

The Biological Diversity Of The Diet Of Children With Dental Caries

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Abstract: *This problem with respect to the younger generation requires priority attention, as the adoption of belated measures dramatically affects the formation of cellular mechanisms of immunity, the state of the endocrine system, and the physical and mental status of the child. The nutritional status and biological diversity of children 3-6 years old with dental caries was assessed in comparison with the diets of healthy children (preschool institutions for children- PI). The diets of children of 4 preschool institutions and 920 families in which children attending preschool institutions live were studied; these objects were investigated in Tashkent city (2 PI), Tashkent and Syrdarya region (1 PI each). 360 layout menus have been studied. It was revealed that the total biological value of diets in practically healthy children in the winter spring season is $67.8 \pm 1.4\%$, in children with dental caries $52.6 \pm 1.5\%$, in the summer-autumn season, respectively $72.2 \pm 1.2\%$ and 56.2 ± 1.1 . Comparatively high biological value of average daily diets in practically healthy children due to low sugar consumption and high specific gravity of products of high biological value (peas, beans), animal proteins, vegetable fats, PNFA, (polyunsaturated fatty acids) sitosterins, indicates the role biological diversity of diets in the prevention of dental caries.*

Key words: *dental caries in children, children's nutrition, biological nutrition, confectionery.*

1. INTRODUCTION

The relevance of the problem.

One of the directions of state policy is the development of the medical aspects of healthy nutrition, which provides for constant monitoring of the nutritional quality of the population, nutritional status, as well as the prevalence of nutritional-dependent diseases and the health status of various population groups. This task is closely related to the implementation of the system of socio-hygienic monitoring, is its mandatory component in terms of developing criteria for nutrition quality and public health, monitoring application points [1,2,3].

This problem with respect to the younger generation requires priority attention, as the adoption of belated measures dramatically affects the formation of cellular mechanisms of

immunity, the state of the endocrine system, and the physical and mental status of the child. This is evidenced by numerous studies on the health status of children and adolescents in conjunction with the nature of their nutrition, both in our Republic and in other countries, etc. (Sharmanov T.Sh., 1990 [4], Shamuhamedov Sh.Sh., 2004 [5], Salomova F.I., 2005 [6])., As well as measures taken by the Government of the Republic of Uzbekistan for the social protection of children and adolescents , including preferential provision of school meals in a market economy.

At the same time, the majority of studies devoted to rationalizing the nutrition of children and adolescents, including among organized children's groups in the Republic of Uzbekistan and in the near and far abroad (Pokrovsky V.I., 1997 [7]; Strein D, 2000 [8], Salomova F.I., 2005 [6]). Undoubtedly having important scientific and practical value in the studied area, they do not allow assessing the state of biological diversity, which is important in protecting children's health. According to research (Sharmanov T.Sh., 1990 [4], Shamuhamedov Sh.Sh., 2004 [5], Salomova F.I., 2005 [6], Khudaiberganova A.S., 2019 [9] and international experience optimizing the structure of diets, bringing them into line with the physiological needs of modern man by simply increasing the consumption of natural foods has become impossible and requires qualitatively new approaches and solutions, the need for which is dictated by objective laws that have a definite effect on the structure of the diet. According to Muminova G, Abduyusupovoy K.M [10], the incidence of dental caries in children is from Uzbekistan 63,4-66% in physiological pregnancy.

The stated assessment of the state of the problem of rationalizing the nutrition of children and adolescents indicates its insufficient study. The dynamic nature of the living conditions, education and upbringing of children and adolescents in the Republic of Uzbekistan, the severity of the problem with increasing environmental pollution and the special structure of the population, where more than 60% are children and adolescents, indicate the urgency of the studied problem.

The purpose and objectives of research. The aim of the work was to assess the risk of dental caries in children and the scientific development of effective methods of nutritional prevention by ensuring the biological value of diets.

To achieve this goal, the following tasks were solved:

- assessment of the actual nutrition of children with dental caries, and control groups of healthy children;
- an analysis of the nutritional and biological value of the diets of children 3-7 years old attending PI and not attending PI;
- assessment of the composition of confectionery in children's diets and their role in the development of dental caries;
- development of ways to increase the biological value of national confectionery.

The scientific novelty of the research.

The biological diversity and biological usefulness of children's diets and their role in the nutritional prevention of dental caries have been studied.

The practical significance of the work.

Based on the studies, the dependence of the nutritional and biological value of the average daily diets of children on the nutritional status in the childcare center and at home was determined. A correlation was found between the prevalence of dental caries and the biological diversity of children's diets.

Characterization of research objects

A simultaneous study of the quality of the actual and directionally changed nutrition of children attending a childcare center was conducted, as well as a longitudinal prospective study of the nutritional properties and biological value of a number of national confectionery

products (navvat, pashmak, halva).

The objects of research were: the diets of children of 4 preschool institutions and 920 families in which children attend preschool institutions live; these objects were investigated in Tashkent city (2 PI), Tashkent and Syrdarya region (1 PI each). All studies were conducted in the period 2017-2019.

2. RESEARCH METHODS FOR ACTUAL AND DIRECTIONALLY CHANGED NUTRITION OF CHILDREN

The nutrition of children attending the studied PIs has been studied by two groups of methods - calculation and laboratory.

Calculation methods are used in determining the nutritional and biological value of diets. For statistical analysis, 360 layout menus were used (90 in each PI). The nutritional value of rations was calculated on the basis of tables of the chemical composition of food products (Skurikhin I.M, Volgareva M.N, 1987 [11]).

The assessment of the data obtained was carried out taking into account the requirements of SanPiN 0105-01 "Average daily rational norms of food consumption for the population of the Republic of Uzbekistan."

The biological value of diets was estimated by 26 indicators, separately for the cold and warm seasons of the year (Debuk N.E., Kogan A.M., 1967). The biological value of dietary proteins was expressed in relative values (in percent) in comparison with similar indicators of the standard, which is usually used as chicken egg proteins (FAO/WHO, 1985).

The total biological value of diets (BVD) was calculated according to the method of A.S. Khudaiberganov and R.R.Usmankhodjaev (1992 [13]).

$$BVD = \sqrt[n]{\frac{LYSINE\ p}{LYSINE\ n} \times \frac{THREONINE\ p}{THREONINE\ n} \times \frac{TRYTOPHAN\ p}{TRYTOPHAN\ n} \times \frac{VITAMIN\ C\ p}{VITAMIN\ C\ n} \times \text{and.etc} \times 100\%}$$

Where, n is the amount of biologically active substances in the studied diet; p is the daily norm of this ingredient for the subjects; N is the total number of selected ingredients.

The calculation of the index of essential amino acids (EAA) was performed as the geometric average of the ratios of the essential amino acids of the protein under study with their amount in the whole egg protein (in%):

$$Index\ EAA = \sqrt[n]{\frac{LYSINE\ i}{LYSINE\ cm} \times \frac{THREONINE\ i}{THREONINE\ cm} \times \frac{TRYTOPHAN\ i}{TRYTOPHAN\ cm} \times \text{and.etc} \times 100\%}$$

where, n is the number of amino acids in the test protein; cm is the amino acid content in the standard; u is the amino acid content in the studied protein.

Laboratory and calculation-laboratory research methods are used to assess changes in the nutritional and energy values of diets of DDU during storage and cooking of food products. Laboratory studies were carried out in 380 dishes.

Laboratory analysis included determination of content:

-proteins - by the Kjeldahl method in the modification of MP Bolotov (Burshtein A.I., 1963 [12]); etc.

-fats - by the Soxhlet method (Burshtein A.I., 1963 [12]);

-total carbohydrates - by the calculation method according to the difference between the dry residue of the found amounts of protein, fat and ash content (Burshtein AI, 1963 [12]);

- the total number of sterols - colorimetrically based on color reactions with ferric chloride (Burshtein A.I, 1963 [12]);
- cholesterol and beta-sterols - by calculation method (I.M. Skurikhin, 1987 [11]);
- pectin - (Burshtein A.I., 1963 [12]);
- the caloric value of dishes and the percentage of investment of products - according to the instance (Burshtein AI, 1963 [12]);
- irreplaceable amino acids - by the method of calculation analysis (I.M. Skurikhina, 1987 [11]);

The actual nutritional status in the families of the studied children was assessed by the generally accepted method: for statistical analysis of daily diets of families, the survey data were used according to a method specially developed by us. The development includes materials from 2100 profiles. Calculation of the nutritional and biological value of the nutrition of families was carried out according to the same methods used in the PI.

When summarizing the materials on studying the actual nutrition of children, it was taken into account that children attending preschool institutions also eat at home: 75% of the children studied have breakfast and 100% have dinner at home. In this regard, when calculating the nutritional and biological nutritional value of the studied children, the data obtained from the statistical analysis of the diets of the PI were summed up with the data of breakfasts and dinners of family nutrition.

The results of all studies were subjected to statistical processing on a personal computer using the Excel application package and calculating arithmetic mean values, standard deviation (δ), and mean error (m). At all stages of the studies, a comparative assessment of the average values was carried out with the calculation of the Student T criterion; the differences were considered significant at $t \geq 2$ ($P < 0.05-0.001$). For individual indicators, when assessing the relationship between the studied phenomena, the pair correlation coefficients (r) were calculated

3. RESEARCH RESULTS.

We studied the state of actual nutrition of children from 3 to 7 years old in families and in kindergartens in Tashkent, Tashkent and Syrdarya regions with 9-10 hours of children staying in preschool institution.

The analysis of materials on the characteristics of the actual nutrition of the studied age groups showed that the nutrition of children in the childcare center has a number of deviations from hygiene requirements. First, there are serious miscalculations in the catering of children attending preschool institutions, because of which significant deviations from the recommended dietary norms are allowed. Limited and the range of dishes offered. The menu, as a rule, is compiled according to the set of available products, without taking into account the physiological needs and principles of good nutrition. Cereals and pasta dishes dominate the menu. None of the children's institutions have dietary meals. Almost everywhere, the practice of fortification of ready meals was stopped. The issues of providing child care facilities with special baby food products enriched with vitamins and microelements are not fully resolved.

One of the reasons for the unsatisfactory organization of food in kindergartens is the lack of awareness of local authorities about the health status of children, inadequate monitoring of childcare facilities, and their untimely and insufficient funding.

The satisfaction of the need for nutrients in the PI is carried out mainly due to bread, cereals and pasta. So, the proteins of these products make up 66-68% of their total amount, carbohydrates - 63-68%, and calorie content by 50.1-50.3% is provided by bread, cereals and pasta, by 18.4-21.1% due to vegetable oils. At 12% - due to meat, milk, vegetables (table. 1).

Table 1

The content of basic nutrients according to theoretical calculations in comparison with laboratory analysis of food products and prepared meals in the winter-spring season, M+m

Indicators	Protein (g)	Fats (g)	Carbohydrates (g)	Calorie content	Vitamin C (mg)
Chemical analysis data					
Tashkent city	55,80±0,4	57,4±2,0	44,5±6,0	772±25	5,0±2,0
Tashkent region	56,4±1,1	53,4±2,2	38,2±9,0	559±25	2,0±2,0
Syrdarya region	53,2±1,1	54,5±2,0	44,0±10	579,3±22	5,0±2,0
Theoretical Data					
Tashkent city	62,2±2,2	63,2±2,5	38±11	969,6±21	5,0±2,1
Tashkent region	63,2±2	60,0±2	78±13	904,8±24	0,3±2,0
Syrdarya region	60,6±1,6	62,6±1,8	40±11	945,8±17	0,2±2,0
Percentage of completion of layouts					
Tashkent city	91,3	90,8	4,8	0,0	0,3
Tashkent region	89,2	89,0	5,6	7,0	3,4
Syrdarya region	87,7	87,0	3,7	2,0	1,4

Table 2

The content of basic nutrients according to theoretical calculations in comparison with laboratory analysis of food products and prepared meals in the summer-autumn season, M+m

Indicators	Protein (g)	Fats (g)	Carbohydrates (g)	Calorie content	Vitamin C (mg)
Chemical analysis data					
Tashkent city	57,6±2,3	56,8±2,2	258,4±8,0	1775,2±28	55,0±2,0
Tashkent region	57,5±1,2	53,8±2,0	252,1±10,0	1667±28	54,0±2,2
Syrdarya region	55,5±1,0	55,3±2,0	258,0±12,0	1751,7±26	52,1±2,0
Theoretical Data					
Tashkent city	68,8±2,4	65,8±2,2	310±11	2107±21	58,0±2,1
Tashkent region	65,8±2,2	68,2±2,2	312±12,0	2125±20	60,3±2,0
Syrdarya region	64,8±1,8	62,8±2,0	316±14,0	2088,4±18	56,5±2,0
Percentage of completion of layouts:					
Tashkent city	83,7	86,3	83,3	84,2	94,8
Tashkent region	87,3	78,8	80,8	84,4	89,5
Syrdarya region	84,3	88,0	81,6	83,8	92,2

Table 3

Specific weight of individual food products by the content of proteins, fats, carbohydrates and calories in them (%) for the studied objects, against the actual nutrition background, M+m

Products	Proteins			Fats			Carbohydrates			Calorie content		
	I	II	III	I	II	III	I	II	III	I	II	III
Bread	37,9	39,4	39,8	3,4	2,9	3,0	40,5	42,2	42,4	26,3	25,5	24,8
Groats and Pasta	28,1	29,0	28,4	6,2	6,4	6,3	23,0	25,4	26,2	24,0	25,0	25,3
Vegetables and fruits	2,6	2,1	2,0	-	-	-	4,6	4,1	3,8	3,0	2,8	2,4

Sweets	-	-	-	-	-	-	22,0	23,0	22,5	8,1	8,0	8,0
Meat and meat products	18,0	17,5	17,8	15,2	15,3	14,6	0,4	0,3	0,1	9,0	8,4	7,6
Fish	3,5	2,0	1,0	1,0	-	-	-	-	-	0,2	0,1	0,1
Milk and Dairy Products	7,4	7,5	6,8	13,0	13,0	11,5	2,5	2,7	1,8	8,4	8,5	7,7
Vegetable oil	-	-	-	52,4	58,6	58,7	-	-	-	18,4	20,1	21,0
Other	2,5	2,5	4,2	10,0	4,5	5,9	7,0	3,3	3,2	3,2	1,8	3,1

Note: Here and in tables 3.6; 3.7; 3.8: I - Tashkent city, II - Tashkent region, III - Syrdarya region

Table 4
The average daily content of vitamins in children's diets on the actual nutritional background, M+m*

Object	Thiamine (mg)	Riboflavin (mg)	Vit B6, mg	Vit B12, mg	Folacin mcg	Niacin, mg	Vit C, mg	Vit A, mcg	Vit D I.E.
Tashkent city	0,8±0,1	0,8±0,07	0,8±0,1	1,1±0,04	168±8	11,0±1,1	45,0±2,0	290±9	690±11
	0,9±0,07	0,9±0,06	0,8±0,07	1,1±0,06	172±9	12,2±1,4	55,0±2,0	374±11	710±14
Average	0,85±0,08	0,85±0,06	0,8±0,08	1,1±0,05	170±8	11,8±1,2	50,0±2,0	332±10	700±13
Tashkent region	0,75±0,1	0,8±0,05	0,7±0,1	1,0±0,05	154±6	10,3±1,0	42,0±1,5	360±10	691±11
	0,8±0,1	0,8±0,08	0,7±0,08	1,1±0,04	159±7	11,1±1,1	52,0±1,3	368±12	693±10
Average	0,8±0,1	0,8±0,06	0,7±0,09	1,05±0,05	156±7	10,6±1,1	47,0±1,4	364±11	692±10
Syrdarya region	0,8±0,1	0,8±0,1	0,8±0,07	1,0±0,06	155±9	11,0±0,8	40,4±1,4	362±9	701±12
	0,9±0,08	0,8±0,06	0,8±0,1	1,0±0,09	160±8	11,0±0,9	51,4±1,2	358±8	719±11
Average	0,85±0,09	0,8±0,08	0,8±0,5	1,0±0,07	158±9	11,0±0,8	45,9±2,3	350±8	710±11

* Note: the numerator is winter-spring season; in the denominator is the summer-fall season.

The results of the assessment of the actual nutritional status of children in families.

It is known that, children attending preschool educational institution, some of the nutrients are obtained from home meals. According to our data, 75% of children have breakfast before leaving for daycare and 100% have dinner with the whole family. Given these circumstances, when analyzing the actual nutritional status of children, we took into account the nutritional and energy value of breakfast and dinner with family meals.

In order to more objectively assess the differences in the nutritional and biological value of family diets in children with tooth decay and practically healthy children, we analyzed more than 800 menu-layouts of families in Tashkent and the SyrDarya region on 26 indicators: total proteins and animals, common and vegetable fats, carbohydrates, di-, -monosaccharides, polysaccharides, pectin, cholesterol, energy value, calcium, phosphorus, iron, magnesium salts, the content of vitamins A, beta-carotene, thiamine, riboflavin, pyridoxine, cyanobalamin, vitamin C, D, E, PP, folic acid and dietary fiber on the seasons of the year.

Since the statistical method does not allow judging about changes in the nutritional and energy value of food products during their storage and cooking, in addition to the statistical method, laboratory methods of study were used in the work. Laboratory analyzes of prepared meals were performed on average 3 times a month. In total, more than 400 products and dishes were investigated.

A comparison of the energy and nutritional values of the average daily diets of children (family meals in the childcare center) in children with dental caries showed that even in Tashkent, where the situation with children's nutrition is more favorable, the quality of food in many respects does not meet hygienic requirements. So, in the city of Tashkent (Table 5), the energy

value of nutrition is even 160-190 kcal higher than normal, but this is due to the fact that carbohydrates in the diet are 43-57 g higher than normal, while proteins and fats are almost close to normal or 2-4 g lower. But at the same time, animal proteins were 10 g less, and vegetable oils - 5-6 g more than the required amount. The lack of animal proteins causes a deficiency of almost all essential amino acids: leucine, lysine, tryptophan, valine, threonine, histidine, methionine. However, the most inefficient nutrition of children is due to a deficiency of vitamins and minerals: vitamin A in the diet is 182 mcg less than the norm, C is 11 mg lower, D is 78 I.E, B6 is 0.4 mg; calcium deficiency is 38-80 mg, magnesium - 17-44 mg, phosphorus - 170-200 mg, iron - 3-4 mg, iodine - 50 µg.

Thus, the analysis of the actual nutritional status of children in families and preschool institutions showed a protein deficit of animal origin of more than 50%, vitamin C-45%; A - 82%; B6 - by 45%; B12 - by 78%; D - 84%; of minerals: - calcium by 55%, phosphorus - by 42%, magnesium - by 62%; of essential amino acids: - methionine - by 68%; leucine - by 44%, amino acids involved in the formation of hemoglobin, bone tissue and brain cells - by 85%.

As shown by a comparative analysis of food, energy and biological value, the average daily diets of children in the Syrdarya, Tashkent regions and Tashkent city were slightly different in vitamin composition. The difference is associated with the use of various types of vegetables, fruits, and legumes. In addition, according to the vitamin composition, there were statistically significant differences in the seasons of the year, both in Tashkent city and in the Syrdarya region. An analysis of the distribution of nutrients in the average daily diets of children attending preschool education showed that the distribution of the specific gravity of the energy intensity of fats is 25.3-0.7% (with a norm of 26-27%), carbohydrates 62.3-1.3% (with a norm of not more 55%). These deviations are also confirmed when analyzing rations according to the megacalorie system (table 3.9), where, the specific gravity of fats is much lower (28.0,22.2 per 1 megacalorie) of the recommended level (37.0 per 1 megacalorie), and the specific gravity of carbohydrates is much higher (155.8±2.4 per 1 megacalorie) recommended (137.0 per 1 megacalorie).

According to the content of biologically active substances and the general biological value of rations, there are also some significant differences between the DDU of Tashkent and the Syrdarya region, where there is a deficiency of PUFAs, choline, potassium, selenium, vitamins C, B6, A, sitosterols, fiber, pectin, irreplaceable amino acids - threonine, methionine, lysine, leucine, which reduce the overall biological value of diets.

Table 5

Energy and nutritional value of average daily diets in children of 3-7 years of Tashkent with tooth decay by seasons of the year in comparison with physiological norms, M+m

The name of indicators	Family	PI	Total content	Norm
Energy value (kcal / day)	394,4±22,0	1772±25,0	2066,4±25,0	2000
	418,0±25,0	1775,2±28,0	2193,2±28,0	
General proteins, g	9,0±0,4	56,8±2,2	65,8±2,2	70
	9,8±0,7	57,6±2,3	67,4±2,3	
Proteins animals, g	5,5±0,3	27,6±1,2	34,1±1,2	44
	2±0,4	3,6±1,3	4,8±1,3	
General fats, g	6±0,4	7,4±2,0	7,0±2,0	70
	1,2±0,5	5,8±2,2	3,0±2,2	
Vegetable fats, g	1±0,1	3,0±1,0	0,1±1,0	4
	2±0,2	3,6±1,1	0,8±1,1	
Carbohydrates, g	3,0±2,5	14,5±6,0	2,5±6,0	70

	9,5±3,0	58,4±8,0	27,9±8,0	
Ratio B: W: Y	1:7.5	1.0:4.3	1:4.7	1:4
	1.5:7	1:4.4	1:4.8	
Vitamin A, mcg / equiv	3,0±2,0	90±9,0	18±9,0	90
	9,3±2,0	74±11,0	93,3±11,0	
Vitamin C, mg	2±0,5	5,0±2,0	9,2±2,0	9
	2±0,6	5,0±2,0	1,2±2,0	
Folacin, mcg	2,2±2,0	58±8,0	80,2±8,0	90
	4,4±2,0	72±9,0	86,4±9,0	
Vitamin D, I.E.	2,0±3,0	90±11,0	22±11,0	900
	8±4,0	10±14,0	48±14,0	
Vitamin B ₁ , mg	1±0,01	8±0,07	9±0,06	9
	2±0,02	9±0,06	1±0,05	
Vitamin B ₂ , mg	1±0,01	8±0,07	9±0,06	9
	2±0,02	9±0,06	1±0,05	
Vitamin B ₆ , mg	1±0,01	7±0,1	8±0,08	3
	1±0,02	8±0,07	9±0,07	
Niacin, mg	0±0,02	1,0±1,1	3,0±1,0	1,0
	0±0,01	2,2±1,4	4,2±1,2	
Vitamin B ₁₂	1±0,01	1±0,04	2±0,04	5
	1±0,02	1±0,06	2±0,06	
Calcium mg	22±2,5	98±12	20±11	90
	48±4,5	14±14	52±10	
Magnesium mg Магний, мг	4±2,2	40±10	54±10	90
	8±3,5	56±13	84±12	
Phosphorus mg	75±12	80±20	55±20	850
	88±15	94±18	82±18	
Iron mg	4±0,3	2,0±1,1	3,4±1,0	9
	5±0,4	2,5±2,7	4,0±1,0	
Iodine, mg	007±0,001	013±0,003	02±0,003	07
	007±0,001	02±0,003	02±0,003	
Selenium, mcg	4,2±0,1	3,3±5,0	7,5±5,0	9,0
	5,5±0,1	4,0±5,0	9,5±5,0	
Potassium mg	20±25,0	290±55,0	510±55,0	800,0
	50±30,0	280±52,0	530±52,0	
Sitosterol, mg	4,2±0,10	9,8±0,20	4,0±0,20	5,0
	5,1±0,10	0,1±0,20	5,2±0,20	
Zinc mg	5±0,04	7±0,60	2±0,60	9
	8±0,05	7±0,50	5±0,5	
PUFA, g (polyunsaturated fatty acids)	5±0,01	1±0,07	6±0,07	9
	6±0,02	2±0,08	8±0,08	
Choline, mg	2,2±5,0	41,8±22,0	94±22	50
	5,0±5,0	44,5±24,0	90,5±24	
Leucine, g	4±0,02	7±0,10	1±0,1	2

	5±0,05	9±0,10	4±0,1	
Lizin, g	2±0,01	5±0,10	7±0,1	8
	2±0,02	6±0,10	8±0,1	
Isoleucine, g	1±0,03	2±0,10	3±0,10	5
	1±0,04	2±0,10	3±0,10	
Tryptophan, g	02±0,002	27±0,03	29±0,03	5
	02±0,002	28±0,03	3±0,03	
Threonine, g	02±0,003	08±0,01	1±0,01	48
	02±0,002	20±0,01	22±0,01	
Valin, g	04±0,003	98±0,10	02±0,10	7
	05±0,002	2±0,10	25±0,10	
Histidine, g.	05±0,002	35±0,005	4±0,05	6
	03±0,003	37±0,004	4±0,04	
Methionine, g.	02±0,002	08±0,05	11±0,05	44
	03±0,003	13±0,05	16±0,04	
Phenylalaline, city	2±0,03	72±0,03	92±0,03	8
	3±0,04	84±0,04	14±0,04	
Fiber, g	1,5±0,03	12,5±1,0	14,0±1,0	20
	1,8±0,05	13,8±1,1	15,6±1,1	
Pectin, g	0,03±0,004	0,7±0,02	0,73±0,02	1,0
	0,04±0,004	0.8±0,02	0,84±0,02	

Note: Hereinafter, in the numerator is the winter-spring season; in the denominator is the summer-fall season.

As a comparative assessment of the nutrient content in daily diets in Tashkent and the Syrdarya region shows, with the actual consumption of basic nutrients in children with dental caries, there are significant differences between the actual content in the winter-spring and summer-fall seasons nutrients in diets and their actual consumption for all nutrients (table 6).

So, these differences in energy value reach - 15-18%, in carbohydrates - 21-24% and in fats - 12-15%.

Table 6

Comparative assessment of the nutrient content in the daily diets of children 3-7 years old in Tashkent in children with dental caries with actual consumption by season M+m

The name of indicators	Actual Content	Consumption (according to laboratory studies)	R
Energy value (kkal / day)	2166,4±25	2086,0±20	<0,05
	2193,2±28	2102,0±25	
General proteins, g	65,8±2,2	64,2±2,2	>0,05
	67,4±2,3	63,8±2,2	
Proteins animals, g	34,1±1,2	30,0±1,2	<0,05
	34,8±1,3	30,5±1,3	
General fats, g	67,0±2,0	65,0±2,0	>0,05
	68,0±2,2	66,0±2,2	
Vegetable fats, g	29,1±1,0	28,1±1,0	>0,05
	29,8±1,1	28,8±1,1	

Carbohydrates, g	312,5±6,0	300,0±5,0	<0,05
	327,9±8,0	305±5,0	

The differences we found in the actual consumption of energy and nutrients in comparison with their actual content in average daily diets (Table 5-6) and a comparative assessment of the content of the main biologically active substances in average daily diets with the recommended norms are explained by the complete absence of the principles of rational nutrition in the organization of children's nutrition.

Table 7
Comparative assessment of the content of the main biologically active substances in the average daily rations of the studied children with dental caries in Tashkent with the recommended norms, M+m

The name of indicators	Contents in diets	Physiol. norms
Vitamin A, mkg / equiv	448±25	500,0
Carotenoids, mg	2,0±0,04	3,6
Vitamin C, mg	45,0±2,2	50,0
Vitamin E, mg	7,1±0,1	7,0
Vitamin D, mg	1,2±0,1	2,5
Vitamin B ₁ , mg	1,1±0,05	1,2
Vitamin B ₂ , mg	1,1±0,06	1,4
Vitamin B ₆ , mg	1,0±0,05	1,3
Calcium, mg	864±28	900,0
Magnesium, mg	176±16	250,0
Phosphorus, mg	1220±44	1350,0
Iron, mg	22,2±2,7	10,0-12,0

The results of studies on the structural composition of average daily diets for children 3-6 years old with dental caries indicate a low biological diversity and deficiency of biologically active substances in diets.

A comparative assessment of the structural composition of biologically active substances and the biological value of average daily diets for children 3-6 years old with dental caries and healthy children indicates a significant difference in the content of sitosterols, choline, fiber, pectin, potassium, magnesium, vitamins B₆, B₁₂, A, C and essential amino acids - methionine, lysine, leucine (table 8) .

Table 8
Comparative assessment of the biological value of the average daily rations of children 3-6 years old with dental caries and practically healthy children of Tashkent city by season of the year, M ± m

The name of indicators	Kids nutrition background	
	With tooth decay	Healthy children
Energy value (kcal / day)	1772±25,0	2066,4±18,0***
	1775,2±28,0	2193,2±20,0***
General proteins, g	56,8±0,4	62,8±2,0**
	57,6±2,3	63,4±2,0
Proteins animals, g	27,6±1,2	32,1±1,1**
	28,6±1,3	34,8±1,1***

General fats, g	57,4±2,0	58,0±2,0
	56,8 ±2,2	58,0±2,2
Vegetable fats, g	23,0±1,0	23,1±1,0
	23,6±1,1	23,8±1,1
Carbohydrates, g	244,5±6,0	212,2±6,0***
	258,4±8,0	216,5±7,0***
Vitamin A, mcg / equiv	290±9,0	312±9,0
	374±11,0	400.0±11,0
Vitamin C, mg	45,0±2,0	68,2±2,0***
	55,0±2,0	75,0±2,0***
Folacin, mcg	168±8,0	190,2±8,0
	172±9,0	196,4±9,0
Vitamin D, I.E.	690±11,0	920±11,0***
	710±14,0	940±14,0***
Vitamin B1, mg	0,8±0,07	1,2±0,06***
	0,9±0,06	1,3±0,05***
Vitamin B2, mg	0,8±0,07	1,1±0,06**
	0,9±0,06	1,2±0,05***
Vitamin B6, mg	0,7±0,1	1,1±0,08**
	0,8±0,07	1,2±0,07***
Niacin, mg	11,0±1,1	13,0±1,0
	12,2±1,4	13,2±1,2
Vitamin B12	1,1±0,04	1,4±0,04***
	1,1±0,06	1,5±0,06***
Calcium mg	698±12,0	920±11,0***
	714±14,0	932±10,0***
Magnesium mg	140±10,0	164±10,0
	166±13,0	174±12,0
Phosphorus, mg	980±20,0	1200±20,0***
	994±18,0	1210±18,0***
Iron mg	12,0±1,1	13,4±1,0
	12,5±2,7	14,0±1,0
Iodine, mg	0,013±0,003	0,2±0,003***
	0,02±0,003	0,2±0,003***
Selenium, mcg Селен, мкг	63,3±5,0	78,0±5,0*
	64,0±5,0	79,0±5,0*
Potassium mg Калий, мг	1290±55	1550±30***
	1280±52	1600±52***
Sitosterol, mg	59,8±0,2	70,0±0,2***
	60,1±0,2	72,0±0,2***
PUFA, g	1,1±0,07	1,6±0,07***
	1,2±0,08	1,8±0,08***
Choline, mg	241,8±22,0	290±12,0

	244,5±24,0	300,0±14,0*
Leucine, g	2,7±0,1 2,9±0,1	6,0±0,1*** 6,4±0,1***
Lysine, g	1,5±0,1 1,6±0,1	2,0±0,1*** 2,1±0,1***
Methionine, g	1,08±0,05 1,13±0,05	1,2±0,05 1,3±0,04**
Pectin, g	0,7±0,02 0,8±0,02	1,0±0,02*** 1,1±0,02***
The total biological value of rations, in%	52,2±1,5 56,2±1,1	68,2±1,3*** 72,1±1,2***
<i>Note:</i> numerator - winter-spring season; denominator - summer - fall season; * -P <0.05; ** - P <0.01; *** - P <0.001		

unreliable ($P > 0.05$). The total biological value of diets in practically healthy children in the winter spring season is $68.2 \pm 1.3\%$ ($P < 0.01$), in children with dental caries $52.5 \pm 1.5\%$ (Fig. 1.)

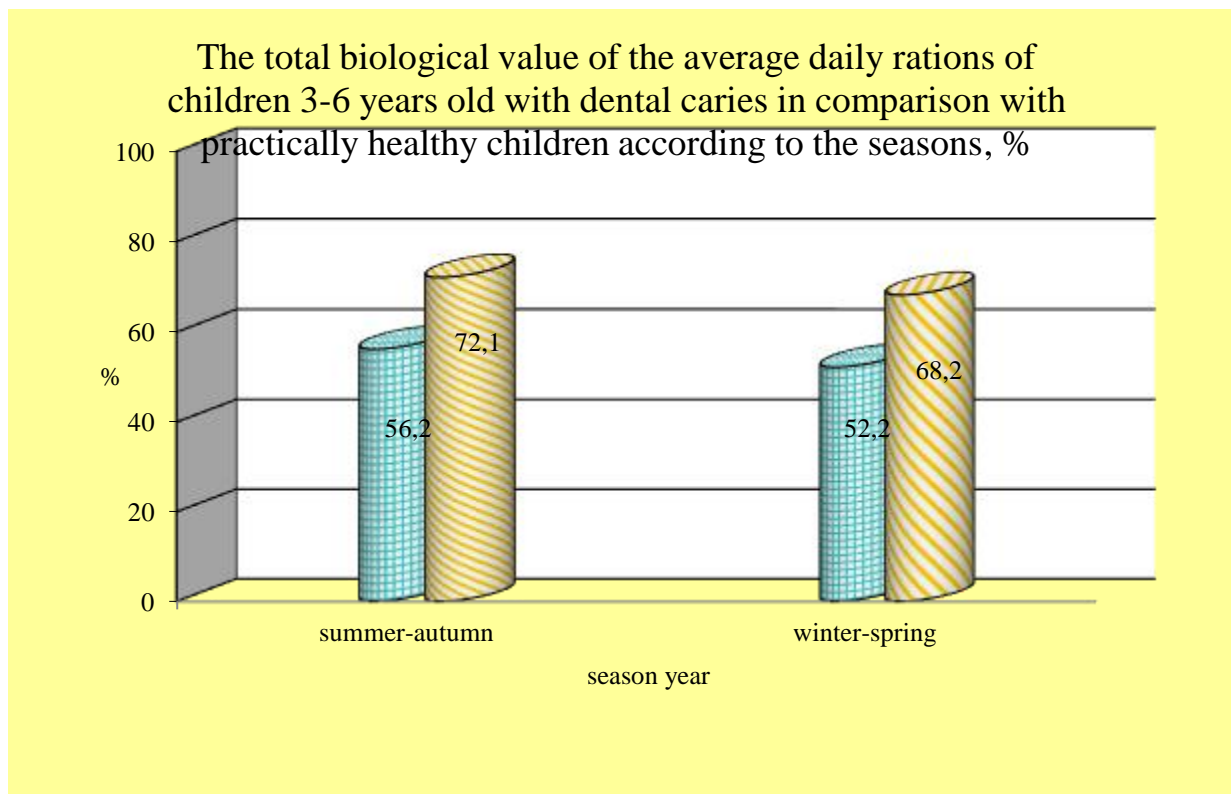


Fig. 5.1.

Discussion of the results.

Thus, a comparative assessment of the structural composition of biological substances and the biological value of average daily rations of children 3-6 years old with dental caries and healthy children in the summer-autumn season have significant differences and make up 56.2 ± 1.1 in the first group and in the second group, $72.1 \pm 1.2\%$ ($P < 0.01$).

The relatively high biological value of average daily diets in practically healthy children is explained by the low sugar intake and high specific gravity of products of high biological value

(peas, beans), animal proteins, vegetable fats, PUFAs (polyunsaturated fatty acids), and sitosterols, which shows a relatively high biological diversity in diets.

Salomova F.I. [6], Khudaiberganov A.S. [9] Conducting studies of the biological usefulness of diets in preschool institutions of Uzbekistan also note a deficiency of vitamins in diets. However, these deviations in the diets of children are not associated with an assessment of the risk of dental caries. Muminova G.G., Abduyusupova K.M. [10] Studying the features of the development of dental caries and its prophylaxis in children, depending on the course of the antenatal period of development, does not reveal the effects of diets and its biological usefulness in the risk of developing dental caries.

4. CONCLUSIONS:

1. Comparison of the energy and nutritional value of the average daily diets of children (family food in the PI) with dental caries, even in Tashkent, where the situation with children's nutrition is more favorable, and the quality of food in many respects does not meet hygienic requirements. Thus, the energy value of nutrition is even 160-190 kcal higher than normal, but this is because carbohydrates in the diet are 43-57 g higher than normal, while proteins and fats are almost close to normal or 2-4 g lower. However, at the same time, animal proteins were 10 g less, and vegetable oils - 5-6 g more than the required amount. The lack of animal proteins causes a deficiency of almost all essential amino acids: leucine, lysine, tryptophan, valine, threonine, histidine, methionine. However, the most inefficient nutrition of children is due to a deficiency of vitamins and minerals: vitamin A in the diet is 182 mcg less than the norm, C is 11 mg lower, D is 78 I.E, B6 is 0.4 mg; calcium deficiency is 38-80 mg, magnesium - 17-44 mg, phosphorus - 170-200 mg, iron - 3-4 mg, iodine - 50 µg.

2. A comparative assessment of the structural composition of biologically active substances and the biological value of average daily diets for children 3-6 years old with dental caries and healthy children indicates a significant difference in the content of sitosterols, choline, fiber, pectin, potassium, magnesium, vitamins B6, B12, A, C and essential amino acids - methionine, lysine, leucine.

3. The total biological value of diets in practically healthy children in the winter spring season is $67.8 \pm 1.3\%$, in children with dental caries $52.6 \pm 1.5\%$, in the summer-autumn season, respectively 72.2 ± 1 , 2% and 56.2 ± 1.1 .

4. The relatively high biological value of average daily diets in practically healthy children, due to the low sugar intake and high specific gravity of products of high biological value (peas, beans), animal proteins, vegetable fats, PUFAs, sitosterols, indicates the role of the biological diversity of diets in the prevention of dental caries.

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