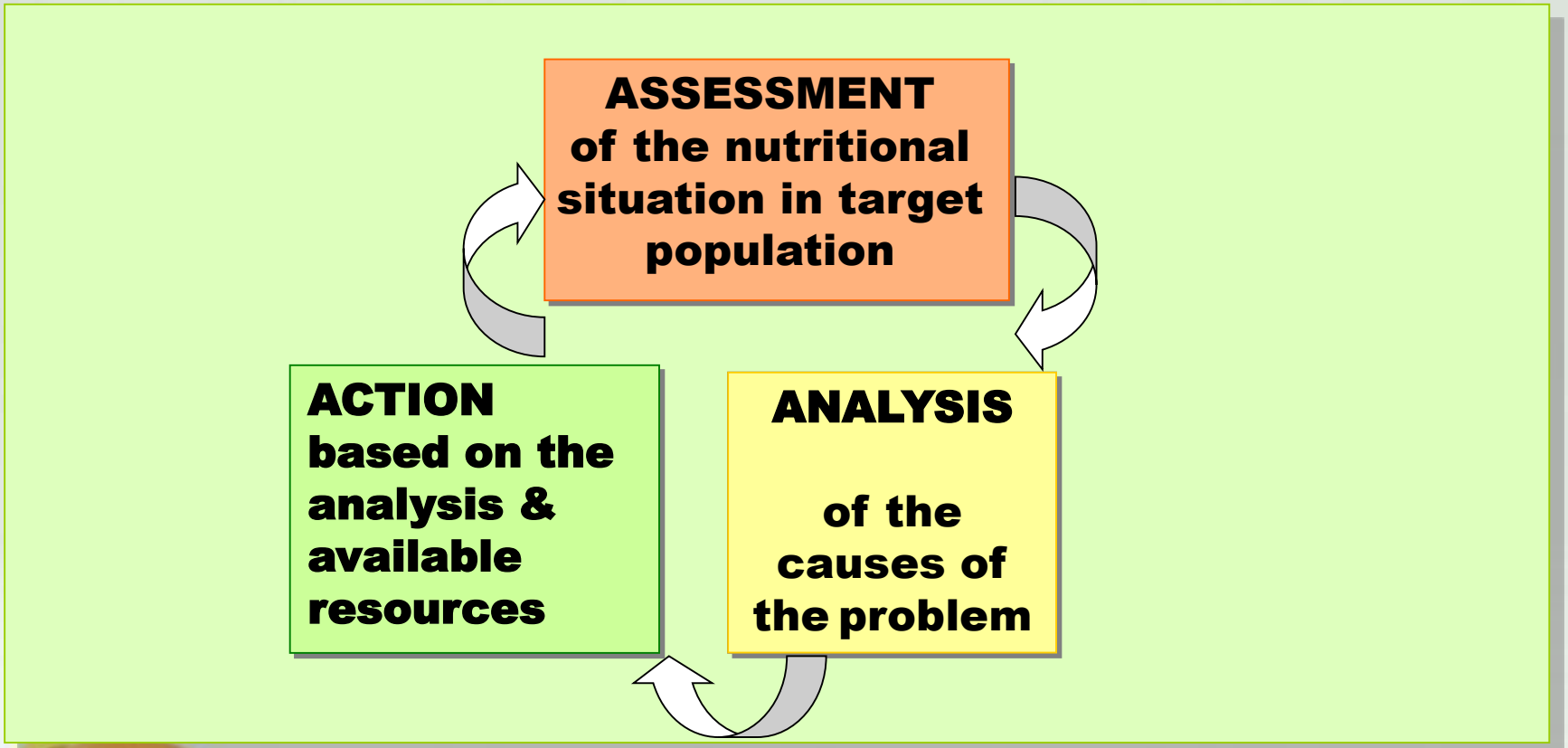
Identifying nutritional problems of a population in a clear and measurable way will help to:

1-Define needs, opportunities and limitations , and prioritize solutions.

2-Evaluate programme impact and improve efficiency.

3-Influence decision making in strategic planning, policy formulation and resource allocation.

4-Raise community awareness and participation to maximize long-term impact.


ASSESSMENT
of the nutritional situation in target population
ANALYSIS
of the causes of the problem
ACTION
based on the analysis & available resources

The indicators collected depend on the situation ; some examples are

* Predicted and actual crop yields and food supplies
*Income and food prices
*Consumption of key foods(iodized salt)

*Indicators of micronutrient deficiencies (Hb, night blindness)
*Anthropometric indicators such as BMI , birth weight and growth rates of young children