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Key Principles in Children's Healthy Nutrition in Schools: A Cross-National Review

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Abstract

The paper presents contemporary data of foreign and Russian researchers on the healthy nutrition of schoolchildren. An analysis of the existing forms and principles of school catering is provided; school rations around the world, different approaches to their formation, and new school nutrition standards in the USA and Eastern Europe are described and discussed. The authors focus on the implementation of the National Government programs on the organization of school healthy nutrition in foreign countries. Original research data collected by the Russian scientists on students' taste preferences are also provided in the paper. Our review clearly indicates a number of products that are offered in a school menu do not meet students' taste preferences. The authors also note that there is no continuity between home and school meals. This determines the need to better educate parents, children, and teachers about modern principles and skills of healthy nutrition, to take into account schoolchildren's food preferences, to promote learning to use a "school-family menu" principle. On the basis of the conducted research, the authors recommend creating an effective model of school feeding in the Russian Federation. On the one hand, this model takes into account local experience, while on the other hand, this model is quite universal (consequently, it is applicable in any foreign country, not only in Russia).

Keywords: School meals, School feeding, School health food programs, School ration, Food preferences, Students.

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1. Introduction

In most modern countries of the world with a developed state social security, such as Sweden, Denmark, Germany, and Finland, government subsidies can account for up to 80% of the cost of a school ration (Aurino et al., 2018). None of these countries shifts the burden of financially ensuring children's nutrition completely to budget sources. Parents are involved in financing school lunches, but the quality of food services provided to a child, for example in the USA, is higher than in Eastern Europe and Russia (Martinchik et al., 2018). In the EU, until recently, there were two basic school feeding schemes. The first one was providing children with fruits and vegetables, and the second one supplied milk. As of now, it is merging into one system. As the EU believes, the effectiveness of children's food programs in schools will increase due to developing one comprehensive system. As well as experiences of other countries in organizing school feeding, this is important when developing an effective school feeding model in the Russian Federation.

Thus, this paper focuses on the highly important topic of schoolchildren's healthy nutrition, which has both national and international appeal. In particular, this research reviews the existing nutrition systems in the United States of America, Sweden, the United Kingdom of Great Britain and Northern Ireland, and Russia, focusing on the most controversial issues within the topic. Then the authors critically discuss the obtained results and propose a number of measures to improve the situation with children's nutrition in schools.

2. Materials and Methods

The main method used in this work is the method of modeling namely highlighting certain properties of an object that are significant from the perspective of a research task. A review of domestic and foreign experiences provided in the paper was carried out from two perspectives, taking into account (1) the quality and variety of products for school feeding and (2) state participation in the organization and control of nutrition in educational organizations.

3. Results

3.1. United States of America

From the aforementioned perspective, we would like to consider how the systems of school meals in a number of countries are organized and functioning. School meals in the United States are implemented as part of the "National School Lunch Program" and the "Program for Providing Free School Breakfasts" (6 cents to 2.78 dollars). These measures and much more are provided for by the new rules of school feeding in the USA (Drake et al., 2018). New school feeding standards are designed to reduce the problem of overweight and other diseases. School food makes up 30-50% of the children's and teenagers' diets. In addition, in the United States, there is a federal program entitled "Nutrition for Children in Summer Camps." In the Federal Program for Low-Income Families, there is a special section on nutrition for school children. In total, the USA allocates about 12 billion dollars a year for free food under the four programs indicated. In 2003, $\frac{2}{3}$ expenditures were spent on providing

children with meat and milk, a little more than one quarter was for purchasing fruits and vegetables, mostly canned or frozen. However, a number of products are constantly criticized, because according to current recommendations, the nutrition of children at school age should mainly include whole grains, natural fruits, vegetables, moderate amounts of meat, fish, dairy products, and legumes (Russian Academy of Education, 2018; Kuchma & Gorelova, 2008).

The US law defines school lunches as “safe for health and beneficial for children’s development.” In this regard, all school rations of any state in the country must meet strict requirements of specialists, as reflected in the “Dietary Guidelines for Americans” (U.S. Department of Health and Human Services, 2015). The Guide determines the diversity of food rations, the degree of presence of fruits and vegetables in them, determines a recommended content of sugars and salts, recommends the principles of nutrition with less than 30% of calories derived from fat and less than 10% of calories derived from saturated fat. In addition, lunches and breakfasts should contain at least 1/3 of the daily child’s need for protein, iron, calcium, vitamins A and C. American scientists together with invited foreign colleagues have developed four approaches in the formation of school rations. School nutrition specialists (SN operators) are free to choose any of these four approaches (Drake et al., 2018).

A traditional approach. According to the traditional approach, a school operator should prepare 5 dishes from 4 types of products: meat or meat containing products, vegetables and/or fruits, cereals/bakery products, and dairy products. The minimum portion sizes are determined according to the age groups of schoolchildren. The approach is based on the nutritional standards of American doctors.

An “increased” approach. According to this approach, calories are increased in diets by using low-fat sources. A total of five components remain, but the supply of fruits, vegetables, carbohydrate-containing cereals, and bakery products increases.

A standard nutrient approach. This approach to the formation of rations (“NuMenus”) is a planning system based on a computer program that calculates a nutrient composition of each dish automatically upon entering data on the menu composition. In Russia, such a program was developed by such companies as “RST,” the corporations “MAGNAT,” “1C: School Nutrition,” etc.

An assisting approach. This approach requires participation of medical specialists, nutritionists, pediatricians, immunologists, and allergists of a particular state or city in advising an operator in choosing a specific menu, taking into account the seasonal availability of certain types of food, climatic regional features, as well as physiological features of children’s health identified during monitoring.

A typical American school lunch often includes French fries, a hot dog, and a milk drink. Only recently, an atypical American school lunch appeared in connection with new standards (increasing a proportion of fruits and vegetables in the diet): lettuce, a thinly sliced cucumber, carrots, a piece of grilled chicken, grated cheddar cheese, a boiled egg, blueberries, a slice of tomato, homemade bread, juice, and strawberries. In contrast, a French school lunch consists of guinea fowl, vegetables, lettuce, cheese, bread, etc. And a Polish school lunch includes a piece of chicken, mashed potatoes, a piece of cabbage, a soup, and a drink.

3.2. Sweden

In Sweden, every child can get not only breakfast (in Sweden, it is given to those who come to classes by 7 am), but also a hot home-cooked lunch with two or three varieties of dishes, several kinds of salads, a soup, and a fruit for dessert, and also afternoon tea (sour milk, milk, fruit and savory pastries). In self-service canteens, an allowed volume of food is unlimited. The menu always contains three main “options”: salads (dressed with yogurt or vegetable oil), main dishes, vegetarian cuisine (a hot fasting dish for every day). Students drink water or half-percent milk in the canteen. It is possible that the quality of school meals is the reason why Sweden has one of the lowest rates in Europe in terms of the number of obese children (18%) (23% in the EU). In the kitchen, sugar is almost never used, any sugary drinks are prohibited in school (even fruit yogurts!). Chips, cookies, ice cream cannot be brought.

More than that, a fine is due for a violation. For example, a student may lose an opportunity to go to the gym after class. But even being so advanced in school meals, the Swedes cannot satisfy everyone. According to nutritionists, 12 students in a class of 30 people do not eat school lunches. In addition, if before the age of 10, 99% of children eat at school, then after the 7th grade, when children can attend café breaks, only 60% of students are satisfied with the menu being provided to them. Therefore, nutritionists will transform the canteens of Swedish schools into mini-restaurants, where children sit at tables, and the tape with first, second, and third dishes moves past them in a circle so they can pick what they want (Roos, Lean, & Anderson, 2002; Zigmund, 2011; Swedish National Food Agency, 2014; Patterson & Elinder, 2015).

3.3. United Kingdom

Currently, about half of all UK students receive hot meals on a paid and subsidized basis. Results of the latest sociological polls demonstrate quite eloquently an attitude widespread among the youth towards the process of nutrition at school. In particular, it is perceived by the latter not only as a process of eating but also as an opportunity for additional socialization among young people.

In order to identify reasons leading to schoolchildren’s mass refusal to get food in school canteens, the UK government initiated a telephone survey of 502 schoolchildren aged 11 to 16 years old (Public Health England, 2016; Lukas et al., 2017). The sample was compiled taking into account social, gender, and geographical features. According to that survey, more than half (56%) of schoolchildren purchased food in school canteens for pocket money, and only 1% of students used the system of organized food. 329 students (66%) reported that they did not always use the services of a school canteen and more often they take meals prepared by their parents at home. 11% of students stated that they always bought meals in the school canteen. Only a few students reported having lunch at home, using the services of a nearby grocery store or buying meals at vending machines. Those respondents who said that they brought meals from home listed the following reasons to refuse to get food in school: “an unsatisfactory quality of school dinners”, “poor menu choices,” and “getting used to the type of dishes provided to them.” The same number of respondents said that the food provided was “not too healthy” and “too boring”, respectively.

Other reasons explaining the unwillingness of schoolchildren to eat in school canteens included such as “a lack of space for eating” or “an unpleasant situation in the canteen”. Reasons such as noise, din, and a large number of peers were also mentioned. Approximately a fifth part of all students called social reasons, such as “my friends do not eat in a school canteen either,” “this is a chance to have a break outside our school,” “we want to be outside,” “I am uncomfortable eating a homemade lunch packed by my parents in front of all other people.”

One-fourth of students who eat irregularly in school canteens claim that they cannot afford school lunches. One of the main reasons for not eating out at school is high meal costs; almost all respondents named this reason. The most frequent statements about possible improvements are “better food quality,” “more choice,” “healthier food,” and “more salad.” A group of 11- and 12-year-old schoolchildren stated that the nutrition process was poorly organized due to the lack of free space and the ability to communicate during meals.

Most students spend 1.17 pounds for lunch. About a third of school children spend 1.88 pounds. The average bill in the dining room ranges from 1.50 to 2.00 pounds for students aged 15-16. More than half of the respondents (60%) spend money on meals given out to them by their parents; about 12% spend their own pocket money and about 25% spend money from both sources.

Experts recognized the desire of schoolchildren to socialize, especially among high school students, as the most important motivating incentive to go to lunch (Kuchma & Gorelova, 2009; Klindukhov et al., 2010; Evans et al., 2016). More than that, it is obvious that the process of nutrition is perceived by children not only from the point of view of satisfying their physiological need for food, but also from the point of view of having an opportunity to get psychologically relaxed, change activities, and avoid an obsessive control from their teachers. The study revealed important nutritional aspects of children’s groups that affect their minds. Consequently, it is necessary (a) to set tasks that would help improve the atmosphere in school canteens; (b) to identify the shortcomings associated with the lack of time for eating, children’s fears of eating food in public, or in a crowded, noisy, and stuffy room; (c) to deal with dissatisfaction because of being excluded from the process of making an independent decision on choosing preferences; and (d) to take into account a desire to imitate friends and peers in the process of eating. For children, each eating break is a special positive ritual. Forming a favorable atmosphere can be an effective mechanism for influencing children's stereotypes about proper nutrition at schools.

3.4. Russia

In Russia, the topic of providing balanced school meals is no less acute than in the United States and other European countries. Joint studies of the Research Institute of Hygiene and Health Protection of Children and Adolescents and the First Moscow State Medical University named after I. M. Sechenov were held (Kuchma et al., 2015; Mogilny & Tutelyan, 2011; 2012). Their goal was to compile and analyze information about students’ taste preferences in 1–11 grades in 220 schools in various districts of Moscow (TSAO, SAO, SVAO, VAO, YUVAO, ZAO, SZAO, TiNAO, and ZelAO). Researchers evaluated each dish consumption from the current menu at the time of the survey, including the range of

products purchased in school canteens and outside schools (i.e. focusing on students' preferences.) Researchers used questionnaires specially designed for this purpose. According to the results of this work, the percentage of consumption of dishes is determined based on the analysis of personal data obtained during the monitoring of food intake by schoolchildren of different age groups in canteens of educational organizations. When comparing data, the results obtained in determining the percentage of food waste by weighing are also used (Titov, Mitaseva, & Pyltsova, 2006).

During the study, information was used on 202,385 portions of dishes, 129,159 portions of breakfast, and 73,226 portions of lunch. 49,952 schoolchildren participated in the study. According to monitoring results, students' taste preferences can be divided into three groups: (1) meals that children practically do not eat, and consumption of these dishes is less than 35% of the total supply; (2) meals that children eat willingly but to a lesser extent, their consumption is 50–65%; (3) meals that children eat with pleasure, with a consumption of 70% and more. At the same time, the number of dishes from the current menu, taking into account the percentage of consumption, was divided in the following ratio: dishes that are practically not eaten (22%); dishes that are eagerly (23%); dishes that are eaten with pleasure (55%).

In sum, the data obtained confirm the need for and the feasibility of developing new diets, taking into account schoolchildren's food preferences and including favorite dishes in the menu (while excluding less consumed ones). New food rations should be developed taking into account home nutrition, following students' daily physiological needs and the principles of continuity in school and home meals.

4. Discussion

Thus, our cross-national review of children's nutrition in contemporary conditions, their eating behavior shows that a number of products, dishes, and culinary products that are offered in a school menu do not meet students' taste preferences (do not like, do not eat, or eat completely). In a school menu, there is no continuity between home and school meals, as our review clearly indicates. This determines the need to better educate parents, children, and teachers about modern principles and skills of healthy nutrition, to take into account schoolchildren's food preferences, to promote learning to use a "school-family menu" principle.

In our opinion, the organization of proper schoolchildren's nutrition must meet a number of basic principles. Meals should be adequate to student's energy expenditure during the day, provide with all the necessary nutrients, be regular, in compliance with the diet. More than that, they should be different (ensuring a better variety), safe and evoke positive emotions. Food should be not only healthy but also tasty, beautifully cooked and served to the table. Meals at school must be combined with home meals, so that the diet is not monotonous or inadequate.

Also, a child should know about benefits of eating healthy food, mainly the following products: milk, kefir, cottage cheese, yogurt, oatmeal, rice, buckwheat, vegetable oil, cheese, bread, fish, meat, eggs, apples, lemons, carrots, cabbage, potatoes, cucumbers, juices, zucchini. Such foods should be included in the diet daily in sufficient quantities. Fresh fruits and vegetables as sources of mineral salts, vitamins,

fiber, and other essential nutrients are also needed. We also need to remember that taste habits are formed taking into account family traditions and individual characteristics of each child. Therefore, it is highly necessary to provide schoolchildren with different and new tastes individually, supporting proper eating behavior both at school and at home.

In our perspective, an important direction in solving these problems is the creation of an effective model of school catering. On the one hand, this model is universal and can be applied in any country, taking into account human needs and nutrition requirements. On the other hand, this model should also focus on local conditions, particularly those related to climate and traditional food rations characteristic for certain regions of the world.

5. Conclusion

In conclusion, this paper presents the results of a cross-national review focused on the key problems existing in schools with providing schoolchildren with healthy nutrition. The authors reviewed both international (USA, Sweden, UK) and domestic (Russia) experiences and demanding challenges. The research clearly shows that (a) a number of products that are offered in a school menu do not meet the taste preferences of schoolchildren and (b) there is no continuity between home and school meals. Based on the conducted research, the authors recommend creating an effective model of school feeding in the Russian Federation. On the one hand, this model takes into account local experience, while on the other hand, this model is quite universal (consequently, it is applicable in any foreign country, not only in Russia).

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