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ABSTRACT

The concept of functional nutrition for the prevention of dental pathologies in all periods of life, which will satisfy the basic needs of life, will make it possible to effectively influence the functional properties of the body and counteract the development of diseases. In this connection, there is a need to assess the average daily diets of individual population groups to identify their possible optimization.

Key words: nutrition, cholesterol, energy value, vitamins, college, students, comparative, standards.

INTRODUCTION

It should be noted that, from the very beginning of the design of functional nutrition product standards and their formulations, the ability of such products to enrich diets becomes particularly important in relation to the prevention of individual pathologies and the impact on individual organs and systems [1].

Materials and methods of research. The actual nutrition was studied by the method of frequency and 24-hour reproduction, recommended by WHO for epidemiological studies [2] with the adaptation for students of questionnaires developed by us and approved by the Ministry of Health [3] for 350 students. When assessing the adequacy of nutrition, the norms of physiological needs for energy and nutrients for different sex and age groups of the Republic of Uzbekistan were taken as reference values [4], as well as the standards for the consumption of micronutrients on the FAO/WHO scale [5].

For the purpose of nutritional assessment of diets and alimentary health risk factors, we studied 1280 menu layouts for 26 indicators: total and animal proteins, total and vegetable fats, carbohydrates, di-monosaccharaides, polysaccharides,

pectin, cholesterol, energy value, calcium, phosphorus, iron, magnesium salts, the content of vitamins A, beta-carotene, thiamine, riboflavin, pyridoxine, cyancobalamin, vitamins C,D,E, PP, folic acid and fiber according to the seasons of the year according to A. A. Pokrovsky (1977) [6].

Before conducting the research, explanatory work was carried out among the subjects about the need to take into account all the products consumed, including street food.

Since the statistical method does not allow us to judge changes in the nutritional and energy value of food products during their storage and culinary processing, in addition to statistical methods, laboratory methods of study used in the work. Laboratory analyses of ready meals carried out on average 3 times a month and on the days of studying the effectiveness of the use of diets with PFP. In total, more than 400 products and dishes were studied.

The analysis of the obtained data of laboratory and statistical studies shows the effectiveness of the measures taken prior to the study. Minor deviations of the chemical and statistical analysis data on the nutritional and energy value of diets are within the limits of laboratory errors (Table 1).

As the analysis of food, energy and biological value shows (table 2) and the structure of the average daily rations (Table 3), the nutrition of the studied students differs somewhat by season, by vitamin composition, associated with the use of various types of vegetables, fruits, legumes.

Table 1

Energy and nutritional value of the average daily rations of medical college students on the actual background of nutrition, in the winter-spring season M±m

Name of indicators	calculated	Laboratory	P
Energy value (kcal / day)	2420±40	2370±45	<0,05
Total proteins, g	79,3±1,3	78,4±1,5	>0,01
Animal proteins, g	43,2±1,2	41,5±1,3	>0,01
Total fats, g	76,4±1,2	74,8±1,5	>0,01
Vegetable fats, g	18,4±0,8	18,2±0,9	>0,01
Carbohydrates, g	420,0±16,0	419,0±18,8	>0,01
The ratio of P:F:C	1:0,9:5,0	1:0,9:5,0	>0,01
Vitamin A, mcg/eq	470,0±55	410±35	<0,05
Beta carotene, mg	2,4±0,05	1,9±0,04	<0,001
Vitamin C, mg	48,8±2,0	41,0±3,0	<0,001
Vitamin E, mg	7,6±0,4	7,0±0,3	<0,001
Vitamin D, mg	1,7±0,2	1,6±0,1	>0,01
Vitamin B1, mg	1,5±0,04	1,1±0,05	<0,001
Vitamin B2, mg	1,6±0,05	1,2±0,06	<0,001
Vitamin B6, mg	1,5±0,05	1,2±0,06	<0,001

In addition, there are errors in the average daily diets of students related to eating habits in family nutrition and the lack of an analysis of diets. This applies to the distribution of the specific weight of the energy intensity of fats (25,3±0,7%, with a norm of 26-27%), carbohydrates (62.3±1.3%, with a norm of no more than 55%). These deviations are also confirmed when analyzing diets according to the megacalory system (Table 2), where the specific weight of fats is much lower (28.0±2.2 per 1 megacalory) than the recommended level (37.0 per 1 megacalory), and the specific weight of carbohydrates is much higher (155.8±2.4 per 1 megacalory) than the recommended (137.0 per 1 megacalory).

Table 2

Energy and nutritional value of the average daily rations of students on the actual background of nutrition, in the summer-autumn season M±m

Name of indicators	Calculated	Laboratory	P
Energy value (kcal / day)	2580±50	2540±40	<0,05
Total proteins, g	84,3±1,0	84,0±1,2	>0,01
Animal proteins, g	48,1±1,1	47,7±1,3	>0,01
Total fats, g	75,6±1,3	74,8±1,2	>0,01
Vegetable fats, g	19,2±0,9	18,8±1,1	>0,01
Carbohydrates, g	512,0±18,8	510,0±6,8	>0,01
Ratio P:F:C	1:0,9:5,2	1:0,9:5,2	>0,01
Vitamin A, mcg/eq	490,0±34	420±30	<0,05
Beta carotene, mg	2,7±0,07	2,1±0,03	<0,001
Vitamin C, mg	69,2±2,5	61,4±3,1	<0,001
Vitamin E, mg	7,8±0,3	7,2±0,3	<0,001
Vitamin D, mg	1,7±0,3	1,6±0,1	>0,01
Vitamin B1, mg	1,5±0,05	1,1±0,05	<0,001
Vitamin B2, mg	1,6±0,07	1,2±0,06	<0,001
Vitamin B6, mg	1,5±0,08	1,2±0,06	<0,001

Table 3

Structural analysis of the average daily diets of students, on the actual background of nutrition, M±m

Name of indicators	Indicators	Norm [4]	P
Energy intensity of fats, in % of total	25,2±0,7	26-27	>0,01
The specific weight of vegetable fats, in % of the total	30,6±1,0	25-30	>0,01
Energy intensity of proteins, in % of the total	12,3±1,2	11-13	>0,01
The specific weight of animal proteins, in % of the total	55,5±1,5	55,0	>0,01
Energy intensity of carbohydrates, in % of	62,3±1,3	55,0	<0,01

total			
Specific weight of proteins in megacalories	30,9±1,4	30,0	>0,01
Specific weight of fats in megacalories	28,0±2,2	37,0	<0,01
The specific weight of carbohydrates in megacalories	155,8±2,4	137,0	<0,01

Table 4

Comparative assessment of the actual consumption of energy and basic nutrients of medical college students with physiological norms by season, M±m

Name of indicators	Actual consumption.		Norm [4]
	Winter-spring	Summer-autumn	
Energy value (kcal / day)	2370±45,0	2540±40,0	2000-2450
Total proteins, g Animal	78,4±1,5	84,0±1,2	61-72
proteins, g Total	41,5±1,3	47,7±1,3	34-40
fats, g Vegetable	74,8±1,5	74,8±1,2	67-81
fats, g	18,2±0,9	18,8±1,1	20-25
Carbohydrates, g	419,0±18,8	510,0±6,8	289-358
Ratio b:w: y	1:0,9:5,0	1:0,9:5,2	1:1:4
Vitamin A, mcg/eq	410±25	420±30	600
Veta carotene, mg	1,9±0,04	2,1±0,03	1,8
Vitamin C, mg	41,0±3,0	61,4±3,1	60
Vitamin E, mg	7,0±0,3	7,2±0,3	10
Vitamin D, mg	1,6±0,1	1,6±0,1	3
Vitamin B1, mg	1,1±0,05	1,1±0,05	1,2
Vitamin B2, mg	1,2±0,06	1,2±0,06	1,3
Vitamin B6, mg	1,2±0,06	1,2±0,06	1,5
Sodium, g	14,4±0,6	14,5±0,7	5,0
Potassium, mg	4100,0±14,0	4000,2±16,0	3500
Calcium, mg	830,2±22,0	870,2±24,6	1000
Magnesium, mg	211,2±8,0	220,0±10,0	260,0
Phosphorus, mg	550,0±18,0	560,0±16,0	600,0
Zinc, mg	6,2±0,5	6,6±0,8	7,0
Iron, mg	14,0±0,5	15,2±0,7	10,0

According to the content of biologically active substances against the actual nutritional background of the subjects, in the spring-winter season, there was a deficiency of vitamins A (410±25.0 μg) at a rate of 600 μg, vitamin D 1.6-0.1 mg, at a daily rate of 3, 0 mg, vitamin C 41.0±3.0, at a rate of 60.0 mg, vitamin E

7.0±0.3 mg, at a rate of 10.0 mg, vitamin B6 1.2±0.06 mg; calcium 830.2-22.0 mg at a rate of 1000 mg, phosphorus 550.0±18.0 mg at a rate of 600.0 mg, magnesium 211.2±8.0 mg at a rate of 260 mg, and zinc 6.2± 0.5 mg at a rate of 7.0 mg, reducing the total biological value of rations (table 5).

These values of the winter-spring season retained the general trend of imbalance in diets in the summer-autumn season (Table 6).In the average daily rations on the actual background of nutrition, a high content of sodium and iron was revealed. Thus, the assessment of the state of the actual nutrition of medical college students shows that the actual consumption of the main nutrients does not correspond to the principles of rational nutrition and functional changes in the body of student youth. This concerns the distribution of the specific weight of the energy intensity of fats (25.3±0.7%, with a norm of 26-27%), carbohydrates (62.3±1.3%, with a norm of no more than 55%).

These deviations are confirmed by the analysis of diets according to the mega-calorie system, where the specific gravity of fats is much lower (28, 0 ±22.2 per 1 mega-calorie) of the recommended level (37.0 per 1 mega-calorie), and the specific gravity of carbohydrates is much higher (155,8±2.4 per 1 mega calorie) recommended (137.0 per 1 mega calorie).

Comparative assessment of the actual consumption of energy and basic nutrients with the physiological norm of need for young students shows a deficiency of vegetable fats, vitamins A, C, B6, E, minerals potassium, magnesium, and zinc.

Table 5

Nutritional and biological value of average daily rations against a changed background of nutrition of those who received PFP "Mix for strengthening teeth" in medical college students in the winter-spring season, M±m

Name of biologically active substances	On the changed background of nutrition	On the actual food background	P
Energy value (kcal / day)	2589,0±24,0	2370±35,0	<0,001
Total proteins, g Animal	91,5±1.5	78,4±1,5	<0,001
proteins, g Total	45.2±1.1	41,5±1,3	<0,001
fats, g Vegetable	78.0±1.0	74,8±1,5	<0,001
fats, g	21.4±0.8	18,2±0,9	<0,001
Carbohydrates, g	451.0±10,0	419,0±18,8	<0,001
Ratio P:F:C	1:0.8:4.9	1:0,9:5,0	<0,001
Vitamin A, mcg/eq	410,0±25,0	410,0±28,0	>0,05
Beta-carotene, mg	13,9±0.6	1,9±0,04	<0,001
Vitamin C, mg	54,9±2.0	41,0±3,0	<0,001
Vitamin E, mg	9,0±0.5	7,0±0,3	<0,001

Name of biologically active substances	On the changed background of nutrition	On the actual food background	P
Vitamin D, mg	1,7±0.1	1,6±0,1	>0,05
Vitamin B1, mg	1.4±0,05	1,1±0,05	<0,001
Vitamin B2, mg	1.6±0.06	1,2±0,06	<0,001
Vitamin B6, mg	1.4±0.03	1,2±0,06	<0,001
Sodium, g	15.8±0.1	14,4±0,6	<0,001
Potassium, mg	4362,3±16,0	4100,0±14,0	<0,001
Calcium, mg	843.0±21,0	830,2±22,0	>0,05
Magnesium, mg	225,4±7.0	211,2±8,0	<0,001
Phosphorus, mg	564.0±13.0	550,0±18,0	>0,05
Zinc, mg	6,9±0,4	6,2±0,5	>0,001
Iron, mg	21,5±1,0	14,0±0,5	<0,001
Sitosterol, mg	125.0±0.3	101.0±0.2	<0,001
PUFA, g	3.2±0.06	1.8±0.07	<0,001
Choline, mg	510±20	394±22	<0,001
Phospholipids, g	4.0±0.2	3.0±0.3	<0,001
Leucine, g	4.4±0.04	4.1±0.02	<0,001
Leasing	3.2±0.1	2.7±0.1	<0,001
Isoleucine, g	3.7±0.1	3.7±0.2	>0,05
Tryptophan, g	0.7±0.02	0.9±0.03	<0,001
Threonine, g	1.5±0.1	1.9±0.1	<0,001
Valine, g	3.6±0.1	3.4±0.1	>0,05
Histidine, g	1.5±0.04	1.8±0,05	<0,001
Methionine, g	2.4±0,05	2.0±0.1	<0,001
Phenylalanine, g	2.6±0.1	2.6±0.3	>0,05
Fiber, g	23.2±0.7	18.2±1.2	<0,001
Pectin, g	2.0±0.1	1.1±0.2	<0,001
Total biological value of diets, in %.	78,2±1,3	54.8±1.5	<0,001

A comparative assessment of the structural composition of biologically active substances and the biological value of the average daily rations of the studied, on the actual and changed nutritional backgrounds, testifies to the effectiveness of the corrections. Thus, the total biological value of food rations in the winter-spring season increased from 54.8±1.5% against the actual background, to 78.2±1.3% (P <0.01) against a changed nutritional background (Table 6). Due to a comparative increase in the average daily content in the diets of the changed nutritional background in the summer-autumn season, an increase in the total biological value of the average daily diet was from 56.7 561.1% to 79.4±1.2% (Table 7). An increase in the total biological value of the diet of students who received the PFP

"Mix for strengthening teeth" was accompanied by an increase in the content of plant lipids from 18.2±0.9 to 21.4±0.8 g in the winter-spring season (Table 6), from 18.8±1.1 g up to 26.4±0.5 g in the summer-autumn season (table 7).

The content of beta-carotene in diets due to the inclusion of the PFP "Mixture for strengthening teeth" increased from 1.9 10.04 g to 13.9±0.6 g in winter-spring and from 2.1±0.03 g to 14, 1±0.4 g in the summer-autumn season.

Against the altered nutritional background, the content of vitamin C, E, potassium, magnesium, iron, B vitamins, PUFAs, sitosterols, choline, fiber, pectin, and essential amino acids methionine, lysine, leucine increased.

Changes in the energy value, total amount of proteins, zinc, isoleucine, valine, phenylalanine, calcium, phosphorus and zinc against the altered nutritional background compared to the actual nutritional background are not significant (P> 0.05).

Table 6

Nutritional and biological value of average daily rations against a changed background of nutrition of those who received PFP "Mix for strengthening teeth" in medical college students in the summer-autumn season, M±m

Name of biologically active substances	On the changed background of nutrition	On the actual food background	P
Energy value (kcal / day)	2759,0±35,0	2540,0±40,0	<0,001
Total proteins, g Animal	97,1±2,2	84,0±1,2	<0,001
proteins, g Total	48.5±1,0	47,7±1,3	>0,05
fats, g Vegetable	78,0±1,1	74,8±1,2	<0,001
fats, g	26,4±0,5	18,8±1,1	<0,001
Carbohydrates, g	542,0±6,0	510,0±6,8	<0,001
Ratio P:F:C	1:0.8:5,5	1:0,9:5,2	>0,05
Vitamin A, mcg/eq	426,0±20,0	420,0±30,0	<0,05
Beta-carotene, mg	14,1±0,4	2,1±0,03	<0,001
Vitamin C, mg	70.5±3.0	61,4±3,1	<0,001
Vitamin E, mg	11.0±0.4	7,2±0,3	<0,001
Vitamin D, mg	2.0±0.2	1,6±0,1	<0,001
Vitamin B1, mg	1.6±0,05	1,1±0,05	<0,001
Vitamin B2, mg	1.7±0.04	1,2±0,06	<0,001
Vitamin B6, mg	1.5±0.03	1,2±0,06	<0,001
Sodium, g	22,0±2.1	14,5±0,7	<0,001
Potassium, mg	4262,5±17,0	4000,2±16,0	<0,001
Calcium, mg	880,4±20.2	870,2±24,6	>0,05
Magnesium, mg	234,2±10,2	220,0±8,0	<0,001
Phosphorus, mg	568,0±13.0	560,0±16,0	>0,05
Zinc, mg	6,9±0,7	6,6±0,8	>0,05

Iron, mg	22,7±0,6	15,2±0,7	<0,001
Sitosterol, mg	1220±30	1040±35	<0,001
PUFA, g	370±20	310±22	<0,001
Choline, mg	128.0±0.2	112.0±0.2	<0,001
Phospholipids, g	16.8±0.2	15.9±0.6	>0,05
Leucine, g	3.5±0,05	2.4±0.09	<0,001
Leasing	580±30	420±28	<0,001
Isoleucine, g	4.5±0.2	3.2±0.3	<0,001
Tryptophan, g	4.5±0.04	4.1±0.02	<0,001
Threonine, g	3.2±0.1	2.7±0.1	<0,001
Valine, g	3.7±0.1	3.7±0.2	>0,05
Histidine, g	0.7±0.04	0.9±0.03	<0,001
Methionine, g	1.5±0.1	1.9±0.1	<0,001
Phenylalanine, g	3.7±0.1	3.5±0.1	>0,05
Fiber, g	1.7±0.04	1.8±0,05	<0,001
Pectin, g	2.6±0,05	2.0±0.1	<0,001
Total biological value of diets, in %.	79,4±1.2	56.7±1,1	<0,001

Conclusions:

1. The actual consumption of the main nutrients by the studied students does not correspond to the principles of rational nutrition and functional changes in the organism of student youth. This concerns the distribution of the specific weight of the energy intensity of fats (25.3±0.7%, with a norm of 26-27%), carbohydrates (62.3±1.3%, with a norm of no more than 55%). These deviations are confirmed by the analysis of diets according to the mega-calorie system, where the specific gravity of fats is much lower (28.0,22.2 per 1 mega-calorie) of the recommended level (37.0 per 1 mega-calorie), and the specific gravity of carbohydrates is much higher (155,8±2.4 per 1 mega calorie) recommended (137.0 per 1 mega calorie).

2. Comparative assessment of the actual consumption of energy and basic nutrients with the physiological norm of need for young students shows a deficiency of vegetable fats, vitamins A, C, B6, E, minerals potassium, magnesium, and zinc.

3. Comparative assessment of the structural composition of biologically active substances and the biological value of the average daily rations of the studied, on the actual and changed nutritional backgrounds, testifies to the effectiveness of the corrections.

Thus, the total biological value of food rations in the winter-spring season increased from 54.8±1.5% against the actual background, to 78.2±1.3% (P <0.01) against a changed background of nutrition.

Due to the comparative increase in the average daily content in the diets of the changed nutritional background in the summer-autumn season, the increase in the total biological value of the average daily diet was from 56.7±1.1% to 79.4±1.2%.

4. An increase in the total biological value of the diet of students who received the PFP “Mix for strengthening teeth" was accompanied by an increase in the content of plant lipids from 18.2±0.9 to 21.4±0.8 g in the winter-spring season, from 18.8±1.1 g to 26.4±0.5 g in the summer-autumn season.

The content of beta-carotene in diets due to the inclusion of the PFP “Mixture for strengthening teeth” increased from 1.9 10.04 g to 13.9±0.6 g in winter-spring and from 2.1±0.03 g to 14 , 1±0.4 g in the summer-autumn season.

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