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ASSESSMENT OF NUTRITIONAL STATUS

Assessment of nutritional status

- History
- Clinical examination
- Laboratory examinations
- Dietary intake

Assessment of nutritional status: levels

- Individual
- Group
- Population
 - health statistics data compared with food/nutrient consumption data

Assessment of nutritional status: **History**

- Family
- Personal
- Nutritional
 - Type of diet
 - Mixed diet
 - Therapeutic diet, dietary restrictions
 - Food preferences
 - Problems related to food intake
 - Unintentional weight loss/gain

Assessment of nutritional status

- History
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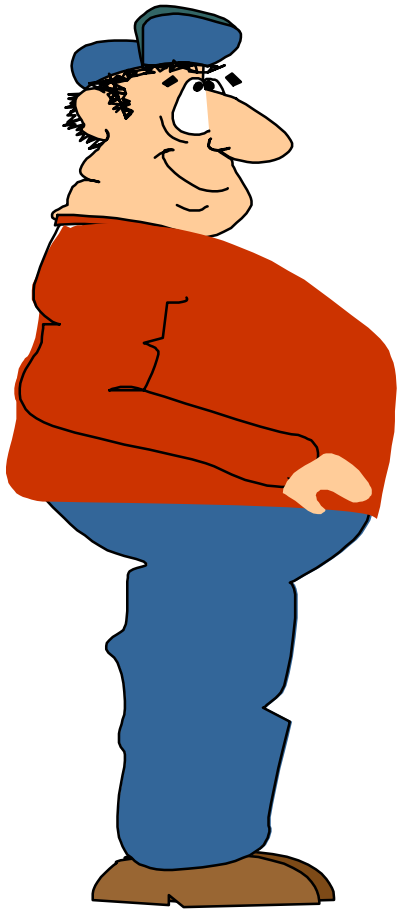
Assessment of nutritional status: **Clinical examination**

- General nutrition status (normal, wasted, obese)
- Signs of malnutrition
- Anthropometric data
 - Weight, height, BMI
 - Proportion of body fat
 - Arm circumference
 - Screening for muscle mass loss
 - Waist circumference

$$\text{BMI} = \text{weight kg} / \text{height m}^2$$

Body Mass Index

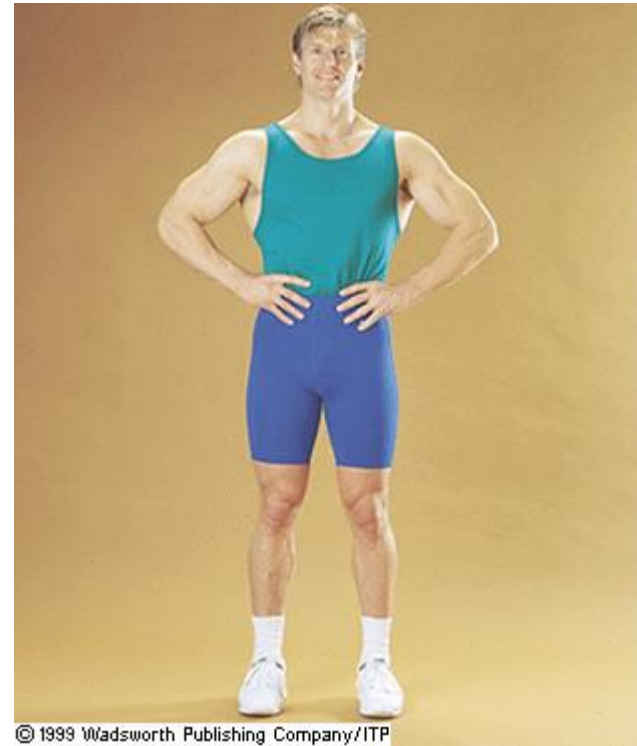
$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$



Classification	BMI (kg/m²)	Risk co-morbidity
Normal values	18.5–24.9	Average
Overweight	≥ 25	
Pre-obesity	25–29.9	Increased
Obesity class I	30.0–34.9	Moderate
Obesity class II	35.0–39.9	High
Obesity class III	≥40.0	Very High

Limitations of BMI :

does not reflect proportion of fat and fat free mass



Both men have a BMI of 31

Estimating body fat percentage: Bioelectrical impedance



Estimating body fat percentage: Bioelectrical impedance analysis

- Based on electrical conduction through organism
 - Fat-free mass (FFM) = good conductor as it contains water and electrolytes; FFM consists of 73.2% water
 - Fat (FM) is anhydrous = poor conductor of electric current
- Total FM + FFM = total body weight

Desirable proportion of body fat

	Men	Women
EU standard	<20%	<24%
US optimum	11-14%	18-22%
CZ Heiner	Up to 23-25%	Up to 28-30%

Minimum: males 3-5 % females 10-12%

Body fat location is important

- Waist circumference
 - Better predictive value than W/H ratio
 - “Apple” > risk of heart disease than “pear”

	Increased risk	High risk
Men	> 94 cm	> 102 cm
Women	> 80 cm	> 88 cm

Assessment of nutritional status

- History
- Clinical examination
- **Laboratory examinations**
- Dietary intake

Assessment of nutritional status:

Laboratory examinations

- **Blood**

- RBC, Haemoglobin
- Lipids, cholesterol
- Proteins
- Vitamins, minerals

- **Urine**

- N, urea, selected minerals and vitamins

- **Stool**

- Culture
- Metabolites

Xenobiotic load:
in body fluids,
stool, nails, hair

Assessment of nutritional status

- History
- Clinical examination
- Laboratory examinations
- Dietary intake

Assessment of nutritional status:

Dietary intake

- Prospective food record
- 24 hour recall
- Food frequency

Patients:

Prospective record of meals eaten, fluids, supplements, artificial feeds

Example: Prospective food record

- **7:00 1 slice rye bread 50g, processed cheese light (30g), green pepper (50g, 33kJ), tea 250 ml**
- **9:30 1 peach, 1 apple**
- **12:00 Chicken breast 100g, mixed vegetable 100g, boiled rice 100g, water 250 ml**
- **14:00 Broccoli 100g, leek 50g, cottage cheese 100g, orange juice 100 ml, water 100 ml**
- **16:30 5 radishes, 125 ml yoghurt, 1tsp olive oil, 1tsp minced dill, wholewheat bread 50g,**
- **19:00 Chicken ham 100g, eidam 20% 45g, 2 small tomatoes**
- **21:00 1 apple**

Example: Food frequency questionnaire

Example of a short food frequency questionnaire:

Please tick how frequently do you eat the following types of food

	≥3 times a day	2 times a day	Once a day	4-6 times a week	1-3 times a week	< once a week
Bread, cereals, rice, pasta						
Sweet bakery products						
Potatoes						
Vegetables (other than potatoes)						
Fruits						
Milk and milk products						
Red meat (beef, pork)						
Poultry						
Offal						
Fish, fish products						
Smoked meat products						
Eggs						
Pulses						
Milk and milk products						
Fats and very fatty foods (bacon)						
Sweets, cakes, icecream						

Dietary record evaluation

- More reliable for groups than individuals
- Food composition tables
 - limitations: average values
- Nutritien reference intake
 - designed for population groups

Food composition tables: **limitations**

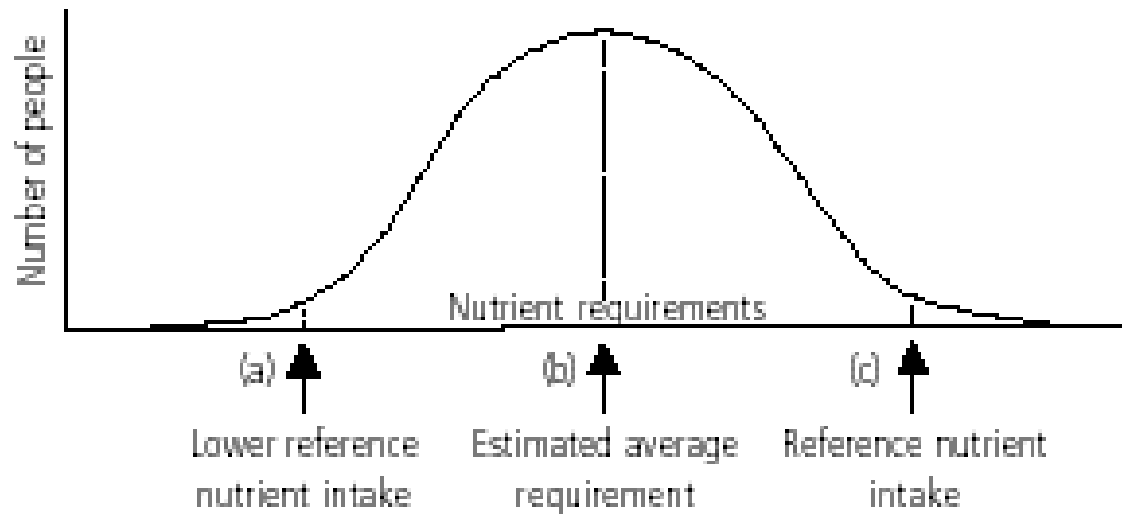
- Animal foods:
 - Different fat content influences
- Vegetable foods:
 - Protein, carbohydrates, fat constant
 - Vitamins vary: type, preparation, storage
 - Minerals vary: concentration in soil

Reference values for nutrient intake

- RDA - Recommended daily allowances
- RNI – recommended nutrient intake
- DRI – Daily recommended intake
- (...other exist)

	Men	Women
Energy [MJ]	10 (10.9)	9.2 (10)
Energy [Kcal]	2400 (2600)	2200 (2400)
Protein [g]	68 (70)	63 (65)
Fat [g]	70 (75)	65 (70)
Linoleic acid [g]	8 (9)	7(8)
Calcium [mg]	1000	1000
Phosphorus [mg]	1000	1000
Magnesium [mg]	400	400
Iron [mg]	10 (15)	15 (16)
Zinc [mg]	14	12
Iodine [µg]	200	200
Selenium [µg]	55	55
Vitamin A [mg] (retinol equivalent)	1	0.9 (1)
Vitamin D [µg]	5	5
Vitamin E [mg]	14	12
Vitamin K [µg]	75	65
Vitamin B1 (thiamine) [mg]	1.1 (1.3)	1 (1.1)
Vitamin B2 (riboflavin) [mg]	1.6 (1.8)	1.4 (1.6)
Vitamin B6 (pyridoxine) [mg]	1.9 (2)	1.8 (1.9)
Vitamin B12 (cobalamin) [µg]	3	3
Niacin [mg]	18 (20)	15 (18)
Vitamin C [mg]	100	100
Folic acid [µg]	400	400

Reference nutrient intake: **concept**



Reference nutrient intake: Applications

- Benchmark for the development of dietary guidelines and the planning of public health nutrition strategies
- Food labelling – public education
- Assess and interpret dietary surveys relating to normal healthy populations
- Assess the adequacy of the dietary intake of vulnerable groups