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**Estimation of Nutritional Status of Children, Adolescents and Students of the Sakha Republic (Yakutia)
According to a Single-Moment Questionnaire**

ABSTRACT

We estimated nutrition of younger generation of the Republic Sakha (Yakutia). With the help of the questionnaire we found out that the level of breastfeeding up to 4 months was high and made 92% in urban children and 70% of rural ones. In preschool institutions nutrition is unbalanced, with a predominance of carbohydrates. In the adolescents of school age nutrition is deficient on the main components of food, unbalanced on nutrient composition and is characterized by a reduced energy value of the daily diet. The majority of the students have disordered regime and nutrition due to the limited budget in the selection of natural products. This study has shown that in all age groups nutrition must be corrected with a possible use of multivitamin-mineral complexes.

Keywords: breastfeeding, nutrition assessment, preschool children nutrition, school meals, students' nutrition, the micro -, macronutrients.

The balanced diet of children and teenagers plays a significant role in the system of the actions preserving and promoting the health of younger generation [6, 7]. In recent reform years the health of children in the Republic of Sakha (Yakutia) has considerably worsened. The level of physical development has changed and also the nature of nutrition caused as insufficient consumption of nutrient materials, first of all vitamins, macro - and microelements, proteins, as their irrational ratio (Khandy M.V., Prokopyeva S.I., 2005, Stepanova L.A. 2006, Markova S.V., 2000).

The most balanced product for children of early age is women's milk which is considered as "the gold standard" of optimum nutrition promoting biological adaptation in the neonatal period, in correct development of organs and systems of the baby next years, to the prevention of diseases, increase of resistance to harmful factors of environment [1, 2, 3]. However in Russia the prevalence of breastfeeding, despite a number of actions which are actively carried out in recent years, there are only about 40% of children of 3-months age [3]. For harmonious development of the child at the early age the nutrition has to be balanced not only in proteins, fats, carbohydrates, but also to include vitamins, minerals which requirement is significantly increased during active growth.

The rates of physical development of children, since their second year of life, are a little slowed down, but nevertheless remain quite high. Active physical growth is interfaced to intensive formation of bone and muscular systems. Effective accumulation of bone weight at this age influences on the risk of development of osteopenia and osteoporosis next years. The central nervous and endocrine systems continue to develop actively along with the bone and muscular system. The increase in number of contacts of the child with anti-genes of environment demands hard work of immune system. The balanced nutrition in the main nutrients provides normal growth rates and development of the child, and also helps to prevent developing of such alimentary and dependent diseases as anemia, rickets, food insufficiency, obesity and others [8]. It has been proved that the healthy nutrition of children at

early age is able to reduce risk of development of such diseases as diabetes, obesity, cardiovascular pathology and some types of cancer [4]. The correct nutrition organization in preschool institutions plays an important role, there more than a half of children of preschool age is raised up and practically all children are older 1,5 - 2 years old in many large cities and industrial centers. Most of them are there for 9 - 12 hours and their nutrition, except weekends and holidays, is almost completely provided with preschool institution where children are raised up within several years.

The school age is that key period of human body development, final formation of the skeleton and skeletal muscles, a sharp disharmonic reorganization, puberty, changes in the psychological sphere connected with educational process. High growth rate and the anabolic processes demand food sufficient with protein and mineral salts and also exogenous regulators of metabolic processes – vitamins and microelements. The deep neuroendocrine reorganization happening at teenage age creates certain prerequisites for emergence of endocrinopatia and metabolic disorder. In particular, at this age school children begin to have overweight (in some cases obesity), development of diabetes, cushingoid syndrome, skin problems (acne, etc.) and other diseases, the important role in genesis belongs to the alimentary factor [9]. The peculiarity of nutrition of schoolchildren is division of daily diet into two parts. One part is – home nutrition before study, another – the school food including, as a rule, two meals – breakfast and lunch. We should provide the growing organism with enough calories and necessary substances, a balance of all parts of a day diet of the school children by chemical composition, food processing and correct nutrition [5].

Lack of time, food incompetence, modern way of life – has resulted in incorrect food choice. The growth of popular fast food containing various fragrances, dyes, modified components among young generation disturbs us. Therefore bad food habits become serious risk factor of the development of many diseases. Some physiological systems development, first of all neurohumoral continues in the organism of young people, therefore they are very sensitive to diet balance disorder. Unfortunately, last years statistics has shown sharp increase of young people having obesity, diseases of cardiovascular system, diabetes, etc. It is possible to prevent such diseases with the help of healthy lifestyle and, first of all, healthy food habits.

Thus, the purpose of our work was food assessment of children, teenagers and students living in city and rural conditions of the Republic of Sakha (Yakutia).

MATERIALS AND METHODS

Nutrition problems have been studied by questionnaire of 606 people. The 1-st group included 172 children aged till 1 year, in the II-nd - 300 preschool children from 3rd to 7 years, in the III-rd group - 48 school students of 13-14 years, in the IV-th - 86 students of medical institute aged from 18 till 22 years.

The standard questionnaires were used in our research. The data obtained by calculation method were compared to the recommended physiological norms of nutrition for children and approved average daily set of products for preschool institutions and also according to the requirements regulated by MR 2.3.1.2432-08 "Norms of physiological requirements of nutrient materials and energy for various groups of the population of the Russian Federation" (2008) [6].

RESULTS

In the first group the analysis of 172 «Cases of history of the child" ($\phi 112/y$) and questionnaire of mothers has been carried out. Research was conducted on the basis of children's polyclinic № 3 in Yakutsk, Zhigansky and Nurbinsky regions by method of casual selection. "The Questionnaire for Mothers" developed by the department of

propaedeutics of children's diseases of Medical institute and history of development of the child were used in the research (ϕ 112/y).

According to questionnaire, the national structure was: Yakuts – 88, Russians – 30, Evens – 49, other nationalities – 5. Boys – 94, girls – 78, living in city – 86, rural – 86. All children were aged till 1 year. The age of mothers from 18 to 40 and older, average age of mothers $25,5 \pm 10,2$ years. More than a half (62%) of mothers had the higher education, 12% - secondary education, 2% - college education and 24% were students. 45% of women had first childbirth. Only 30% of mothers were in child maternity leave. The state of health of mothers during pregnancy showed that almost everyone had pathology. Anemia - 43,3% of rural women and 26,8% - city, the complicated obstetric and gynecologic anamnesis - 37,5 and 31%, illness of organs of urinary system – 44,3 and 15%, digestive - 6,6 and 22% respectively. Smoking is the strongest factor making an adverse effect on the health of future child and lactation. According to questionnaire the rural women smoke almost twice more often than the urban. In the city 9% of mothers smoke. Early breastfeeding was noted among 60% of rural newborns and 43% - city. Discharge from maternity hospital were 70% of rural newborns on breastfeeding and 91,8% - city, mixed – 13,3 and 3,1%, artificial – 16,7 and 5,1%, respectively.

0,9% of children of rural areas and 4,9% - city had only breastfeeding at the age of 4 months by S. I. Prokopyeva's data, 2005. According to our questionnaire, the children who were mainly on breastfeeding about 4 months among the rural – 70%, city - 91,8%. The reasons of the breastfeeding stop among rural children more than in a half (54,7%) of cases had a hypogalactia, 13,2% - diseases of mother and breast refusal of the child, 9,4% - illness of the child and 15% - other reasons (mother's study, business trips, dairy mixes, bad regime feeding). When studying the anamnesis of women with hypogalactia: 40% of pregnant women had anemia and pyelonephritis, 29% of women - toxicosis of 1-2 half of pregnancy, three women were operated because of the heart diseases.

In the second group we have analysed a food diet of 300 children aged from 3 till 7 years attending kindergarten №11 "Snowdrop" in Yakutsk (for children with the weakened sight). The analysis of food of children was carried out according to the daily menu with transfer of the dishes prepared during the day, and the indication of quantity of the products used for preparation. According to "Sanitary control requirements 2.4.1.2660-10, the appendix 6" of 2010, the children attending kindergarten received 4-times meal: breakfast, lunch, snack and dinner which had to provide their daily need for nutrient materials and energy. Menus was according to these requirements of 105 rubles a day on 1 child for 10,5 hours of stay in the kindergarten in the afternoon.

Breakfasts consisted of hot meals (milk porridges, mashed potatoes with sausages, rice pilaf with fruit), cheese sandwiches, 1-2 times a week cottage cheese casseroles, flat cakes with jam. Drinks for breakfast - sweet tea, coffee and cocoa. For lunch children ate the vegetable salads (fresh cabbage, carrots, beet, cucumbers, tomatoes) filled with vegetable oil; first, second and third dishes. First course soups – meat soup and 1-2 times a week fish soup; on the second – meat or fish in the form of cutlets, meatballs, baked puddings, roll, goulash, 1 time in 10 days liver fritters with grain and pasta, 1-2 times a week – stewed vegetables. For improvement of tastes of food seasonings (parsley, fennel, onions, garlic) were used. As the third dish for lunch was compote from dried fruits, the cowberry drink, washbrew, compote allsorts or juice packaged was served. For a snack children received generally flour products: rolls, cheese cakes with jam or cottage cheese, sausage rolls; 1-2 times a week: cookies, wafers, gingerbreads and candies. Children received milk every day, fermented milk products - bifasil or kefir, every other day. Fruit - apples, bananas, pears and tangerines was only once a week. Two times a week children received fruit drink from the fresh frozen fruits and berries, and in other days for a snack sweet tea was offered. The dinner

consisted generally of porridges: oat, millet, cottage cheese casseroles, cheesecakes, an omelet, meatballs semolina, the pies baked fish cutlets with mashed potatoes sometimes once a week; for dinner children had tea with honey.

The meals distribution by calories was the following - considerable percentage of calories of separate meals to the general caloric content of a day diet was during the lunchtime - 47% (in comparison with normal- 35%), and decrease in percentage of caloric content was during a snack - 17% (in comparison with normal - 20%) and for dinner - 14% (normal - 15%). Studying of a diet according to the content of proteins, fats and carbohydrates showed that children received 62 g. of proteins, 61 g. of fats, 320 g. of carbohydrates a day in average, i.e. normal food diet of children were overestimated in carbohydrates. The ratio of proteins, fats and carbohydrates corresponded to the recommended - 1:1:4 only in half of menu. Such products as bread, grain, milk, meat, creamy and vegetable oil, sugar, potatoes were included in the menu daily, fresh vegetables – every other day, fermented milk products (kefir, bifasil, cottage cheese) 2-3 times a week, and fresh fruit, cheese, fish – once a week. No eggs. By the set of products children received less fresh vegetables (actually 100 g. a day - norm 200 g.), fermented milk products (actually 30 ml a day - norm 150 ml) and the salt iodated (actually 2 g. a day - norm 5 g). Children didn't eat eggs but grain products were almost twice more than norm (actually 80 g a day - norm 45 g).

Thus, nutrition of children of preschool age has been characterized by the high content of carbohydrates, 320 g. when the norm was 240 g, overestimate of caloric content of lunches (47% when norm was 35%) and decrease in caloric content of snacks and dinners (respectively 17% and 14% when norm was 20% and 15%). The snack and dinner weren't balanced on carbohydrate structure: large number of pastries and grain products.

In the third group there were 48 school students aged from 13-14 years, pupils of school № 38 of Yakutsk, boys - 15, girls - 33. Studying at school is provided in two changes. Teenagers from the 7th and 8th classes studied at the second change. Lessons began at 14 p.m and to 19.10 p.m. Research was conducted on the basis of questionnaire with the use of a 24-hour method (daily) reproduction of food.

The questionnaire has revealed that most of children ate as usual. One child kept a diet according to the recommendation of the doctor. The questionnaires have revealed that the most part (73%) of teenagers ate 3-4 times a day. Six people ate that day 2 times. Most (94%) of school children had breakfast in the morning. A half of the children had breakfast from 7.30 till 10 a.m. Children preferred sandwich, fried eggs, flakes, yogurt for breakfast, porridges, macaroni. Five teenagers for breakfast ate a chocolate. About a third of children had the second breakfast. Generally it was cookies, pies, more rare - porridges and meat dishes. Most (83,7%) of teenagers had dinner in school canteen. The menu consisted of pastries (sausage roll, pizza), bakery products, yogurt, juice, chocolate. The mid-morning snack was also at school. All children had supper at home. Often teenagers received macaroni or grain with meat, vegetables with meat for dinner.

Studying of frequency of the use of necessary food products revealed that 36% of school children didn't eat fermented milk products in a regular diet: milk, cottage cheese, kefir, yogurt, suorat. Bakery products as daily products didn't specify 19% of children. A half (54%) of school students didn't eat porridge. Only 79% of children ate meat products daily. In a diet beef meat and meat semi-finished products were prevailed (sausages, sausages, cutlets). Fish and seafood only 7% of teenagers, egg - 40%. 42% of school students didn't note Soup in the questionnaire. Almost 40% of children had no fruits and vegetables. No bean in a diet - 41%, grain – 30%. Pasta was used most of children, tinned products - a half. 78% of teenagers used the increased consumption of digestible carbohydrate products: French fries, chips, Coca Cola, chocolate, hamburgers, bakery and confectionery, etc. Especially it should be noted the prevalence of bakery and confectionery in the school menu.

The assessment of food diet of school children has established their discrepancy to the principle of quantitative full value of food. The power value of food diet of teenagers was below the recommended. The boys and girls of the 7th class were provided with energy for 68-65% and corresponded $1644,1 \pm 1202,5$ kcal/days and $1564,5 \pm 867,1$, respectively; among school children of the 8th class – for 59-55% also corresponded $1731,4 \pm 1050,6$ and $1394,6 \pm 325,6$, respectively. It has been revealed that also the principle of qualitative full value of a food diet wasn't observed. The content of proteins in food diet was lower norms and cover age requirement for 66-75%, thus the most expressed deficiency was revealed among girls of the 8th class. The content of fats in a food diet of teenagers fluctuated from 50,4% of age norm among girls and to 77% of norm among young men. The content of carbohydrates was 43-45% lower than daily requirement. Food diet of school children was also scarce according to the content of iron. Deficiency of iron was reduced both in girls and young men by 66 and 55%, respectively. According to the content of vitamin C in a daily food diet all teenagers had a deficiency, but the deficiency among girls of the 8th class - for 89% was more expressed.

Thus, the food assessment of school children have shown deficiency of the main components of food, imbalance on nutrient structure and also decrease in energy value of a daily diet. Energy of organism and nutrients in boys were 75%, girls - 64% of daily requirement.

In the fourth group there were 86 medical students of the North-eastern federal university named after M. K. Ammosov living in the hostel № 20. Students of the 1 - 3 courses aged from 18 till 22 years from different departments of medical institute, young men - 30, girls - 56 were analysed.

The questionnaire has revealed that 53% of students hadn't any breakfast. 50% of males and 55% of females didn't eat in the morning. Meal frequency among students from 1 to 4 times a day: 2,3% eat food 1 time a day, 34,9% - 2 times, 18,6% - 2-3 times, 20,9% - 3 times, 23,3% - 4 times a day.

Most (88,4%) of students 93% of men and 85,7% of women ate in the canteen of medical institute and "Sergeleekh". During the day 94% of respondents had a snack in dining rooms and buffets of university. For breakfast there was food quick-cooking cereals (15%) of great popularity, then yogurt (8%), 13% of students had coffee. For lunch 38% of students preferred second courses, 28% - first courses and 12% - bakery. For dinner 30% of respondents preferred meat dishes. 28% of students preferred pilaf, bakery and roast (meat with potato) - 23%. 9% of students ate "Doshirak", potato Rolton and Coca - 8%. It should be noted that students didn't eat eggs, fish and milk products.

CONCLUSIONS

1. A significant frequency increase of breastfeeding of children till 4 months has been noted: to 91,8% - in Yakutsk, to 70% - in rural areas (2005 in Yakutsk - 4,9%, in the villages - 0,9%). Rural mothers have shown high percent of hypolactia.
2. Nutrition of preschool children is characterized by the high content of carbohydrates, due to the prevalence of bakery and dishes with grain.
3. Nutrition of teenagers is characterized by deficiency of main nutrient components, unbalanced nutrient content and low energy value.
4. Significant disorders of food diet and regime among students have been revealed.

RECOMENDATIONS:

1. Prophylaxis of family planning, maternity leave (for students – academic leave) for young families should be organized. All women with pathology anamnesis, anemia should be made early prophylaxis to reduce risk of hypolactia. All women planning babies shouldn't smoke.
2. All children preschool establishments should systematically correct menu by the main nutrient components and content.
3. School canteens should eliminate fast food, supplying with healthy hot meals. Multivitamins complexes supply.
4. Students should follow healthy lifestyle, have breakfast, lunch, snack, dinner. No fast food. For the purpose of providing diets with enough biologically valuable proteins it is necessary to use their cheap sources (byproducts, skim milk, low-fat kefir, etc.). For fats need it is necessary to use vegetable oil and butter (20 - 25 g). It is necessary to avoid sweets, to include vegetable products.

References:

1. Abolian L.V. Okhrana, podderzhka i pooschrenie grudnogovskarmivaniya v lechebno-profilakticheskikh uchrezhdeniyakh rodovspomozheniya i detstva: rukovodstvo dlya vrachey [Protection, support and encouragement of breastfeeding in treatment-and-prophylactic establishments of obstetrics and childhood: manual for doctors]. M.: MMA of I. M. Sechenov, 2005. - P. 110.
2. Vorontsov I.M. Estestvennoe vskarmivaniye detey [Natural feeding of children] / E.M. Fateeva, L. B. Hazenson. - SPb.: PPMI, 1993. - P. 199.
3. Natsionalnaya programma optimizatsii vskarmivaniya detey pervogo goda zhizni v Rossiyskoy Federatsii ["National programs of optimization of feeding of children of the first year of life in the Russian Federation"] / A.A. Baranov, A. V. Tutelian, O. V. Chumakova and others. M., 2010. - P. 67.
4. Gultikova O. S. Pitaniye detey starshe 1 goda [Nutrition of children aged older 1 year] // Pediatrics. - 2009. - 88 (5). - P. 76-79.
5. Ivanov A.A., Bukharov I.O. Formirovaniye tipovykh organizatsionnykh principov i modelей sistem shkolnogo pitaniya [Formation of the standard organizational principles and models of system of school food] // Health of the population and habitat. - 2009. - № 5. - P. 11-13.
6. Organizatsiya det'skogo pitaniya v doshkolnykh uchrezhdeniyakh [The organization of baby nutrition in preschool institutions] / editor Kon I.Y. Methodical materials. - M., 2003. - P. 144.
7. Metodicheskiye rekomendatsii 2.3.1.2432-08. Methodical recommendations 2.3.1.2432-08. Normy fiziologicheskikh potrebnostey pishchevykh veschestv i energiy dlya razlichnykh grupp naseleniya RF [Norms of physiological requirements of feedstuffs and energy for various groups of the population of the Russian Federation]. - M., 2008. - P. 40.
8. Onishchenko G.G. Zadachi i strategiya shkolnogo pitaniya v sovremennykh usloviyakh [Tasks and strategy of school nutrition in modern conditions] // Problems of nutrition. - 2009. - № 1. - P. 16-21.
9. Pitanie zdorovogo i bolnogorebenka [Food of the healthy and sick child] / editor V.A. Tutelian, I.Y. Kon, B. S. Kaganova. - M.: PH "Dynasty", 2009. - P. 49-54.
10. Prokopenko S.I. Kharakteristika i organizatsiya pitaniya detey pervogo goda zhizni v usloviyakh RS(Y) [The nature and characteristics of the first year of life child nutrition in the Republic Sakha (Yakutia)]: PhD thesis / S. I. Prokopenko. - M., 2005. - P. 24.

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