

Course: Nutrition and Dietetics Lab

Field of study: Dietetics

Type of instruction and number of hours: lecture 30 h, practical classes 45 h

Number of ECTS credits: 5

Learning outcomes:

Knowledge:

- Student knows and implements in practice the methodology of research on nutrition, nutritional status, individuals and groups.

Skills:

- Student prepares questionnaires for nutritional research.
- Student evaluates the nutritional status; uses questionnaires for screening and in-depth assessment of nutritional status, can recognise the type of malnutrition, obesity.
- Student shows the role of a dietitian in monitoring the nutrition of patients in the hospital.
- Student is able to use the results of laboratory and anthropometric tests in nutrition planning and assessment of nutritional status.
- Student plans an individual diet using exchangers, calculates individual energy and nutrient requirements.

Social competences:

- Student takes responsibility for the action taken and organises his/her work.

Evaluation methods of learning outcomes:

written test, activity during classes – solving tasks

Subject matter of the classes:

Lecture:

1. Nutritional dietary assessment methodology – main questionnaires: dietary records, 24-hour dietary recall, food frequency, diet history.
2. Dietary assessment in different study designs: cross-sectional surveys, case-control (retrospective) studies, cohort (prospective) studies, intervention studies.
3. Physical and clinical assessment of nutritional status part 1 – assessment of body size and shape (weight, height, WHR, BMI).
4. Physical and clinical assessment of nutritional status part 2 – assessment of body composition analysis (BIA, densitometric analysis).
5. Biomarkers and their use in nutrition intervention (blood, urine, feces, saliva, hair).
6. Overweight and obesity – behavioural risk factors, treatments and interventions.
7. Evaluation of the nutritional status of children (centile charts).
8. Overfeeding and malnutrition problems in XXI century.
9. Evaluation of the nutritional status – screening test NRS 2002, SGA.
10. Nutrition intervention – theories used in achieving dietary behaviour change in clinical trials.

Practical classes:

1. Anthropometric research and analysis of the results.
2. A questionnaire preparation for nutritional research:
 - the rules for making a questionnaire;
 - differentiate the questionnaire and the interview questionnaire;
 - prepare a questionnaire to check the frequency of food intake;
 - prepare a questionnaire to identify food preferences;
 - prepare a questionnaire for examining eating habits.
3. Creation of food rations to the assumptions of the diet.
4. Planning and evaluation of easily digestible foods:
 - the rules of the easily digestible foods, assumptions for the diet;
 - analysis of the products and dishes recommended, prohibited;
 - the differences in relation to the basic diet;
 - planning the meals: breakfasts, lunches, dinners, extra meals;
 - use of the Dietetic Cookbook;
 - evaluation of meals in terms of recommended and prohibited products.
5. Making the assumption of a diet for people with diabetes:
 - a diet planning methodology;
 - plan for an individual case of a diabetic patient (case study).
6. The use of carbohydrates, proteins and fats exchangers for nutrition planning.

Bibliography

Basic literature

Coulston A., Boushey C., Ferruzzi M., Delahanty L., *Nutrition in the Prevention and Treatment of Disease*, Elsevier – Academic Press, 2017.

Lee D. R., Nieman D. C., *Nutritional assessment*, Mc Graw Hill, 2013.

Lovegrove L.A., Sharma S., Hodson L., Lanham-New S. A., *Nutrition research methodologies*, Wiley Blackwell, 2015.

Ostrowska L., Orywal K., Stefańska E., *Diagnostyka laboratoryjna w dietetyce*, PZWL, 2018.

Complementary literature

Gibson R. S., *Principles of Nutritional Assessment*, Oxford, New York, 2005.

Gorbacz-Gancarz B., Ostrowska L., Stefańska E., Supińska E., Szczepaniak E., *English for Dietetics*, PZWL, 2016.

Hark L., Deen D., Morrison G., *Medical nutrition & disease. A case-based approach*, Wiley Blackwell, 2014.

Websites

World Health Organization: <https://www.who.int/health-topics/#D>

Nutritional assessment

Nutritional assessment is an attempt to evaluate the nutritional status of individuals or populations through measurements of food and nutrient intake and nutrition-related health. Nutritional assessment techniques can be classified according to four types:

- anthropometric,
- biochemical (laboratory),
- clinical,
- dietary.

Use of the mnemonic 'ABCD' can help in remembering these four types.

Nutritional screening

Nutritional screening allows persons who are at nutritional risk to be identified, so that a more thorough evaluation of the individual's nutritional status can be performed.

The most popular methods of Nutritional Status

- **In the 24-hour recall method**, a trained interviewer may ask the respondent to remember all foods and beverages consumed during the last 24 hours. The Automated Multiple-Pass Method and the Internet based automated self-administered 24-hour recall have simplified and improved the collecting of dietary data using the 24-hour recall. The 24-hour recall is quickly administered, has a low respondent burden, but does not give data representative of an individual's usual intake.
- **A food frequency questionnaire** assesses nutrient intake by determining the frequency of consumption of a limited number of foods known to be major sources of the dietary components of interest.
- **A diet history** is valuable in understanding of a patient's nutritional status. This includes information about the patient's usual eating pattern, food likes and dislikes, and intolerances and allergies, as well as money available for purchasing food, ability to obtain and prepare food, eligibility for and access to food assistance programmes, and use of vitamin, mineral, and other supplements.

Biochemical tests to assess nutritional status can be grouped into two general categories: static and functional tests. Static tests are based on measurement of a nutrient or specific blood, urine, or body tissue metabolite. Functional tests involve the physiologic processes that rely on the presence of adequate quantities of a nutrient.

Estimates of portion sizes can be sources of mistake in measuring dietary intake. A number of tools have been developed to assist respondents in accurately reporting amounts of foods consumed. These include photographs of food, geometric shapes of various sizes, measuring devices, and realistic plastic food models.

National dietary and nutrition survey data are important in monitoring the nutritional status of a country's population, revealing the relationships between diet and health, identifying groups at nutritional risk and those who may benefit from food assistance programmes, and evaluating the cost-effectiveness of food assistance and health education programmes.

Subjective Global Assessment is a clinical technique for assessing the nutritional status of a patient based on features of the patient's history and physical examination, rather than relying on more objective measures of nutritional status, such as anthropometric and biochemical data.

1. Study the following case and answer the questions that follow

Medical report:

Adonis Scheller is a 35-year-old morbidly obese man with a past medical history of gastric ulcers, hypertension lasting 4 years, high triglyceride level and elevated cholesterol since 2012. He was hospitalised due to arterial hypertension in 2011. He was diagnosed with insulin resistance in 2014. He is married, has got two sons, at the age of 9 and 11, both of whom are overweight. His father died of a heart infarct at the age of 65, had hypertension, atherosclerosis and he was obese. His mother is alive, 62-year-old, of normal weight. She has osteoporosis. His younger sister, 28-year-old, is overweight. The man has been smoking a package of cigarettes daily for twenty years, but he drinks only occasionally. He has a sedentary lifestyle and avoids physical activity. He says that he sleeps well but snacks at night when he wakes with hunger pangs. During the day, he eats three big meals, and snacks frequently. He was referred to a dietitian by his General Practitioner due to obesity, hypertension and hyperglyceridemia that are pharmacologically difficult to control. On the physical examination his blood pressure was high, 162/98 mmHg, despite being treated with antihypertensive drugs.

Questions:

1. In what way are nutrition and dietetic related with health?
2. What are the medical risks associated with obesity?
3. What are the health risks related with diabetes mellitus?
4. What do you know about N-NCD's (nutrition-related non-communicable diseases)?
5. What do you think, do the patient's preferences should be changed to help him to lose weight and improve health?
6. What kind of nutrition assessment method would you choose for this patient?
7. What type of dietary questionnaire should you prepare for this patient?
8. What is the Body Mass Index of this patient? Can we calculate it?
9. What is the normal value of blood pressure?
10. Should you prepare the subjective global assessment for this patient?

2. Diabetes mellitus – study the following case and answer the questions that follow

Case description

Mia Antalaya is a 55-year-old Hispanic female. Mia presents history of fatigue and lethargy, mostly noticeable after meals and in the evening. She also periodically experiences transient hot flashes. She has noticed some increased irritability, both at home and at work, which she attributes to her fatigue. She does not have any recent change in weight or appetite, shortness of breath, skin or hair changes, change in urinary frequency, bowel irregularity, or memory impairment.

Height: 5'4" (163 cm)

Current weight: 187 lb (85 kg)

BMI: 32 kg/m²

Waist circumference: 37 inches (94 cm)

Blood pressure: 145/90 mm Hg

Laboratory Data – random capillary blood glucose: 210 mg/dL (normal: 70 to 99 mg/dL)

Based on her history and laboratory data, Mia Antalaya's problem list includes: type 2 diabetes mellitus, obesity class I, stage 1 hypertension, dyslipidemia and perimenopausal hot flashes.

Case questions:

1. What are the risks factors of Mia’s problem?
2. Describe insulin resistance pertains type 2 diabetes mellitus.
3. What specific evidenced-based nutrition recommendations would you give to Mia based on her current diagnosis?
4. What is the role of exercise in patients with type 2 diabetes?
5. Prepare one day menu for Mia.

3. Obesity and metabolic syndrome – study the following case and answer the question that follow

Case description

Kathrine Koen is a 44-year-old African – American woman who works as a manager at McDonald’s. She has high blood pressure and obesity. She has a history of dieting but has been unable to maintain a healthy weight. She has tried a weight-loss diet. Kathrine Koen states her weight problems began when she had her first child, 18 years ago. Although she understands the medical consequences associated with being overweight, she is primarily motivated to lose weight for cosmetic reasons.

Height: 5’3” (160 cm)

Current weight: 208 lb (94.5 kg)

BMI: 36.8 kg/m²

Waist circumference: 38 inches (96.5 cm)

Blood pressure: 135/88 mm Hg

Case Questions:

1. How are overweight or obesity clinically assessed for this patient?
2. What are the medical risks associated with obesity of this patient?
3. Does Kathrine Koen meet the criteria to diagnose metabolic syndrome?
4. What are the appropriate treatment goals for Kathrine Koen?
5. Kathrine Koen is interested in trying a high-protein, low-carbohydrate diet. Describe the biochemical and metabolic effects of high protein, low carbohydrate diets.
6. What dietary and exercise guidelines would you recommend for Kathrine Koen considering her diagnosis of metabolic syndrome and her current diet?
7. On a subsequent visit, Kathrine Koen is interested in medication for weight loss. What do you think about it? Discuss the current criteria and options for pharmacological therapy.

4. Medical history

Study the table below and then look at the questions concerning patient’s medical status that the dietitian may have asked when interviewing the patient.

| Medical history | |
|--|--|
| History of presenting complaint including dietary history: | Numerous weight-reduction diets, rapid body weight losses with ‘yo-yo effects’, hypertension of 4 years duration |

| | |
|------------------------------|--|
| Main complaints: | 35-year-old patient with morbid obesity, hypertension and hyperglyceridemia, high cholesterol, insulin resistance |
| Other complaints: | Sleep – good Appetite – good, frequent snacking, 3 big meals, night snacking Thirst – 2-3 l liquids/day Stool – no changes Urine – no changes |
| Family history: | Mother – alive, 62-year-old, osteoporosis, normal weight Father – died of heart infarct last year (when he was 65), obesity, hypertension, atherosclerosis Sister – alive, 28-year-old, overweight |
| Social history: | Sedentary lifestyle – office clerk Housing conditions – good Married, two children (9-year-old and 11-year-old boys); overweight Alcohol – sporadically Smoker – 1 package/day for 20 years |
| Past medical history: | 2009-2010 gastric ulcers Since 2011 arterial hypertension, hospitalised Since 2012 hyperglyceridemia, high cholesterol – treated with drugs Since 2014 – insulin resistance |

Questions:

1. What is the problem with this 35-year-old man?
2. When the patient has the increased appetite?
3. Does he undertake any physical exercise? Walking? Swimming?
4. Does he smoke? How much? How long has he smoked?
5. Is he married?
6. How old is his sister/mother?
7. Does he have children? How old are they? Are they Ok? Do they have any weight problems?
8. Has he ever been admitted to hospital?
9. Has he ever been operated on?
10. Has he had any health problems in the past?
11. Do his parents live and are they well?
12. What did he die of?
13. Was he overweight/ obese?
14. Does anyone in the family have any health problems?
15. Where does he live? Are his living conditions alright?
16. Has he ever been on any diet? Was it one diet or many? What kind of diet was it?
17. Did he lose weight? How much weight did he lose?
18. Did he have the yo-yo effect?
19. Does he sleep well?
20. Does he drink alcohol? How much? How often?
21. How long has he had hypertension/ high triglycerides?
22. Are there any other problems?
23. What does he do at work?

5. Describe the patient

Read the information about the patient. What can you say about patient (explain Body Mass Index)?

The patient: Kate Mider
 Sex: female
 Age: 16
 Height: 179.8 cm (70.8 in; 5.9 ft)
 Weight: 70 kg (152.1 lb)
 Problem: weight loss

6. Food diary

Analyse the list of the food the patient ate and give her dietary recommendations.

Menu – Day 1:

1. Chocolate milk 200 ml, 2 bananas,
2. 4 white toasts with butter and strawberry jam,
3. Strawberry yoghurt 200 ml,
4. orange, one chocolate bar 50 g,
5. crisps 200 g,
6. coke 500 ml.

Menu – Day 2:

1. 2 slices of bread with strawberry jam, apple juice 250 ml,
2. Bread roll 100 g, grilled chicken 350 g, sprite 500 ml,
3. two cans of sardines in oil, bread roll 100 g,
4. A glass of milk, banana 300 g, coffee with sugar – 2 teaspoons,
5. butter biscuits 100 g,
6. 2 slices of white bread with coco-cream, coffee.

7. Complete the chart for the fictional patient

Swap the charts with a partner. Analyse each other’s charts, describe the case and give the patient recommendations.

| | |
|-----------------|--|
| Patient’s name | |
| Sex | |
| Age | |
| Height | |
| Weight | |
| Problem | |
| Recommendations | |

Day 1

| Meal | Time | Place | Food and drink | Amount |
|------|------|-------|----------------|--------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

8.1. A male patient Adonis Scheller, 35-year-old, has just received his physical and lab results

He is not sure what the abbreviations mean. In pairs, analyse the information from the tables below. Then, assess the body fat of the patient. Which information can you use for the assessment?

| Laboratory report | Result | Ref. value |
|--|---|--|
| Immunology: CRP | 10.78 mg/l (H!) | < 10 mg/l |
| FBC (full blood count): RBC WBC HbA1c | 5.29 (H!) 11.28 (H!) 8,1% | 3.91-5.11 x 10 ⁶ /μl 4.5-10.5 x 10 ⁹ /l 5.7% |
| Lipids: Total cholesterol HDL LDL TG | 300 mg/dl l (H!) 20 mg/dl (L!) 249 mg/dl (H!) 350 mg/dl (H!) | < 190 mg/dl > 40 mg/dl < 100 mg/dl < 150 mg/dl |
| Electrolytes and blood chemistry: Glucose, fasting Potassium Sodium | 130 mg/dl (H!) 3.29 mmol/l (L!) 143 mmol/l | 70-99 mg/dl 3.8-5.5 mmol/l 135-145 mmol/l |

| Anthropometric data – body composition | |
|--|------------------------|
| Height | 166.9 cm (5 ft 6 in) |
| Weight | 120.9 kg (267 lb) (H!) |
| BMI: | 42.9 |
| Adipose tissue (kg): | 50.6 kg (110 lb) |
| Adipose tissue (%): | 41.5% |
| Muscle weight (kg): | 41.5 kg (90 lb) |
| Water (l): | 51.93 l |
| BMR: | 1907 kcal |
| WHR: | 1.06 |
| IBW: | 66.8 kg (147 lb) |

| | | |
|----------------|------------------|-------------|
| Temperature | 36.57 stC | |
| Pulse | 77/min | 60-100/min |
| Blood pressure | 165/97 mmHg (H!) | 120/80 mmHg |
| Blood group | B Rh- | |

8.2. Look at the patient’s results again and interpret them in pairs

Use some of these phrases and the words below.

Very high, very low, increased, above the normal limit, too high, normal, within the normal limits, below the norm, reduced, too low, slightly, moderately, decreased, considerably, extremely, significantly.

9. Nutritional Status – complete the text with the words from the box

Part A

dietitian, identify, nurse, approach, verifying, analysis

'Nutritional assessment is defined by the American Society for Parenteral and Enteral Nutrition as 'a comprehensive to diagnosing nutrition problems that uses a combination of the following: medical, nutrition, and medication histories; physical examination; anthropometric measurement; and laboratory data.' Nutritional screening can be defined as 'a process to an individual who is malnourished or who is at risk for malnutrition to determine if a detailed nutrition assessment is indicated.' If nutritional screening identifies a person at nutritional risk, a more thorough assessment of the individual's nutritional status can be performed. Nutritional screening can be done by any member of the health-care team such as a, dietetic technician, dietary manager,, or physician. The Academy of Nutrition and Dietetics defines nutritional assessment as 'a systematic method for obtaining,, and interpreting data needed to identify nutrition-related problems, their causes and their significance.' It involves initial data collection and continuous reassessment and of data, which are compared to certain criteria such as the Dietary Reference Intakes or other nutrient intake recommendations.'

(D.R. Lee, D.C. Nieman: Nutritional assessment, Mc Graw Hill, 2013)

Part B

preventing, muscle, nutrition, nutritional, live, composition, health, disability, diseases, bone, nails

'Now we know that, prevention is usually much cheaper than treatment and it offers a better quality of life for individuals and societies. Effective health care measures should be used to monitor this quality of life through dietary and assessment. The diet we live on will ultimately determine our growth, development and In the past, treating diseases was more important than them. The processes by which food is ingested, digested, absorbed and metabolised affect nutrition. status is referred to as our physical condition determined by the diet we on. It also means the ability or of the organism to maintain proper metabolism resulting from desired levels of nutrients. of nutritional status is made among others by determining the body assessment (the percentages of, fat, and water) and appearance such as the condition of the skin, hair andThe nutritional status depends on age, sex, nutrition, style of life and we suffer from. It is also determined by the we live in as well as by economic, social or even cultural circumstances.'

(B. Gorbacz-Gancarz, L. Ostrowska, E. Stefańska, E. Supińska, E. Szczepaniak: *English for Dietetics*, PZWL, 2016)

10. Prepare a 24-hour recall form. In pairs, make a 24-hour recall interview

Example of 24-hour dietary recall:

| Meal | Time | Place | Food and drink | Amount |
|-----------------------------|------------|-----------------------------------|---|---------------------------------------|
| Breakfast | 7.30 a.m. | Home | Buttermilk | 70 ml |
| Snack – in the morning | 10.55 a.m. | Car | Oranges | 300 g |
| Canteen | 12.15 p.m. | Lunch | Zucchini and roasted asparagus penne salad with (cow) cheese, green tea with sugar | 350 g 500 ml |
| Snack – in the afternoon | 01.15 p.m. | Office | Ice cream Sprite cheese cake | 3 scoops 4 x 250 ml 50 g |
| Dinner | 06.30 p.m. | Home, kitchen | Home-made lentil-barley meat, asparagus black tea with sugar | 200 g 2 250 ml |
| Snack – in the evening | 08.45 p.m. | Home, during watching TV | Take-away pizza, orange juice, beer salted peanuts | 300 g 200 ml 2 x 0.5 l 100 g |
| Snack – in the night | 23.20 | Home, in bed | Mineral water, milk shake biscuits with nuts | 250 ml 100 g 300 g |

Use some of the following prompts:

- time, place, meal,
- details of food and drink, ingredients, contain,
- preparation,
- quantity of food eaten, portion size, serving size, amount,
- appetite.

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