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Dietary Preferences of Children in the Nenets Autonomous Area Considering Ethnic Affiliation

Olga A. Shepeleva[1], Tatiana N. Unguryanu[1], Galina N. Degteva[1], Natalia N. Simonova[2], Irina I. Novikova[3]

[1] Northern State Medical University, Arkhangelsk, Russia;
[2] Lomonosov Moscow State University, Moscow, Russia;
[3] Novosibirsk Research Institute of Hygiene, Novosibirsk, Russia

ABSTRACT

BACKGROUND: Children living in the harsh climatic conditions of the Arctic zone are among the most vulnerable age groups. Among all the constituent entities of the Arctic zone of the Russian Federation, the Nenets Autonomous Area is considered a high-risk territory for primary morbidity in the pediatric population across all classes of diseases. The dietary preferences of children residing in the Nenets Autonomous Area therefore warrant special attention.

AIM: The work aimed to identify the dietary preferences of the pediatric population of the Nenets Autonomous Area, taking into account ethnic affiliation.

METHODS: A cross-sectional study was conducted to assess the frequency of food consumption and dietary preferences in children aged 7–17 years attending general educational institutions in the Nenets Autonomous Area. Two groups were formed according to ethnic affiliation: group 1—children from the indigenous population; group 2—children from the non-indigenous population. Relative frequencies were used to describe qualitative variables, with Pearson's χ^2 test for contingency tables and Fisher's exact test applied to compare differences between groups and to clarify differences within the tables. A p-value of 0.05 was taken as the threshold for statistical significance.

RESULTS: A total of 809 children participated in the survey: 209 in group 1 and 600 in group 2. Discrepancies were noted in the frequency of consumption of certain food categories by the pediatric population. In addition, an influence of ethnic affiliation on dietary preferences was identified. The proportion of children in group 1 who more frequently included fish, cereals, pasta, legumes, pickled vegetables, berry compotes and fruit drinks, and juices in their diet was higher compared to group 2 ($p < 0.001$). The proportion of children in group 2 who consumed fruit daily was higher than in group 1 ($p < 0.001$). Daily school diets in the Nenets Autonomous Area more often contained meat, milk, white bread, fruit, and sweet pastries compared to fish, fermented dairy products, rye bread, vegetables, and berries ($p < 0.05$–0.01). Children in group 1 preferred reindeer meat, beetroot, cloudberry, lingonberry, and bilberry, whereas those in group 2 preferred beef, pork, poultry (chicken), and cranberry.

CONCLUSION: Ethnic affiliation influences dietary preferences. The diet of children in the Nenets Autonomous Area does not correspond to the historically established polar type typical of the Arctic zone. When designing diets, it is important to use food products derived from the local traditional raw material base and to take into account the dietary preferences of ethnic groups.

Keywords: Arctic; Nenets Autonomous Area; indigenous children; non-indigenous children; diet; dietary preferences.

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Пищевые предпочтения детей Ненецкого автономного округа с учётом этнической принадлежности

О.А. Шепелева[1], Т.Н. Унгуряну[1], Г.Н. Дегтева[1], Н.Н. Симонова[2], И.И. Новикова[3]

[1] Северный государственный медицинский университет, Архангельск, Россия;
[2] Московский государственный университет им. М.В. Ломоносова, Москва, Россия;
[3] Новосибирский научно-исследовательский институт гигиены, Новосибирск, Россия

АННОТАЦИЯ

Обоснование. Дети, проживающие в суровых климатических условиях Арктической зоны, являются наиболее уязвимой возрастной группой. Ненецкий автономный округ среди всех субъектов Арктической зоны Российской Федерации является территорией риска по первичной заболеваемости детского населения по всем классам болезней. Пищевые предпочтения детского населения, проживающего в Ненецком автономном округе, требуют особого внимания.

Цель исследования. Выявить пищевые предпочтения детского населения Ненецкого автономного округа с учётом этнической принадлежности.

Методы. Выполнено поперечное исследование по изучению частоты потребления пищевых продуктов и пищевых предпочтений детей в возрасте от 7 до 17 лет, обучающихся в общеобразовательных организациях Ненецкого автономного округа. Сформировано две группы детей в зависимости от этнической принадлежности: 1-я группа — дети из числа коренного населения; 2-я группа — дети из числа некоренного населения. Для описания качественных переменных использованы относительные частоты, для сравнения которых между группами применяли критерий χ^2 Пирсона для таблиц сопряжённости, а также критерий Фишера для уточнения различий внутри данных таблиц. За критический уровень статистической значимости принимали p=0,05.

Результаты. В анкетировании приняли участие 809 детей, из них 209 человек составили 1-ю группу, а 600 — 2-ю группу. Отмечено несоответствие частоты потребления отдельных групп пищевой продукции детским населением. Кроме того, выявлено влияние этнической принадлежности на пищевые предпочтения. Удельный вес детей 1-й группы, чаще включающих в рацион рыбу, крупы, макаронные изделия, бобовые, квашеные овощи, компоты и морсы из ягод, соки выше по сравнению с детьми 2-й группы (p <0,001). Доля детей 2-й группы, ежедневно потребляющих фрукты, выше по сравнению с детьми 1-й группы (p <0,001). Ежедневные суточные рационы питания школьников Ненецкого автономного округа чаще содержали мясо, молоко, белый хлеб, фрукты, сладкую выпечку по сравнению с рыбой, кисломолочными продуктами, чёрным хлебом, овощами, ягодами (p <0,05–0,01). Дети 1-й группы предпочитали оленину, свёклу, морошку, бруснику, чернику, тогда как 2-й группы — говядину, свинину, мясо птицы (курицу), клюкву.

Заключение. Этническая принадлежность оказывает влияние на пищевые предпочтения. Питание детей Ненецкого автономного округа не соответствует исторически сложившемуся в Арктической зоне полярному типу. При разработке рационов необходимо использовать пищевую продукцию местной традиционной сырьевой базы, а также учитывать пищевые предпочтения этнических групп.

Ключевые слова: Арктика; Ненецкий автономный округ; коренное детское население; некоренное детское население; рационы питания; пищевые предпочтения.

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考虑民族归属因素的Nenets Autonomous Area儿童饮食偏好

Olga A. Shepeleva[1], Tatiana N. Unguryanu[1], Galina N. Degteva[1], Natalia N. Simonova[2], Irina I. Novikova[3]

[1] Northern State Medical University, Arkhangelsk, Russia;
[2] Lomonosov Moscow State University, Moscow, Russia;
[3] Novosibirsk Research Institute of Hygiene, Novosibirsk, Russia

摘要

论证。生活在北极地区严酷气候条件下的儿童是最为脆弱的年龄群体之一。在俄罗斯联邦北极地区各主体中，Nenets Autonomous Area在儿童人口所有疾病类别的初发病率方面均属高风险地区。居住在Nenets Autonomous Area的儿童饮食偏好问题值得特别关注。

目的。识别Nenets Autonomous Area儿童的饮食偏好，并结合民族归属因素。

方法。开展了一项横断面研究，调查了7–17岁、就读于Nenets Autonomous Area普通教育机构的儿童食品摄入频率及饮食偏好情况。根据民族归属将受试儿童分为两组：第1组为原住民族儿童，第2组为非原住民族儿童。对定性变量采用相对频率进行描述，组间比较使用Pearson x^2检验（列联表），并采用Fisher精确检验以明确表内差异。统计学显著性水平设为p=0.05。

结果。共809名儿童参与问卷调查，其中第1组209人，第2组600人。结果显示，儿童群体在部分食品类别的摄入频率方面存在不均衡。此外，民族归属对饮食偏好具有显著影响。第1组儿童在饮食中更频繁地加入鱼类、谷物、意大利面、豆类、腌制蔬菜、浆果制成果饮或果汁，其比例显著高于第 2 组（p <0.001）。每日食用水果的儿童比例在第2组显著高于第1组（p <0.001）。Nenets Autonomous Area 学龄儿童的日常膳食更常包括肉类、牛奶、白面包、水果、甜烘焙食品，而鱼类、发酵乳制品、黑面包、蔬菜、浆果的比例较低（p <0.05–0.01）。第1组儿童更偏好驯鹿肉、甜菜、云莓、越桔、蓝莓；第2组则更偏好牛肉、猪肉、禽肉（鸡肉）、蔓越莓。

结论。民族归属因素对饮食偏好有显著影响。Nenets Autonomous Area儿童的饮食结构不符合北极地区历来形成的极地型膳食模式。在制定膳食方案时，应更多使用当地传统原料生产的食品，并考虑不同民族群体的饮食偏好。

关键词：北极；Nenets Autonomous Area；原住民族儿童；非原住民族儿童；膳食结构；饮食偏好。

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BACKGROUND

The Nenets Autonomous Area (NAA) is part of the Arctic zone of the Russian Federation (AZRF)[1]. Representatives of the indigenous small-numbered peoples of the North (Nenets, Komi-Zyrians, Komi-Izhemtsy), as well as representatives of the non-indigenous population, reside in the NAA. According to the 2010 All-Russian Population Census, Nenets make up 17.8% of the region's population, and Komi account for 8.6% [1]. Among all entities of the AZRF, the NAA is considered a high-risk territory for primary morbidity across all classes of diseases (A00–T98 according to the International Classification of Diseases, 10th Revision) in all age groups, including children [2, 3].

In the 1970s–1980s, due to westernization and urbanization, the diet of the indigenous small-numbered peoples of the NAA underwent major changes [4, 5]. The importation of food products introduced new types of foods previously uncommon in the region. At the same time, children from nomadic communities were integrated into educational institutions, where a standardized dietary model was used that did not take traditional eating habits into account [6].

Violations of healthy eating principles, disregard for the specifics of the traditional diet of the peoples of the North, and a shift toward a European (carbohydrate-based) dietary pattern contribute to decreased intake of vitamins and minerals [7–10], and increase the risk of metabolic disorders and chronic non-communicable diseases, including overweight and obesity [11, 12]. The inclusion of ultra-processed foods containing high amounts of sugar and sodium in daily diets is particularly harmful for the health of the pediatric population [13, 14]. Genetic predispositions to obesity among the indigenous peoples of the North must also be considered, as they require special attention to the nutritional status of children [15].

Reducing the risk of chronic non-communicable diseases among children and adolescents living in the harsh Arctic conditions can be achieved by optimizing daily diets [16]. Dietary recommendations should not only contain information on the required nutrients but also include suggested meal plans and food products [17], and take into account the dietary preferences of children with regard to ethnic affiliation.

When designing diets for organized children's groups, compliance with sanitary rules and regulations is essential[2]. The development of optimal dietary plans for children is guided by the new norms of physiological requirements for energy and nutrients for various population groups of the Russian Federation [18], which must be considered alongside methodological recommendations for organizing the nutrition of preschool- and school-aged children in organized groups in the AZRF [19].

To increase the demand for the developed diets among children in the NAA, further research into the most preferred food products among children and adolescents is necessary.

This work presents the results of a survey aimed at assessing the dietary preferences of indigenous and non-indigenous children attending general educational institutions in the NAA.

Aim

The work aimed to identify the dietary preferences of the pediatric population of the Nenets Autonomous Area, taking into account ethnic affiliation.

METHODS

Study Design

It was a cross-sectional study of the frequency of food consumption and dietary preferences among children.

Eligibility Criteria

Inclusion criteria:

- Children aged 7–17 years;
- Children attending general educational institutions in the NAA.

For children aged 7–12 years, parents acted as respondents. Children aged 13 years and older completed the questionnaire on their own.

Main Study Outcome

Identification of dietary preferences in the pediatric population of the NAA, taking into account ethnic affiliation.

Subgroup Analysis

All children were divided into two groups according to ethnic affiliation:

- Group 1 included children from the indigenous population.
- Group 2 included children from the non-indigenous population.

Outcomes Registration

A modified semi-quantitative food frequency questionnaire [20], adapted to reflect the national dietary culture of the AZRF, was used for the survey. The questionnaire included items on the frequency of consumption of food products (6–7 times per week, 3–5 times per week, 1–2 times per week) and on preferences for certain foods according to their taste qualities. Dietary preferences based on taste were analyzed using a yes/no response to the question: "Do you

[1] Decree of the President of the Russian Federation No. 296 of May 2, 2014, On the Land Territories of the Arctic Zone of the Russian Federation. Available at: https://www.consultant.ru/document/cons_doc_LAW_162553/ Accessed on: April 19, 2021.

[2] Resolution of the Chief State Sanitary Doctor of the Russian Federation No. 32 of October 27, 2020, On the Approval of Sanitary Rules and Regulations SanPiN 2.3/2.4.3590-20 "Sanitary and Epidemiological Requirements for the Organization of Public Catering for the Population." Available at: https://docs.cntd.ru/document/566276706 Accessed on: April 19, 2021.

prefer to include this food product in your diet more often than others in this group?"

Ethics Approval

The study was approved by the Ethics Committee of the Federal State Budgetary Educational Institution of Higher Education Northern State Medical University, Ministry of Health of Russia (protocol No. 08/11-18 dated November 28, 2018). Voluntary informed consent was obtained from all legal representatives of the surveyed children.

Statistical Analysis

Sample size calculation principles: the required sample size was calculated using EpiInfo™ 3.4.1, assuming an alpha error of 0.05, a statistical power of 80%, and an expected response frequency of 50%. The minimum required sample size was determined to be 358 participants.

Statistical Analysis. Qualitative variables were described using relative frequencies. Comparisons between indigenous and non-indigenous populations regarding the frequency of consumption of specific food products were performed using Pearson's χ^2 test. In cases where significant differences were found, each category was further compared individually using Fisher's angular transformation (ϕ_{emp}) to refine interpretation. A *p*-value of 0.05 was considered the threshold for statistical significance. Statistical analysis was performed using STATA® 18.0 software (StataCorp LLC, USA).

RESULTS

Participants

A total of 809 children participated in the survey. Of these, 209 (25.8%) were assigned to group 1, and 600 (74.2%) were assigned to group 2.

Primary Results

Statistically significant differences were identified in the frequency of consumption of fish, milk and dairy products, vegetables, fruit, cereals, legumes, grain-based products, and baked goods between children in group 1 and group 2 (see Table 1).

The proportion of children in group 1 who consumed fish, legumes, and fruit 3–5 times per week was 1.4–1.8 times higher than in group 2. Likewise, the proportion of children in group 1 consuming cereals, pasta, berry compotes and fruit drinks, and juices 6–7 times per week was 1.4–2.8 times higher than in group 2 (see Table 1). The consumption of fruit and cheese 6–7 times per week was 1.1–1.9 times higher among children in group 2 (see Table 1).

To clarify the dietary preferences of the pediatric population of the NAA by ethnic affiliation, a comparative analysis of daily consumption (6–7 times per week) of food products was performed using Fisher's angular transformation (see Table 2). It was found that fish was insufficiently represented in the daily diet of children, whereas foods with a high content of easily digestible (simple) carbohydrates predominated over those containing slowly digestible (complex) carbohydrates. The proportion of group 1 children consuming fish 6–7 times per week was 2.09 times higher than in group 2. In group 1, the proportion of children consuming meat daily was 5 times higher than those consuming fish daily (see Table 2). The proportion of children in group 2 who consumed fish daily was 11.3 times lower compared with those whose diet included meat on a daily basis (see Table 2).

Group 1 children were less likely than group 2 to include milk, fruit, and berries in their daily diet, and more likely to consume white bread. Daily consumption of white bread was reported by 44.0% of group 1 children, which was 1.2 times higher than the proportion of children consuming rye bread daily (see Table 2).

In both groups, the proportion of children whose daily diet included fruit was 1.6–1.9 times higher than the proportion consuming raw vegetables (see Table 2), 3.04–4.68 times higher than those consuming cooked vegetable side dishes, and 3.56–3.79 times higher than those consuming berries (see Table 2).

The proportion of schoolchildren in the NAA consuming sweet pastries daily was 1.6–3.6 times higher than those consuming vegetables or berries (see Table 2). In group 2, the proportion of children whose daily diets included more sweet pastries than fruit was 1.65 times higher (see Table 2).

Further analysis of taste preferences among schoolchildren in the NAA showed that the proportion of children in group 1 who included reindeer meat, cloudberry, bilberry, lingonberry, and beetroot in their diets was 1.2–1.6 times higher compared with children in group 2 (see Table 3). At the same time, children in group 2 included poultry (chicken), beef, pork, and cranberry in their diets 1.2–1.6 times more often than children in group 1 (see Table 3). No differences in preferences for different types of fish or fruit were identified between the groups.

DISCUSSION

The present study showed that the frequency of food consumption among children in the NAA was suboptimal. Fewer than half of the respondents consumed certain food groups 6–7 times per week. According to regulatory documents, all food groups must be present in schoolchildren's daily diet in the required amounts. A lower food consumption frequency compared with recommended values contradicts the principles of balanced nutrition[2].

Deviations from healthy eating principles among children in the AZRF have also been studied by other authors: Korchina et al. [21], Nikityuk et al. [22], and Lebedeva et al. [8].

In our study, we noted a markedly lower consumption of fish compared with meat (fivefold lower) among the pediatric

Table 1. Proportion of food product consumption among children from different ethnic groups

Food group	Group 1, *n* = 209			Group 2, *n* = 600			*p* (χ^2 test)
	Frequency of food consumption per week (% of sample)						
	6–7 times	3–5 times	1–2 times	6–7 times	3–5 times	1–2 times	
Meat	34.9	49.8	15.3	36.3	46.3	17.3	0.654
Meat soups	45.5	32.5	22.0	37.8	37.3	24.8	0.152
Fish	6.7	31.6[2]	61.7[1]	3.2	17.7[2]	79.2[1]	<0.001
Eggs	10.5	40.7	48.8	6.2	44.3	49.5	0.104
Milk	23.0	50.2	26.8	31.3	42.0	26.7	0.047
Fermented dairy products	10.5	56.0	33.5	9.5	53.7	36.8	0.670
Cheese	11.5[2]	50.7	37.8	22.2[2]	47.0	30.8	0.003
Cereals	14.8[1]	53.1[1]	32.1[2]	9.0[1]	41.5[1]	49.5[2]	<0.001
Pasta	15.3[2]	59.8	24.9[2]	5.5[2]	49.0	45.5[2]	<0.001
Legumes	1.4	65.6[2]	33.0[2]	0.5	47.0[2]	52.5[2]	<0.001
White bread	44.0	33.0	23.0[2]	36.3	29.2	34.5[2]	0.008
Rye bread	35.9	28.7	35.4	34.5	32.5	33.0	0.589
Sweet pastries	38.3	34.9	26.8	40.3	34.0	25.7	0.870
Raw vegetables	24.4	49.8	25.8	27.5	39.2	33.3	0.024
Cooked vegetable side dishes	12.9	46.9	40.2	11.5	42.8	45.7	0.388
Pickled vegetables	2.4	59.8[1]	37.8[2]	1.8	44.0[1]	54.2[2]	<0.001
Onion, garlic, herbs	23.0	17.7	59.3	16.3	20.5	63.2	0.093
Fruit	39.2[1]	47.8[2]	12.9	53.8[1]	32.8[2]	13.3	<0.001
Berries	11.0	34.9	54.1	14.2	26.8	59.0	0.070
Dried fruit compote	7.7	39.2	53.1	9.5	29.2	61.3	0.026
Berry compotes, fruit drinks	29.2[1]	38.3	32.5[2]	20.8[1]	30.2	49.0[2]	<0.001
Juices	27.8[2]	49.8[1]	22.5[2]	13.5[2]	39.2[1]	47.3[2]	<0.001

Note: [1], statistically significant differences according to Fisher's exact test ($p < 0.05$); [2], statistically significant differences according to Fisher's exact test ($p < 0.01$).

population of the NAA. Insufficient frequency of meat and fish consumption—compared with the levels needed to maintain adaptive capacity in people living in the North—was also highlighted by Murashko et al. [23], who conducted research as part of the Monitoring of Traditional Nature Use in the NAA project.

A substantial decline in the consumption of fish and seafood by indigenous residents of the Arctic Zone worldwide during the 1960s–1980s has had a negative impact on vitamin D status of the population [24]. A study on determinants of serum 25-hydroxyvitamin D [25(OH)D] concentration among indigenous peoples in northern Ontario (Canada) revealed a positive association with a traditional dietary pattern characterized by the inclusion of fish, moose meat, wild fowl (duck, goose), and wild berries, and a negative association with a Western dietary pattern. People who consumed northern fish (whitefish, pike, sturgeon, etc.) more than once per month had higher serum 25(OH)D concentrations compared with those who consumed it less frequently [25].

The need to include northern fish in the diet is also linked to ensuring adequate intake of high-quality protein, omega-3 polyunsaturated fatty acids, macro- and microelements (including iodine and selenium), as well as B vitamins and vitamins A and E, for residents of the Arctic Zone. Traditional diets of the AZRF population, which take into account the specific features of the northern type of metabolism and, compared with the diets of residents of other regions, contain a greater proportion of animal products—particularly fish—contribute to maintaining the adaptive capacity of the inhabitants of the North [11, 23].

The results obtained also indicate a reduced frequency of dairy product consumption among children in the NAA, these products being an optimal dietary source of bioavailable calcium. A previously conducted large-scale study of the actual nutrition of children and adolescents identified a

Table 2. Comparative analysis of daily consumption (6–7 times per week) of food products by schoolchildren in the Nenets Autonomous Area

Products	Proportion of children, %	Products	Proportion of children, %	ϕ_{emp}	*p*
		Group 1, *n* = 209			
Meat	34.9	Fish	6.7	7.56	<0.01
Milk	23.0	Fermented dairy products	10.5	3.48	<0.01
White bread	44.0	Rye bread	35.9	1.69	<0.05
Fruit	39.2	Raw vegetables	24.4	3.27	<0.01
		Cooked vegetable side dishes	12.9	6.32	<0.01
		Berries	11.0	3.48	<0.01
Sweet pastries	38.3	Raw vegetables	24.4	3.09	<0.01
		Cooked vegetable side dishes	12.9	6.13	<0.01
		Fruit	39.2	0.18	>0.05
		Group 2, *n* = 600			
Meat	36.3	Fish	3.2	16.16	<0.01
Milk	31.3	Fermented dairy products	9.5	9.69	<0.01
White bread	36.3	Rye bread	34.5	0.64	>0.05
Fruit	53.8	Raw vegetables	27.5	9.41	<0.01
		Cooked vegetable side dishes	11.5	16.54	<0.01
		Berries	14.2	15.14	<0.01
Sweet pastries	40.3	Raw vegetables	27.5	3.09	<0.01
		Cooked vegetable side dishes	11.5	11.85	<0.01
		Fruit	24.4	4.69	<0.01

calcium deficiency problem in the pediatric population of the Russian Federation, associated with insufficient intake of dairy products [26].

A comparative analysis of the frequency of consumption of plant-based foods showed that, in the diets of both indigenous and non-indigenous children, foods high in readily digestible carbohydrates were more common than those rich in dietary fiber. In particular, sweet pastries were consumed more frequently than raw vegetables or vegetable side dishes. Children from the non-indigenous population included sweet pastries in their daily diet more often than fruit.

The polar dietary pattern differs from the European pattern by its lower carbohydrate content and is essential for survival under the extreme conditions of the North. A higher intake of readily digestible carbohydrates, compared with the level recommended for this climatic zone, may adversely affect the health of both indigenous and non-indigenous populations [27]. Furthermore, it has been established that the transition of indigenous peoples to civilized diets promotes the development of maladaptive conditions and is accompanied by increased oxidative stress, impaired immune function, deterioration of blood rheology, and increased risk of dyslipidemia, hypertension, obesity, and type 2 diabetes mellitus [11, 28].

An analysis of food preferences among NAA children and adolescents based on product taste characteristics showed that preferences for certain types of meat, vegetable side dishes, and northern wild berries varied by ethnic affiliation.

Indigenous children more often consumed reindeer meat, whereas non-indigenous children preferred beef, pork, and poultry (chicken).

This study did not identify differences in taste preferences for different types of fish between children from the indigenous group and the non-indigenous group. Children most often preferred whitefish for its taste qualities.

CONCLUSION

Analysis of the frequency of food consumption among children in the NAA indicates non-compliance with the principles of rational nutrition established by SanPiN 2.3/2.4.3590-20.

A comparative assessment of children's choices across different food groups, based on dietary preferences, showed that diets of the NAA pediatric population significantly more often contained meat, milk, fruit, and sweet pastries compared with fish, fermented dairy products, raw vegetables, vegetable side dishes, and berries.

Table 3. Dietary preferences of children in the Nenets Autonomous Area according to ethnic affiliation

Products	Group 1, *n* = 209		Group 2, *n* = 600		*p* (χ^2 test)
	Yes, %	No, %	Yes, %	No, %	
Meat					
Beef	83.3	27.7	72.3	0.002	
Pork	83.7	26.8	73.2	0.002	
Poultry — chicken	43.5	68.8	31.2	0.001	
Reindeer meat	17.2	61.8	38.2	<0.001	
Fish					
Cod	85.2	19.3	80.7	0.146	
Perch	89.0	8.3	91.7	0.246	
Herring	79.9	15.7	84.3	0.140	
Whitefish	59.3	41.0	59.0	0.933	
Omul	81.3	18.7	81.3	0.998	
Vegetable side dishes					
Potato	7.7	91.0	9.0	0.552	
Cabbage	65.1	37.3	62.7	0.534	
Zucchini	90.0	8.3	91.7	0.451	
Beetroot	72.7	18.0	82.0	0.004	
Fruit					
Apples, pears	17.2	84.7	15.3	0.519	
Citrus fruits	26.3	67.2	32.8	0.080	
Berries					
Cloudberry	25.4	50.8	49.2	<0.001	
Lingonberry	41.6	49.5	50.5	0.027	
Bilberry	39.2	38.3	61.7	<0.001	
Cranberry	71.8	41.5	58.5	0.001	

An analysis of food consumption by ethnic affiliation revealed that children from the indigenous group more frequently included fish, cereals, pasta, legumes, sauerkraut, berry compotes and fruit drinks, and juices in their diets. At the same time, children from the non-indigenous group more often consumed cheese and fruit.

Taking taste preferences into account during the comparative analysis of individual product consumption drew attention to the fact that indigenous children in the NAA were more likely to include reindeer meat, beetroot, cloudberry, bilberry, and lingonberry in their diets, whereas non-indigenous children preferred beef, pork, poultry (chicken), and cranberry.

The data obtained on dietary preferences by ethnic affiliation can be used when developing menus in general educational institutions to increase the engagement of both children and their parents in school nutrition.

The identified statistically significant preferences in consumption of certain foods among children in the NAA could serve as a basis for developing supplements—aligned with the dietary traditions of the indigenous peoples of the North—to collections of recipes and culinary products intended for schoolchildren in educational institutions

The development of functional food products using local traditional raw materials is also a promising direction for preventing maladaptive states and reducing the risk of diet-related diseases in children living in the harsh climatic conditions of the AZRF.

Further research is required into hygiene education for the younger generation and their parents to improve knowledge about healthy nutrition for residents of northern regions.

ADDITIONAL INFORMATION

Author contributions: O.A. Shepeleva: conceptualization, methodology, data curation, formal analysis, writing—original draft; T.N. Unguryanu: formal analysis, writing—original draft; G.N. Degteva: conceptualization, methodology, writing—review & editing; N.N. Simonova: formal analysis; I.I. Novikova: writing—review & editing. All the authors approved the version of the manuscript to be published and agreed to be accountable for

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ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Вклад авторов. О.А. Шепелева — концепция и дизайн исследования, сбор, анализ и статистическая обработка данных, написание текста рукописи; Т.Н. Унгуряну — статистическая обработка и анализ данных, написание текста рукописи; Г.Н. Дегтева — концепция и дизайн исследования, редактирование текста рукописи; Н.Н. Симонова — статистическая обработка и анализ данных; И.И. Новикова — редактирование текста рукописи. Все авторы одобрили рукопись (версию для публикации), а также согласились нести ответственность за все аспекты работы, гарантируя надлежащее рассмотрение и решение вопросов, связанных с точностью и добросовестностью любой её части.
Этическая экспертиза. Проведение исследования одобрено локальным этическим комитетом Северного государственного медицинского университета (протокол заседания № 08/11-18 от 28.11.2018). Законные представители всех участников исследования добровольно подписали форму информированного согласия до включения в исследование.
Источники финансирования. Отсутствуют.
Раскрытие интересов. Авторы заявляют об отсутствии отношений, деятельности и интересов за последние три года, связанных с третьими лицами (коммерческими и некоммерческими), интересы которых могут быть затронуты содержанием статьи.
Оригинальность. При создании настоящей работы авторы не использовали ранее опубликованные сведения (текст, иллюстрации, данные).
Доступ к данным. Все данные, полученные в настоящем исследовании, доступны в статье.
Генеративный искусственный интеллект. При создании настоящей статьи технологии генеративного искусственного интеллекта не использовали.
Рассмотрение и рецензирование. Настоящая работа подана в журнал в инициативном порядке и рассмотрена по обычной процедуре. В рецензировании участвовали два внешних рецензента, член редакционной коллегии и научный редактор издания.

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AUTHORS' INFO

*** Olga A. Shepeleva,** MD, Cand. Sci. (Medicine),
Associate Professor;
address: 51 Troitsky ave, Arkhangelsk, Russia, 163069;
ORCID: 0000-0002-7973-9320;
eLibrary SPIN: 8947-5552;
e-mail: shepelevaoangmu@mail.ru

Tatiana N. Unguryanu, MD, Dr. Sci. (Medicine), Associate Professor;
ORCID: 0000-0001-8936-7324;
eLibrary SPIN: 7358-1674;
e-mail: unguryanu_tn@mail.ru

Galina N. Degteva, MD, Dr. Sci. (Medicine), Professor;
ORCID: 0000-0002-3269-2588;
eLibrary SPIN: 3606-3363;
e-mail: gala7d@mail.ru

Natalia N. Simonova, Dr. Sci. (Psychology), Professor;
ORCID: 0000-0001-5658-6811;
eLibrary SPIN: 8362-1808;
e-mail: n23117@mail.ru

Irina I. Novikova, MD, Dr. Sci. (Medicine), Professor;
ORCID: 0000-0003-1105-471X;
eLibrary SPIN: 3773-2898;
e-mail: novikova_ii@niig.su

ОБ АВТОРАХ

*** Шепелева Ольга Анатольевна,** канд. мед. наук, доцент;
адрес: Россия, 163069, Архангельск,
пр-кт Троицкий, д. 51;
ORCID: 0000-0002-7973-9320;
eLibrary SPIN: 8947-5552;
e-mail: shepelevaoangmu@mail.ru

Унгуряну Татьяна Николаевна, д-р мед. наук, доцент;
ORCID: 0000-0001-8936-7324;
eLibrary SPIN: 7358-1674;
e-mail: unguryanu_tn@mail.ru

Дегтева Галина Николаевна, д-р мед. наук, профессор;
ORCID: 0000-0002-3269-2588;
eLibrary SPIN: 3606-3363;
e-mail: gala7d@mail.ru

Симонова Наталья Николаевна, д-р психол. наук, профессор;
ORCID: 0000-0001-5658-6811;
eLibrary SPIN: 8362-1808;
e-mail: n23117@mail.ru

Новикова Ирина Игоревна, д-р мед. наук, профессор;
ORCID: 0000-0003-1105-471X;
eLibrary SPIN: 3773-2898;
e-mail: novikova_ii@niig.su

* Corresponding author / Автор, ответственный за переписку