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*L.I. Vlasyk*<sup>1,2</sup>,*O.M. Iftoda*<sup>1</sup>,*O.V. Kushnir*<sup>1</sup>,*N.M. Fundiur*<sup>1</sup>

Department of Hygiene and Ecology,  
Bucovinian State Medical University<sup>1</sup>,  
L.I. Medved's Research Center of  
Toxicology MH Ukraine<sup>2</sup>,  
Chernivtsi, Ukraine

## HYGIENIC EVALUATION OF A CARBOHYDRATE CONSTITUENT IN THE DIETARY INTAKE OF PRESCHOOL INSTITUTIONS IN THE TOWN OF CHERNIVTSI

**Key words:** daily nutrition ration,  
children, balance of carbohydrate,  
dietary fiber, preschool institutions.

**Abstract.** Qualitative and quantitative composition of the daily nutrition ration of children at preschool institutions of Chernivtsi was investigated and analyzed. Hygienic evaluation of carbohydrate constituent was provided. Analysis of the daily children's diets in 9 preschool institutions of Chernivtsi showed that the percentage content of simple carbohydrates in the daily diet was twice more than the recommended norm. The content of dietary fiber in all the preschool institutions was lower than the recommended one. The main reasons of disbalance of carbohydrates in children's food ration are the increase of consumption white bread, macaroni and confectionery products, absence of rye bread, deficiency of fresh fruits and uncooked vegetables. Received results served as the basis for development of the recommendations for correction of actual nutrition of children at preschool institutions of Chernivtsi.

### Actuality

The problem of children's health under contemporary conditions is of a special importance, as economical and social complications as well as ecological environmental conditions influence upon the rising generation. It is explained by a high sensitivity of children to harmful environmental factors [1, 2].

According to all the WHO data available an alimentary factor is one of the leading determinants of health. An adequate diet is one of the major factors determining the physical development of children, optimal functioning of all the organs and systems, their adaptive-compensatory possibilities and the level of children's health [3]. Carbohydrates are one of the chief nutrients in dietary intake of children and adults. According to contemporary view they are not only energy substrate, but they perform a plastic function as a glycoprotein structural components and take part in important metabolic processes. A well-known children's inclination to increased ketogenesis combined with high energy loss stipulates the importance to intake a sufficient amount of carbohydrates with food exactly in childhood [4].

**Objective:** to study and analyze the state of nutrition of preschool children in Chernivtsi by carbohydrate constituent.

### Materials and methods of the research

The state of organized food supply of children attending nine preschool institutions in Chernivtsi was examined by means of the calculation method by copying the data during 10 days from the menu according to the seasons of the year, and then an average amount of products per one child a day was determined and compared with the recommended one [5]. Energy value of food and the content of main nutrients in it were detected by means of specially elaborated program compiled on the basis of I.M. Skurykhin's reference tables [6]. Qualitative and quantitative indices of children's diet were estimated according to the "Food Standards in Educational and Health Institutions" (2004) [5], "Standards of Physiological Requirements of Ukrainian Population in the Major Dietary Substances and Energy" (1999) [7].

### Results of the research and discussion

The nourishment of children in preschool institutions of Chernivtsi is organized according to group principle: practically healthy children of a certain group get similar by its volume and chemical content food corresponding to the average physiological requirements of their organisms in the main nutrients and energy. Children have three meals

a day providing 70-80% of their daily diet. The volume of food is distributed according to the time of meal: breakfast - 20-25%, lunch - 35-40%, afternoon snack - 10-15% out of daily energy food value.

The analysis of the menu per year showed, that there was more white bread in children's diet (45% more), and rye bread was absent. Excess of cereals, beans, pasta (37,8% more) and pastry (13,3% more) should be noted. An average amount of various vegetables (except potato) was within the recommended norm. At the same time fruit deficiency was found (75% less). The analysis of carbohydrate ingredients in diets showed that general content of

carbohydrates in the diet of one preschool institution was within the norm, and in the remaining ones it was 3,5-12,4% less than recommended. Simple carbohydrates were an average two times higher than those recommended ones (table 1). The amount of dietary fiber in children's diets of all the preschool institutions is insufficient (1,96-2,1 times less than that of recommended one). The analysis of seasonal dynamics of the dietary fiber content showed that it is the lowest in spring in all preschool institutions ( $4,71 \pm 0,49$  g/day). In summer and autumn it increases gradually ( $4,95 \pm 0,69$  and  $5,01 \pm 0,64$  g/day respectively), till the highest values in winter

Table 1

Daily amounts of carbohydrates in preschool institutions children's diets

PI №	Carbohydrates			Dietary fiber in grams
	Total grams	Simple carbohydrates in grams	% of simple carbohydrates	
1	219,1	93,8	42,8	5,24
3	220,2	90,9	41,3	4,67
4	230,8	93,4	40,5	5,11
6	209,6	88,7	42,3	4,56
7	239,3	98,8	41,3	5,50
9	225,2	88,3	39,2	4,79
12	223,4	96,3	43,1	5,72
28	220,6	86,5	39,2	4,88
44	217,8	87,7	40,3	4,08
Average	222,9	91,6	41	4,95
Norms	239,2	47,8	20	10

( $5,11 \pm 0,64$  g/day).

In our opinion the main reasons of carbohydrates disbalance in children's food ration are the following:

- increase of consumption of food products, which are high-caloried, reach of simple carbohydrates and poor of dietary fiber (white bread, pasta and confectionery products);
- absence of rye bread;
- deficiency of vegetables and fruit as a sources of dietary fiber and pectin.

Being an anti-toxic component of food, dietary fiber prevents absorption of toxic and carcinogenic substances in the intestines, favours the formation of normal intestinal microflora, increasing the body resistance to unfavourable environmental factors. An excessive intake of simple carbohydrates on the ground of insufficient intake of dietary fiber in children's organism promotes constipation, diverticulosis, intestinal dysbacteriosis resulting in metabolic disorders, and thus creating the preconditions for the development of diabetes mellitus and diseases of the bile ducts [8].

Thus dietary intake of preschool children needs such correction:

- to include in the food ration rye bread and bread

with bran and to reduce in the diet portion of wheat bread;

- to increase consumption of buckwheat, oat, barley grains due to reduction in the diet of macaroni and confectionery products;
- to increase the content of fresh fruits and uncooked vegetables in the diet.

### Conclusion

1. The analysis of daily children's diets in preschool institutions showed that their food was variable, the order and intervals between meals were kept, as well as the sequence of taking dishes and distribution of energy value.

2. There is qualitative and quantitative deficiency of taking the main foods observed causing reduced energy value of the diet.

3. Percentage composition of simple carbohydrates in a daily diet is an average two times higher than that of the recommended norm.

4. The content of dietary fiber in all preschool institutions was lower than the recommended one.

The results obtained and conclusions drawn made the basis for recommendation of measures concerning the correction of real diets of preschool children.

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**ГІГІЄНИЧНА ОЦІНКА ВУГЛЕВОДНОЇ СКЛАДОВОЇ РАЦІОНІВ ХАРЧУВАННЯ ДІТЕЙ ДОШКІЛЬНОГО ВІКУ В ДИТЯЧИХ НАВЧАЛЬНИХ ЗАКЛАДАХ М.ЧЕРНІВЦІ**

*Л.І. Власик, О.М. Іфтода, О.В. Кушнір,*

*Н.М. Фундюр*

**Резюме.** Вивчено та проаналізовано якісний та кількісний склад добових раціонів харчування дітей дошкільного віку, які відвідують дитячі навчальні заклади м. Чернівці з наступною гігієнічною оцінкою збалансованості їх вуглеводної складової. Проведений аналіз добових раціонів дітей дошкільного віку дев'яти ДНЗ м. Чернівці засвідчив, що відсотковий вміст простих вуглеводів у добовому раціоні в середньому в два рази перевищує рекомендовану норму. Вміст клітковини в раціонах усіх ДНЗ нижче рекомендованої величини надходження. Дисбаланс вуглеводної складової раціону зумовлений відсутністю у раціоні житнього хліба, дефіцитом свіжих овочів і фруктів, перевищенням кількості круп, макаронних та кондитерських виробів. Отримані

результати лягли в основу розробки рекомендацій щодо корекції фактичного харчування дітей дошкільного віку, які відвідують ДНЗ м. Чернівці.

**Ключові слова:** добові раціони харчування, діти, збалансованість вуглеводів, клітковина, дитячі навчальні заклади.

**ГИГИЕНИЧЕСКАЯ ОЦЕНКА УГЛЕВОДНОЙ СОСТАВЛЯЮЩЕЙ ПИЩЕВЫХ РАЦИОНОВ ДЕТЕЙ ДОШКОЛЬНОГО ВОЗРАСТА ДЕТСКИХ ОБРАЗОВАТЕЛЬНЫХ УЧРЕЖДЕНИЙ Г.ЧЕРНОВЦЫ**

*Л.И. Власык, О.М. Ифтода, О.В. Кушнир,*

*Н.М. Фундюр*

**Резюме.** Изучен и проанализован качественный и количественный состав суточных пищевых рационов детей дошкольного возраста, посещающих детские образовательные учреждения г. Черновцы с последующей гигиенической оценкой сбалансированности их углеводной составляющей. Анализ суточных пищевых рационов детей дошкольного возраста девяти ДОО г. Черновцы свидетельствует, что процентное содержание простых углеводов в суточном рационе в среднем в два раза превышает рекомендуемую норму. Содержание клетчатки в рационах всех ДОО ниже рекомендуемой величины поступления. Дисбаланс углеводной составляющей рациона обусловлен отсутствием в рационе ржаного хлеба, дефицитом свежих овощей и фруктов, превышением количества круп, макаронных и кондитерских изделий. На основе полученных результатов разработаны рекомендации относительно коррекции фактического питания детей дошкольного возраста, посещающих ДОО г.Черновцы.

**Ключевые слова:** суточные рационы питания, дети, сбалансированность углеводов, клетчатка, детские образовательные учреждения.

**Bucovinan State Medical University(Chernivtsi)**

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