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PRINCIPLES OF FOOD ORGANIZATION FOR PRIMARY SCHOOL STUDENTS IN GENERAL EDUCATIONAL ORGANIZATIONS

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Abstract

This article is written about the problem of proper nutrition, the state of health of schoolchildren, the dynamics of the incidence of alimentary-dependent pathology in school-age children in Samarkand and the region, the principles of catering for primary school students in educational institutions, as well as the menu (breakfasts) that we are developing , recommended average daily food sets. The actual nutrition of younger schoolchildren was analyzed in the organization of public catering with the provision of a 10-day breakfast ration, which differ in price and range of dishes.

Keywords: organization of meals, primary school age, menu layout, health status

INTRODUCTION

The problem of proper nutrition of children is one of the urgent tasks facing the modern school. It is in childhood that the assimilation of the main volumes of information, the development of fundamental life stereotypes take place [5,7,8,13,16,19,33,39]. The subject of special attention of the state is the full nutrition of children - a necessary condition for harmonious growth and morphofunctional maturation of the body, as well as resistance to adverse external environmental factors. Unbalanced nutrition of schoolchildren is the cause of violations of metabolic processes and physical development, the formation of chronic diseases. Maintaining health and maintaining adaptive potential is possible under conditions of optimal satisfaction of physiological needs for nutrients and energy [1,3,7,8,9,11,12,18,20,33]. Despite the implementation of a set of measures in the field of rationalization of school meals, according to domestic research, micronutrient deficiencies are relevant and leading in terms of the degree of negative impact on the health of schoolchildren. In the structure of nutrition, more than half of the students of general education organizations have reduced the consumption of the most biologically valuable products of animal origin against the background of excessive consumption of potatoes, pasta and confectionery [4,6,9,10,13,14,17,30,32]. In order to improve the provision of healthy nutrition in educational organizations in our Republic, 2022 was adopted, a presidential decree was issued to provide breakfast to primary school students. It is also important that learning activity is natural for children and adolescents, so the formation of a healthy lifestyle, food culture can be organically included in the educational process. In children and adolescents during the school period, intensive growth processes, complex hormonal changes in the body, the activity of the nervous and cardiovascular systems, and the brain are observed. Significant mental and physical stress, which

has increased significantly in recent years due to an increase in the flow of information, the complication of school programs, often combined with additional loads, leads to the need for a responsible approach to compiling the diet of modern children [21,26,31,34, 36,37,38,39]. At present, the health status of schoolchildren is dominated by an increase in the proportion of those with chronic pathologies and a decrease in the number of relatively healthy children. Unfortunately, diseases of the gastrointestinal tract, kidneys, metabolic diseases have become more common in the structure of schoolchildren's diseases, and myopia and scoliosis have become frequent companions of our children. Not rationally built loads, unbalanced nutrition can lead to poor health and exacerbation of existing chronic diseases [4,5,21,24,25,26,30,33].

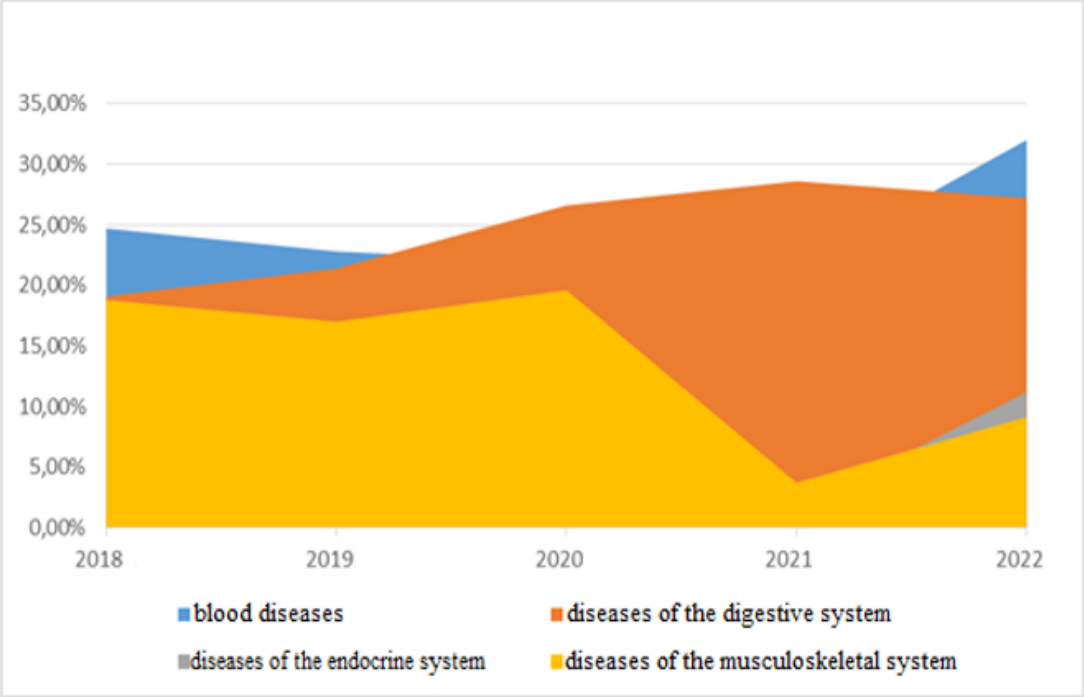

Fig 1: Dynamics of alimentary-dependent diseases in children 7-11 years old, Samarkand region

Figure 1 shows the dynamics of nutritionally dependent diseases in school-age children of the Samarkand region in 2019-2022. From this chart, it can be seen that diseases of the blood and blood-forming organs have not changed much from 2019 to 2022, while diseases of the endocrine system have increased, and diseases of the digestive tract and diseases of the musculoskeletal system are on the rise in 2020. The low incidence rate in 2021 is due to the inability to conduct full medical examinations due to the covid-19 pandemic.

Purpose of the research

Our research purpose is to study the actual nutrition of younger students in the organization of school meals with the provision of a 10-day breakfast ration.

Materials and Methods

Students in grades 1-4 were offered a 10-day breakfast ration. The standard breakfast consisted of a snack (cheese, fruits, portioned vegetables or fresh vegetable salads), a hot dish (milk porridge, vegetable, cottage cheese, egg dish) and a hot drink and

bakery products. Tea alternated with juice and fortified compote (cost - from 3633.25 to 5496.5 soums).

The hygienic assessment of nutrition was carried out taking into account the requirements of SanPiN 0017-21 2021 "Sanitary rules, standards and hygienic norms for catering for students in general education, special secondary, vocational educational institutions." The grocery set of the daily ration of primary school students was analyzed, according to the "Diary of schoolchildren's nutrition for 10 days". Statistical processing of the study results was performed using standard statistical methods and special software products with MS-Office applications. Statistical analysis of parametric (mean value and error of means) indicators was carried out. Differences in the results obtained were statistically significant at $p \leq 0.05$.

Table 1: Meet the Recommended Serving Weights on the Layout Menu for Elementary School Students Ages 7-11

Food	Mass of a portion of a food, g		
	recommended	by menu layout	% of recommended
Porridge, egg, cottage cheese, meat	150-200	150	100
Beverage (tea, cocoa, juice, compote, milk, kefir, etc.)	200	200	100
Salad	60-100	60	100
vegetable	200-250	150	100
Meat, cutlet	80-120	80	100
Garnish	150-200	150	100
Fruits	100	100	100

Table 2: Quantification of the intake of key nutrients by students (7-11 years old) during breakfast at school

Product	RUP, g/day	Average daily diet	% of RUP
wheat bread	150	62,3 ± 41,3	41,5
Rye bread	80	7,8 ± 14,9	9,8
Cereals, legumes	45	34,0 ± 20,7	75,6
Pasta	15	20,3 ± 14,6	135,3
Fresh vegetables, herbs	350	128,4 ± 75,9	43,7
Potato	250	86,5 ± 49,6	43,9
Fresh fruits	200	155,4 ± 115,8	84
Fruit juices	200	142,7 ± 115,7	71,4
Egg	40	14,2 ± 11,9	35,5
Meat	95	94,0 ± 50,7	131,4
Bird	40	51,6 ± 24,5	141,7
Fish	60	5,9 ± 7,2	8,4
Milk	300	118,3 ± 112,8	39,4
Dairy products	150	35,5 ± 39,6	23,7
Butter	30	6,7 ± 5,9	22,3
Cottage cheese	50	45,4 ± 34,5	90,8
Sour cream	10	4,8 ± 6,2	48,0
Cheese	10	5,0 ± 5,3	51,0
Confectionery	10	123,4 ± 73,9	1234,0

RESULTS

The proposed diet corresponded to the approved exemplary menu, in accordance with the requirements of paragraph SanPiN 0017-21. In general, 10-day breakfast rations contained all the necessary dishes regulated by SanPiN 0017-21. The analysis of the menu layouts for students in the primary grades showed that the mass of portions corresponded to the recommended one for students aged 7–11 years (SanPiN 0017-21) (Table 1). At the distribution, the mass of the offered ready-made dishes and culinary products did not significantly differ from the documentary data. According to the data of the layout menus, school breakfasts, on average, ensured the intake of the recommended amount of micronutrients for breakfast (at least 25% of the daily requirement): the content of B vitamins was 25–29%, vitamin C – 73%, calcium and phosphorus – 19–23% , magnesium - 38%, iron - 43%. At the same time, the content of vitamin A did not exceed 10% of the daily requirement. An analysis of the balanced diets showed that the ratio of the main food components in the breakfast rations approached the recommended levels (1.2:1:3.7 and 1.2:1:4.4, respectively). School breakfasts made a significant contribution to the formation of daily consumption of cottage cheese (61.2%), wheat bread (70.1%), eggs (78.2%), cheese (48%), juices (41.6%), fruits (39.8%), cereals and potatoes (35%). The most consumed foods in household diets were pasta (79% of the daily ration and 107% of the RUP), meat (79.5% of the daily ration and 104% of the RUP), poultry (76% of the daily ration and 108% of the RUP) and confectionery (72.4% of the daily ration and 893% of RUP) (Table 2).

A number of works by domestic and foreign authors indicate that most school menu dishes do not correspond to the taste preferences of students [12,14,15,18,32,36]. The results of our study show that the actual consumption of micronutrients, minerals, vitamins, and energy by schoolchildren depends on the cost and set of breakfast dishes. Students of general educational institutions, depending on the mode (shift) of training, are provided with hot meals in the form of breakfast and (or) lunch. The duration of the break for eating should be at least 20 minutes. Students of the first shift are provided with breakfast in the second or third shift.

Breakfast should consist of a hot dish and a drink, it is recommended to add berries, fruits and vegetables. Breakfast for students in grades 1-4 should contain 12-16 g of protein, 12-16 g of fat and 48-60 g of carbohydrates. The range of products and breakfast dishes should be varied and may include a choice of: cereal and cottage cheese dishes, meat or fish dishes, dairy products (including cheese, butter), egg dishes, vegetables (fresh, stewed, boiled), pasta products and drinks. To implement the principles of a healthy diet, it is advisable to supplement dishes with fresh fruits and berries. In this case, fruits must be given out by the piece.

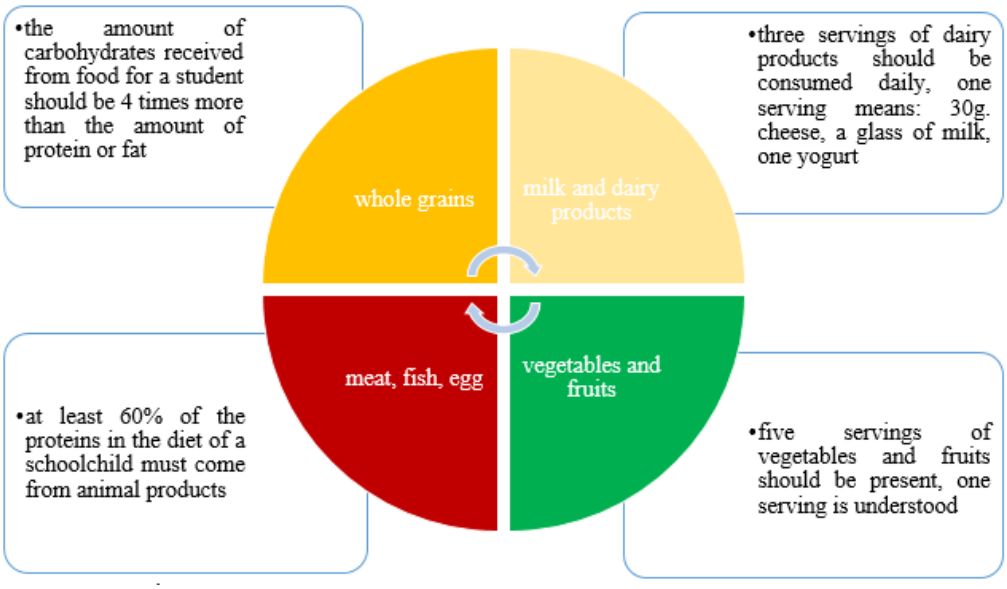

Fig 2: A plate of healthy food for younger schoolchildren

Note: The 2nd picture shows the products that must be included in the daily diet.

The menu is developed for a period of at least two academic weeks, taking into account the required intake of calories, proteins, fats, carbohydrates, vitamins and microelements for children, necessary for their normal growth and development. To ensure the biological value in the nutrition of children, it is recommended to use:

- Products of increased nutritional value, incl. enriched foods (macro-micronutrients, vitamins, dietary fiber and biologically active substances);
- Food products with limited content of fat, sugar and salt.

The content of salt added to the dish for each meal is not recommended to exceed 1 gram per person.

When developing a menu, it is recommended to be guided by the following: include dishes whose cooking technology ensures the preservation of taste, nutritional and biological value of products and involves the use of gentle cooking methods. The names of dishes and culinary products in the menu must correspond to their names indicated in the recipe books used. The production of ready meals is carried out in accordance with technological maps, which indicate the recipe and technology for preparing dishes and culinary products. The menu is not allowed to include the same dishes repeatedly within one day and two subsequent days. When compiling the menu (breakfast), it is recommended to use average daily product sets.

The menu is developed taking into account seasonality, the required amount of basic nutrients and the required calorie content of the daily diet, differentiated by age groups (classes) of students. Based on the proposed menu options, other options can be developed depending on regional, national and other characteristics, subject to the requirements for the content and ratio of essential nutrients in the diet. For students who need medical nutrition, a separate menu is developed in accordance with the approved set of products for this pathology. In exceptional cases (violation of the delivery schedule, lack of the necessary stock of food, etc.), dishes may be replaced. Replaced products (dishes) should be similar to the replaced product (dish) in terms

of food and biologically active substances.

The menu developed for students in grades 1-4 should meet the following recommendations:

The energy value of a school breakfast should be 400-550 kcal - 20-25% of the daily calorie content.

When compiling the menu, it is necessary to comply with the requirements for the mass of servings (dishes). The recommended mass of dishes (portions), taking into account the age of students, is presented in Table 3.

Table 3: Preliminary menu (breakfast) for catering for primary school age (7-11 years old) students in general educational institutions with a 6-hour break

DAY 1														
BREAKFAST														
Name of the dish	**Yield (gr)**	**Name of products**	**Raw material consumption**		**Nutrients**				**Nutrients**				**Sanpin norm**	**Price for 1 kt**	**Price**
			gross	**net**	**Б**	**Ж**	**У**	**Эп/ц**	**Б**	**ж**	**у**	**Эн/ц**			
Viscous porridge with milk from oat flakes "Hercules"	220-250	Milk	150,0	1 50,0	4,20	5,25	7,05	91,50	2,8	3.5	4,7	61,0	150,0	8990	1348
		Hercules	30,0	30.0	3,30	1,86	1 5,03	91,50	11.0	6,2	50,1	305,0	30.0	10000	300
		Butter	5.0	5.0	0,02	4,90	0,03	44,35	0,3	98,0	0,6	887,0	5,0	41000	205
		Sugar	15,0	1 5,0	0,00	0,00	14,97	56.85	0,0	0,0	99.8	379,0	15,0	13000	195
		Salt	0.5	0,5	0,00	0,00	0,00	0,00	0.0	0.0	0.0	0,0	0,5	2500	1,25
cocoa with milk	200	Cocoa	2,0	2.0	0.48	0.35	0,56	7,60	24,2	17,5	27,9	380,0	2,0	54000	108
		Milk	1 50,0	150,0	4,20	5,25	7,05	91,50	2,8	3,5	4.7	61,0	150,0	8990	1348
		Sugar	10,0	10,0	0,00	0,00	9,98	37,90	0.0	0,0	99.8	379.0	10,0	13000	130
Wheat bread fortified with spruce in black oil	80-120	Bread	80-120	80-120	4,62	1,80	29,88	1 57.20	7.7	3.0	49,8	262,0	60,0	2500	400
		Butter	5,0	5,0	0.02	4,90	0,03	44,35	0,3	98,0	0,6	887,0	5.0	41000	205
Total			427,5	427,5	16,83	24,31	84,58	622,75	49,1	229,7	338,0	3601,0	-	-	4240,25

CONCLUSION

Maintaining health and maintaining adaptive potential is possible under conditions of optimal satisfaction of physiological needs for nutrients and energy. School breakfasts, on average, provide the amount of micronutrients recommended for breakfast, the content of vitamins and minerals. According to the data of the layout menus, school breakfasts, on average, ensured the intake of the recommended amount of micronutrients for breakfast (at least 25% of the daily requirement): the content of B vitamins was 25–29%, vitamin C – 73%, calcium and phosphorus – 19–23% , magnesium - 38%, iron - 43%. An analysis of the balanced diets showed that the ratio of the main food components in the breakfast rations approached the recommended levels (1.2:1:3.7 and 1.2:1:4.4, respectively). School breakfasts made a significant contribution to the formation of daily consumption of cottage cheese (61.2%), wheat bread (70.1%), eggs (78.2%), cheese (48%), juices (41.6%), fruits (39.8%), cereals and potatoes (35%).

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