

**Ministry of Public Health of Ukraine
National O.O. Bohomolets Medical University**

**METHODICAL GUIDE
to practical classes for students**

<i>Educational discipline</i>	Propaedeutics of Pediatrics including nursing practice, basic medical skills in the pediatric department
<i>Training direction</i>	22 " Public Health ", II (master's) educational and qualification level
<i>Specialty</i>	222 «Medicine»
<i>Department</i>	Paediatrics # 2
<i>Thematic module 3</i>	Types of infant feeding. Nutrition of children older than one year. Peculiarities of metabolisms in children.
<i>Topic:</i>	Natural feeding of babies. Quantitative and qualitative composition of mother's milk. Methods of calculating the daily amount of food and regime of feeding. Complementary feeding and nutritional correction. A child's daily need for food ingredients and energy.
<i>Course</i>	3

Approved on methodic meeting of department of pediatrics №2 from «28» august 2023., protocol №1

Considered and approved: CMC on pediatric disciplines from «28» august 2023., protocol №1

1. Purpose: acquisition of knowledge by the student:

1. Basic principles of successful breastfeeding of children proposed by WHO and UNICEF.
2. Quantitative and qualitative composition of female colostrum, mature and transitional milk.
3. Features of human milk, which determine its biological value in comparison with cow's milk and milk of other animal species, and their influence on the child's development.
4. Calculation of the volume of the daily ration of a child in the first year of life by various methods.
5. Needs of an infant in the main nutrients and calories.
6. Rules and deadlines for the introduction of corrective supplements and complementary foods into the child's diet.
7. Peculiarities of a nursing mother's diet.
8. Hypogalaxies. Prediction of development, prevention and treatment.
9. An approximate scheme of the diet for a child of the first year of life on natural feeding.

2. Competencies:

1. Preparation of a daily diet for a healthy child of the first year of life on natural feeding.
2. Evaluation of anamnesis data, which testify to the quality of the child's nutrition, detection of errors in the child's diet and their correction according to existing rules.
3. Compilation of a nursing mother's diet.
4. Identification and evaluation of clinical signs indicating malnutrition of the child and the ability to eliminate them.
5. Forecasting the development of hypogalactia, prevention and treatment of this condition.

Equipment: tables of the main food ingredients in baby food products, a notebook, a pen.

1. Plan and organizational structure of the lesson

Stage name	Stage description	Levels of assimilation *
Preparatory stage	Organizational measures Setting educational goals, student motivation	*

*	The main stage	Test control on the subject of the lesson, checking and announcing the results. - theoretical survey; - demonstration of practical skills, clarification of the most important points regarding the preparation of a daily diet for a healthy child of the first year of life with natural feeding; - students' work on acquiring skills in preparing a daily diet for a healthy child of the first year of life on natural feeding; - student's acquisition the skills of evaluating the results of the prescribed diet and, if necessary, making its adjustments. Solving tasks according to the subject of the lesson	** *, **, *** **, ***, ****
	Final	Analysis and assessment of student work results. Announcement of the topic of the next lesson, an indicative map for independent work with literature.	*
	Together 2,5 academic hours		

Introductory, **reproducible, *** reconstructive, **** creative learning levels.

2. Content of educational material

4.1. A list of the main terms, parameters, and characteristics that the student should learn when preparing for the class:

<i>Term</i>	<i>Definition</i>
1. Natural or breastfeeding	Natural breastfeeding means feeding a child with breast milk. Moreover, the child should receive it in the amount of at least 75% of the daily amount of food.
2. Mammogenesis	The phase of mammary gland development in the first 2-3 months of pregnancy
3. Lactogenesis	Milk secretion - holomeroocrine secretion by cells of the acinus, which is accompanied by the destruction of epithelial cells
4. Galactopoiesis	Accumulation of milk secreted by the mammary gland

5. Corrective applications	Food products that adjust the child's diet in terms of microelements, vitamins (meat, fruit puree, egg yolk, etc.)
6 Complementary food	Thick food that gradually replaces breast milk, in order to further meet the nutritional needs of the child

4.2 Topic content:

The main principles of nutrition's organizing for early age children:

The main principles of food organization, and therefore of feeding a child, are:

- the principle of physiological adequacy of nutrition
- the principle of multicomponent balanced nutrition
- the principle of nutrient advance provision.

Anatomical and physiological features of the digestive system in infants as an adaptation to natural feeding.

Features of the structure of the oral cavity, which ensure the act of sucking:

- relatively small size of the oral cavity,
- wide and thick tongue,
- low upper palate,
- the presence of a ridge on the upper lip,
- transverse folds on the lips,
- the presence of Bish fat cells in the cheeks,
- the presence of a duplication of the mucous membrane along the edge of the maxillary segments

It should also be noted that the features of food digestion and absorption in children include, in addition to cavity, wall (or membrane) digestion adapted to lactotrophic nutrition, and intracellular digestion provided by pinocytosis and phagocytosis. During breastfeeding, proteins are absorbed as peptides (not in the form of amino acids), carbohydrates - as monosaccharides, fats - in the form of fatty acids.

Basic rules of successful breastfeeding

In the modern concept of healthy children's nutrition, a priority role is assigned to natural feeding. In 1995 Ukraine joined the International Movement for the Revival of Breastfeeding.

Basic rules of successful breastfeeding

Attaching the child to the mother's breast during the first hour of life in the absence of contraindications.

Round-the-clock joint stay of mother and child.

Proper attachment of the child to the mother's breast.

Breastfeeding is carried out at the request of the child, including at night.

Do not give a child up to 4-6 months any other products and liquids, except in cases determined by medical indications.

Do not use pacifiers.

Mandatory introduction of adequate complementary food from 4-6 months.
Continuation of breastfeeding up to 1 year, and if possible longer.

Contraindications to breastfeeding:

From the mother's side:

- active tuberculosis in the mother,
- the state of decompensation in chronic diseases of the liver, kidneys, heart,
- malignant neoplasms and severe blood diseases (leukemia),
- acute mental illnesses,
- severe infectious diseases (tetanus, anthrax, natural smallpox),
- acquired syphilis in the last weeks of pregnancy or after the birth of a child,
- HIV infection.

From the child's side:

- congenital metabolic diseases: galactosemia, phenylketonuria, leucinos

Breastfeeding technique

Especially in the first days, the technique of breastfeeding is quite difficult for mothers, so the medical staff of maternity hospitals must make great efforts to teach them the rules of breastfeeding.

- Before feeding the baby, the mother should wash her hands, sit or lie down in a comfortable position and relax.
- The child's head should be in line with his body.
- The mother supports the whole body of the child from below, not just his head.
- The baby's body is pressed against the mother (her stomach is opposite the mother's stomach), the baby's nose is opposite the nipple.
- The mother supports the breast with her fingers, with the index finger on the bottom and the thumb on top (the fingers should not be close to the nipple).
- First, the mother should touch the baby's lips with the nipple and wait until she opens her mouth wide, then quickly bring the baby to the breast, directing her lower lip below the nipple so that the baby grasps the lower part of the areola. It is necessary to ensure that the nostrils of the child are not blocked by the mammary gland.

A sign of effective sucking is the presence of slow, deep sucking with short breaks.

Today it is recommended to follow the principle of free feeding of the child, especially this applies to children in the newborn period. However, you need to know that during the first two months of life, the child should be fed at least 7 times a day, then - 6 times a day, from 4-6 months to 1.5 years - 5 times a day.

Despite the accession of Ukraine to the WHO/UNICEF declaration on the support of natural feeding, part of the children in the first 6 months of life receive artificial formulas. The most common reasons for this are a violation of lactation in the mother due to the mother going to work, her reluctance to breastfeed the child, chronic diseases of the mother.

Lactation disorders. Forecasting the development of hypogalactia, its prevention and treatment.

The most common lactation disorder is hypogalactia. Hypogalactia refers to a reduced secretory capacity of the mammary glands during lactation.

Classification of hypogalaxies:

1. Depending on the causes and factors contributing to lactation disorders, **primary** (or neuroendocrine) and **secondary** (or acquired) hypogalactia are distinguished.

2. Depending on the term of development, **early** (occurs in the first 10 days after childbirth) and **late** (develops later than 10 days after childbirth) are distinguished. Early hypogalactia is usually also primary.

3. Depending on the degree of insufficiency of breast milk in relation to the daily need, **4 degrees** of hypogalactia are distinguished:

I degree - daily breast milk deficit is up to 25%

II degree - daily deficit of breast milk is up to 50%

III degree - daily breast milk deficit is up to 75%

IV degree - daily breast milk deficit is more than 75%

Prevention of hypogalactia. Determination of the risk of developing hypogalactia in each specific mother has great practical importance. The greatest positive impact on a woman's lactation capabilities is primarily:

- early attachment of the child to the breast (in the first minutes after birth);
- positive emotional attitude towards natural feeding.

Other factors are also important, such as the high activity of sucking the child after childbirth, the beginning of lactation on the first day after childbirth, prenatal preparation of the mammary glands for feeding, regular pumping of the remains of breast milk, the absence of pathology of the mammary glands, the physiological course of pregnancy, childbirth and the postpartum period.

Prevention of hypogalactia should be carried out in all periods of development of the fetus, girl, girl, woman and consists of three stages.

The first stage. Prevention of hypogalactia in a girl - a future mother. It is necessary to ensure a healthy way of life and create harmonious conditions for the physical, mental and sexual development of the girl. Ensure natural feeding in the first year of life, timely detection and treatment of acute and chronic diseases (somatic, infectious, allergic, neurological), timely remediation of chronic foci of infection. During puberty - control the development of the mammary glands, the formation of menstrual function. Deviation in terms of puberty from normal indicators requires mandatory consultation of the girl with a pediatric endocrinologist, gynecologist, and, if necessary, appropriate correction and treatment.

In all age periods, but especially in the pubertal period, it is necessary to carefully prescribe drugs that can affect sexual development and subsequently worsen the lactation function of a woman (such as glucocorticosteroids, anabolic hormones, antimetabolites, cytostatics).

In the reproductive period, it is necessary to pay great attention to the detection and treatment of gynecological diseases, to carry out educational work on the prevention of smoking, alcoholism, drug addiction, and drug addiction.

The second stage. During pregnancy, for the prevention of hypogalactia, a necessary condition is an early decision to register in a women's consultation. Women's counseling staff prepares a woman for lactation:

- hold conversations about the importance of natural feeding for the child's development;
- if necessary, conduct psychotherapy sessions (to form a positive motivation in the expectant mother for natural feeding of her child).
- explain the need for rational nutrition of a pregnant woman, indicate the daily fluid requirement (should not exceed 2.0 liters);
- explain the need for rational motor and hygienic regimes
- teach methods of preparing the mammary glands for lactation (twice a day massage 2 months before childbirth), the technique of expressing breast milk residues, the principles of caring for the mammary glands during lactation, for the prevention of their diseases (cracked nipples, mastitis).

The third stage of prevention is *after the birth of the child* (in the maternity hospital). The most intense stimulator of lactation at this stage is the early application of the child to the mother's breast.

It is modern for the child to stay with the mother and feed the child not according to an hourly schedule, but according to the baby's needs (sometimes up to 12 or even more times a day).

The fourth stage of prevention of hypogalactia is carried out *after discharge from the maternity hospital*. It also includes the implementation of all recommendations regarding the organization of a nutritious diet, a healthy lifestyle, maintaining a rational sleep and rest regime, maintaining a friendly attitude towards natural feeding in the family, etc.

Medicines that can affect lactation	
Suppress lactation	Stimulate lactation
Adrenaline, norepinephrine, atropine, camphor, certain hormonal preparations, saline laxatives, diuretics, phenobarbital.	Apilak, vitamins A, E, C, groups B, PP, nicotinic and glutamic acids, metoclopramide, pyroxan, iodine preparations, reserpine, theophylline, some hormonal preparations.

Pronounced venous mesh on the mammary glands, enlargement of the mammary gland between feedings and an increase in the number of milk spurts during pumping, an increase in body temperature under the gland by 0.5-1.0°C - indicate good lactation.

Treatment of hypogalactia begins in conditions of objective signs of reduced lactation (it is necessary to remember physiological lactation crises).

Reliable signs that the child is not getting enough breast milk.

- Insufficient weight gain per month.
- Decrease in the daily volume of urine, it is yellow, concentrated with a sharp smell.
- "Hungry" stools
- Restlessness

The main measure in the treatment of hypogalactia is regular attachment of the child to both breasts, adjustment of the mother's regime with sufficient rest, full nutrition, and consumption of a sufficient amount of liquid; the mother is prescribed multivitamins (A, C, E, D, group B, folic acid, Pregnavit, Gendevit, Undevit). The appointment of NIRR, HUMANA tea to improve lactation, homeopathic drugs "Mammogran", "Mlekoin" (Ukrainian Homeopathic Union), Lactogon, Pulsatilla-compositum is modern. A positive effect is obtained when using preparations made on the basis of hydrolyzate of dry yeast, herbs - cumin, nettle, lemon balm, motherwort, dill seeds, fennel, anise, hawthorn fruits, dandelion root infusion, burkun herb, yarrow, wild strawberry leaves and roots, on Lactation stimulants are prescribed for 2 weeks - apilak, nicotinic and glutamic acids, potassium iodide, cerukal.

UV radiation of the mammary gland, electrophoresis with nicotinic acid, diathermy, and reflexology are used in complex treatment.

It should be noted that an increase in daily caloric intake does not improve lactation, but leads to obesity in women. Of the food products, lactation is stimulated by hard cheese (50 g 2 times a day), sour cream (50 g 2 times a day), blackcurrant juice, walnuts (5-6 pieces/day) or syrup of unripe nuts (1 tbsp. 1 3 times a day), brewer's yeast.

Formulas for calculating the daily amount of food for children.

Zaitseva's formula is used for children up to 7-8 days of life:

The daily amount of milk (ml) is 2% of the child's body weight at birth x n, where n is a day of life.

Finkelstein's formula is used for children up to 7-8 days:

n x 70 (if the body weight at birth <3200 g), n x 80 (if the body weight at birth >3200 g).

The volumetric method is used for children aged 2 weeks to 12 months:

2-6 weeks - 1/5 of the child's body weight,

6 weeks - 4 months - 1/6 of the child's body weight,

4-6 months - 1/7 of the child's body weight,

6-12 months - 1/8 - 1/9 of the child's body weight.

Caloric (energy method): per 1 kg of body weight, a child should receive:

0-3 months - 120 kcal per day,

4-6 months - 115 kcal per day,

7-12 months - 110 kcal per day.

If it is known that 1 liter of breast milk contains 700 kcal, it is easy to calculate its daily need.

Complementary food is food that is added to breast milk (milk formula in the case of artificial feeding) to a child of the first year of life.

Before introducing complementary foods, you need to make sure that the child is ready for this.

ESPGHAN experts recommend individual indications and deadlines for the introduction of complementary foods at 17-26 weeks in order to form food tolerance

Signs of the child's readiness to introduce complementary foods:

- holds the head;
- sits almost without support (in a high chair);
- opens his mouth when a spoon with food is presented;
- turns away from the spoon with food when not hungry;
- closes the mouth with a spoon in the mouth, holds the food in the mouth, and then swallows, not pushing it out or spitting it out.

Rules for the introduction of supplementary food

- 1) The introduction of supplementary food should be in each individual case the process of introduction of food products recommended in accordance with the age of the child with a gradual change in the dynamics of their consistency, taste, smell and appearance, while continuing breastfeeding.
- 2) It is necessary to make sure that the child is ready for the introduction of complementary foods.
- 3) Complementary food should be given when the child is active and hungry, preferably during breakfast or lunch together with other family members.
- 4) During feeding, the child should be in an upright position, in a comfortable position on the hands or knees of the mother or in a special high chair.
- 5) Supplementary food must be given from a spoon.
- 6) You should start feeding the baby by putting a small amount of food on the tip of a teaspoon. Hold the spoon so that the child can see it. Then touch the baby's lips with a spoon so that part of the product remains on her lips. And only when the child opens his mouth, put a spoon with food in the middle of the tongue, then the child will easily swallow it.
- 7) Each complementary food product is introduced, starting with 1 teaspoon and increasing gradually, 5-7 days before a full portion, dividing it into 2 feedings. The child himself will show that he is full by turning his head away, pushing the spoon away, or not opening his mouth.
- 8) Every time, after the child has received complementary food, it is advisable to put it to the breast. This will help maintain lactation, and the child will feel satisfied.

- 9) If the child refuses complementary food, it is not necessary to force-feed it, as the child may refuse all other products altogether. You can offer a different product (of a different taste and/or consistency), or the same one, but on a different day. During feeding, it is necessary for the mother to communicate with the child.
- 10) Each subsequent new complementary food product must consist of one ingredient and be given to the child for at least 5 days, only after that it is possible to give mixed complementary food from these products. This will give an opportunity to determine the cause of food allergy in case of its occurrence.
- 11) To facilitate the child's getting used to new foods, it is recommended to add breast milk to complementary foods.
- 12) The complementary food must be freshly prepared, have a gentle homogeneous consistency, from creamy to sour cream (according to age), cooled to body temperature (36-37°C).
- 13) To prevent iron-deficiency anemia, it is mandatory to introduce complementary foods containing iron (meat, egg yolk, fish) from 6 months of age.
- 14) It is not recommended to use any types of tea and coffee for children under 2 years of age, as these drinks interfere with the process of iron absorption.
- 15) Whole undiluted cow's milk should not be given to children under 12 months of age (a factor in the development of iron deficiency anemia).
- 16) Whole milk and dairy products can be given to a child from 12 months.
- 17) Salt and spices should not be added to complementary foods during the introduction of complementary foods.
- 18) In case of signs of poor tolerance of the complementary food product (disruption of the function of the digestive system, allergic reactions, etc.), the introduction of this complementary food product should be stopped and another should be introduced.

I complementary food

It is necessary to start ***vegetable feeding*** with only one type of vegetables: it is better with cauliflower or broccoli, zucchini. It is better to give carrots and white cabbage in the 2nd year of life. It is necessary to gradually change the consistency of complementary food to a thicker one (after 9 months).

It is possible to introduce porridge instead of vegetables for the 1st complementary food, especially when the child gains a slightly lower body weight

II complementary food

Porridge, you should start with porridge that contains one grain, preferably with a high iron content (for example, rice or buckwheat). Then introduce porridge from other cereals (corn, oatmeal). It is desirable to give oats and wheat groats from 8 months. Initially, for better digestion of food, it is better to give rice and buckwheat in the

form of industrially produced porridges, in which they look like flour. Porridge can be diluted with mother's milk, an adapted mixture.

Porridge with several cereals should be introduced only after the child has already received porridge with each cereal separately.

Corrective additives

- **At 6.5 months** - meat - rabbit, chicken, turkey, veal, lean pork;
- **At 7 months** - vegetable oil;
- **At 7 months** – boiled egg yolk;
- **At 8 months** – bread;
- **At 9 months** – crackers, cookies;
- **At 8-10 months** - minced fish: first, low-fat fish is recommended (polke, cod, perch, zander, hake). Red fish is introduced into the child's menu after one year of life (spurfish, chum, trout);
- **At 6.5-7.5 months** - soft cheese. The dish must be prepared immediately before feeding, industrially produced food cannot be given to children under one year old. Give 3-4 times a week.
- **Fruit puree** - from green varieties of apples, followed by peach and apricot, then plum. The amount of puree gradually increases from 1 teaspoon to 100 g per day at the end of 1 year of life. After 9 months, puree is replaced with small pieces of boiled vegetables, ripe, baked or boiled fruits.

Daily protein, fat, carbohydrate and energy needs of children (Order of the Ministry of Health No. 1073 dated September 3, 2017)

Age group	Sex	Energy	Proteins, g		Fats, g	Carbohydrates, g
		kcal	the total number of	animal		
0-3 місяці*	boys and girls	120	2,2	2,2	6,5	13
4-6 місяців*	boys and girls	115	2,6	2,5	6,0	13
7-12 місяців*	boys and girls	110	2,9	2,3	5,5	13
1-3 роки	boys and girls	1385	53	37	44	194
4-6 років	boys and girls	1700	58	41	56	240
6 років (учні)	boys and girls	1800	60	43	58	260
7-10 років	boys and girls	2100	72	51	70	295
11-13 років	boys	2400	84	62	84	327
11-13 років	girls	2300	78	55	76	326
14-17 років	youth	2700	93	68	92	375

14-17 pokib	girls	2400	83	59	81	334
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* For children 0-12 months of life, the need is given based on 1 kilogram of body weight.

5. Questions about the student's self-preparation for practical classes

1. Name the basic principles of a child's physiological nutrition.
2. Name the needs of a child that natural feeding provides.
3. What anamnestic data and clinical symptoms testify to the adequacy of nutrition received by the child?
4. Name the child's needs in the main nutrients and calories depending on his age.
5. What is the difference between colostrum, transitional and mature female milk?
6. Specify the difference in the protein composition of women's and cow's milk, how does it affect the child's digestive processes?
7. What features of the fat composition of human milk, in contrast to cow's milk, contribute to its better assimilation and improve the child's development?
8. Name the differences in the carbohydrate composition of women's and cow's milk, what processes does it contribute to?
9. What is the difference between the mineral composition of women's and cow's milk, how does it affect the child's digestion and metabolism?
10. What factors in human milk contribute to the child's immunological protection?
11. What effect do the hormones contained in breast milk have on the growth and development of the child?
12. Name the features of the composition of vitamins (qualitative and quantitative) in women's and cow's milk.
13. Contraindications to breastfeeding (from the mother and child).
14. Name the complications that can be observed when breastfeeding a child.
15. Modern requirements regarding the diet of a naturally-fed child.
16. What clinical signs indicate a child's malnutrition?
17. Lactation disorders, hypogalactia, classification.
18. Specify the main reasons contributing to the development of hypogalaxia.
19. Name preventive and therapeutic measures for the development of hypogalactia.
20. Explain what is involved in the introduction of corrective additives and various types of supplementary food into the child's diet.
21. Define the concept of supplementary food.
22. What products are complementary foods?
23. What products are corrective supplements?
24. Name the rules for introducing corrective supplements and complementary foods.
25. What formulas can be used to calculate the approximate daily amount of food for a child in the first year of life?

Recommended literature.

Nelson textbook 21th Edition by Robert M. Kliegman, MD, Joseph St. Geme, Nathan J. Blum, Samair S. Shan, Robert C. Tasker, Karen M. Wilson, Richard E. Behrman
Видавництво: Elsevier, 2019. P. 538-542.

Additional:

1. Fundamentals of pediatrics according to Nelson. Karen J. Marcante, Robert M. Kligman; translation of the 8th Eng. edition in 2 volumes. Scientific editors of the translation V.S. Berezenko, T.V. Rest Kyiv: VSV "Medicine", 2020.
2. Katilov O.V., Dmitriev D.V., Dmitrieva K.Yu., Makarov S.Yu. Clinical examination of a child. 2nd edition. Vinnytsia: Nova Kniga, 2019. 520 p.
3. Pediatrics: textbook. T.O. Kryuchko, O.Y. Abaturov, T.V. Kushnereva et al.ed. by T.O. Kryuchko, O.Y. Abaturov. Kyiv: AUS Medicine Publishing, 2016. 208 p. (p.39-49) ISBN 978-617-505-485-7.