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# What can be changed by nutrition education? Evaluation of the educational influence on children's behaviour and nutritional knowledge

In recent years development of a healthy lifestyle among children has become one of the main goals of Russian education. The responsibility of schools, to shape a healthy life for young people so that they are able to make healthy choices, is fixed in the Federal State Educational Standards. Numerous health education programmes are being currently implemented in Russian schools. In 2013, more than 70 educational programmes, targeting various age groups and aimed to form and maintain healthy habits, were implemented in Moscow.

One of the most popular healthy lifestyle programmes is the 'Good Nutrition Programme' which is part of the global initiative of the Nestlé Healthy Kids Programme aimed to form a healthy culture among children. This programme has been working in Russian schools since 1999. Its main purpose is to form healthy nutrition habits among children and teenagers aged 6-14. In 2014, more than 1,000,000 children from 51 regions of Russia participated. The programme is scheduled for 3 years and covers various aspects of nutrition, including culinary history, nutritional traditions of different countries, etc. The programme is supported by regional and federal ministries of education.

So it can be stated that the programme is an important tool for healthy life education in many schools in different regions. But to be able to plan their healthy life activity, local schools need to have a clear idea about the particular results that can be achieved by the programme's implementation. That is why research was conducted in 2013-2014 to evaluate the programme's effectiveness. This research does not only provide significant information for the schools participating in the programme but demonstrates the role of education in promotion of a healthy life style among children in general. That is why it can be used for the development of methods of healthy life education.

## Methods

The research was performed among 729 schoolchildren from 4 regions of Russia. The main group consisted of children at the age of 8-9, who studied the first part of the Good Nutrition Programme (participated in the programme during one year) and children at the age of 10-12, who studied 3 parts of the programme (participated in the programme during 3 years). The control group included students who were not involved in the programme. The groups were formed on the basis of age as well as on the basis of social and cultural features - children of both groups studied in the same schools.

The information was collected through questioning and personal interviews with children. Two types of questionnaires were used, both developed in the Institute of Anthropology of the Russian Academy of Science.

The first type of questionnaires was developed for a one-time data collection. It was used to study the structure and the contents of the information about nutrition, which the respondents had. The questions in the questionnaire were selected with consideration of children's age. The questions for 8-9 years old students were aimed to reveal their familiarity

with the rules of healthy nutrition, hygienic rules, products and food, which should be included in the daily food ration. The questionnaire developed for 10-12 year-olds covered a wider range of questions, such as the role of main nutrients, the products containing these nutrients, the rules of table setting, table manners, the contents of information on the food packages, rights and duties of customers. All the questionnaires also contained some points related to food preferences of children – i.e. their favourite dishes and types of food.

The second questionnaire was meant for a weeklong data collection and was connected with studying the respondents' lifestyle. All children had to fill in a diary, describing their previous day. The following information was gathered: actual food intake of a schoolchild (products and dishes in his breakfast, lunch and dinner, afternoon snack, other snacks), nutritional regime (time of the main meals), the main types of activity and their duration (studying at school, preparing homework, walking, sports, reading, etc.)

The results in the control and the main groups were compared. This analysis enabled us not only to evaluate the particular impact of the programme's implementation but also to clarify how this impact depends on the period of training.

Table 1. Structure of groups-research participants

| Year | Scope | Number of regions | Main group characteristics | Control groups characteristics |
|---|---|---|---|---|
| 2013 | 373 students (11-13 y. o.) and their parents | 4 | 180 studied the programme for 3 years | 193 did not participate in the programme |
| 2014 | 356 students (8-9 y. o.) and their parents | 4 | 167 studied the programme for 1 year | 188 did not participate in the programme |

## Results and discussion

### Awareness of students about nutrition

The level of awareness about nutrition in the main group is higher in general. Students – participants of the programme give more correct answers about regime, ratio, rules of hygiene etc. in comparison with their peers not participating in the programme. Percentage differences between the number of correct answers are summarized in Table 2. Attention should be paid to the fact that the difference in awareness in control and main groups increases with age. So the difference in control and main groups of children aged 7-8 is 18% and 28% in groups aged 9-11. These statistics do not only demonstrate the positive impact the programme has on children's awareness, but also confirm the effectiveness of long-term systematic learning. The three-year course allows to equip children with deeper knowledge than the one-year course.

Table 2. Awareness of the students about nutrition

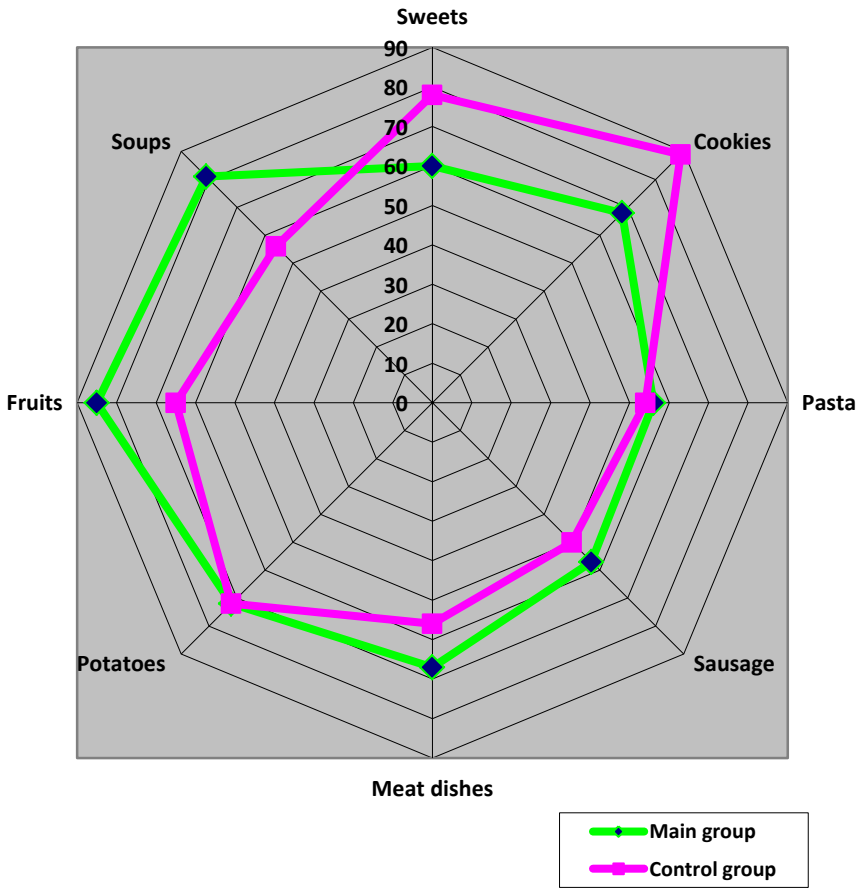
| Students 8-9 y.o.(1 year of studying) | | | Students 11-13 y.o.(3 years of studying) | | |
|---|---|---|---|---|---|
| Main group (n=167) | Control group (n=188) | Significance level | Main group (n=180) | Control group (n=193) | Significance level |
| 70% | 52% | P<0,001 | 88% | 57% | P<0,001 |

### Taste preferences of students

Further analysis was intended to study children's food preferences. Children had to indicate their "favourite" food. On the basis of their answers the list was created, which included 8 types of food and dishes most frequently mentioned (Figure 1). The list of "the favourite food" proved to be the same in both groups, as well as no age difference in food preferences among children aged 8-9 and 11-13 was revealed. The most popular types of food are potato dishes, some fruits, different types of soups, pasta, several types of meat dishes, sweets.

At the same time the ratings of the "preferred" dishes (by frequency of mentioning) are various. Children from the main group demonstrate "healthier choice" in comparison with the control group (they mention fruits, soups more often, while the children from the control group choose sweets and cakes more often).

Figure 1. The favourite products mentioned by students




Thus nutrition education did not radically change the typical food preferences among children. The list of "the most favourite food" is determined mainly by social and economic characteristics of families, (presence of particular types of products on a family menu, family culinary traditions, etc.). But health education can correct already formed food preferences and increase children's interest in healthier products.

**Regime and intake of students**

It turned out that eating 4-5 times a day (including breakfast at home, breakfast at school, lunch, afternoon snack and dinner) was typical for children aged 8-9 from both groups. Significant differences though are found in groups of children aged 11-13 (studying the programme for 3 years). A regime with 4-5 meals per day remained typical in the main group, while in the control group, students tended to have only 3 meals a day. Children of the control group had their afternoon snack and breakfast at school less often in comparison with the main group.

It is known that at the age of 8-9 food regime is controlled mostly by parents and teachers. That is why the majority of the students (participants and not participants) follow the best food regime. At the age of 10-12, students become more independent, while parents' control decreases. As a result the children in the control group may miss their breakfast and their afternoon snack. And in the main group, the most correct regime was preserved because children continue to follow the right regime without constant control of parents.

We analysed the weekly menu of the respondents and outlined the most typical products and dishes. The lists of the typical food are the same for the control and the main groups and they do not depend on the age. Description of the daily meals is presented in Table 3.

Table 3. Typical products and dishes included in the students' daily menu

| | |
|---|---|
| Breakfast | Porridge or flakes, bread, a sausage sandwich, sausage products (sausages, small sausages, pastry, tea, milk) |
| Lunch | Soup (meat or vegetable soup), bread, meat dish (cutlet, stew), macaroni, fresh vegetables, fish, sausage products (sausages, small sausages), tea, juice |
| Afternoon snack | Fruit, pastry, bread, milk products (yoghurt), sandwiches, sweets, tea, juice |
| Dinner | Meat dishes, macaroni, sausage products, fresh vegetables, stewed vegetables, tea, juice, milk products |

The set of products for the daily menu corresponds to recommendations of dietitians in general. It includes the main types of food: meat, dairy products, fruits and vegetables, cereals products. At the same time the frequency of eating some products in both groups do not completely correspond to the dietitians' recommendations (Table 4). The student-participants and non-participants do not eat enough fish, fruits and vegetables. It all means that education itself did not radically improve the typical intake of children. The main role here is played by social and economic factors.

Despite this, education can still have a positive influence on students' diet. As we've found out, the frequency of consumption in the control group changed with age in groups of 8-9 to 10-12 y.o, while in the main group it was preserved at the same level. As a result the diet of 3-year course students can be evaluated as healthier and better in comparison with their peers. They eat fruit and vegetables and cereal dishes (porridge, flakes) twice as often than non-participants, and milk products – half as much. In the main group of 10-12 y.o. students frequency of eating fish products is 0,3 times per week, while in the control group it is 0,1 times per week. In the same group, those who took part in the programme were half as likely to eat junk food (0,3 times per week) as those who did not take part (0,6 times per week).

Table 4. Frequency of consumption : products and dishes (average number of intakes per week)

| Products and dishes | Students, 8-9 y.o. (1 year of studying, n=167) | | Significance level | Students, 10-12 y.o. (3 years of studying, n=180) | | Significance level |
|---|---|---|---|---|---|---|
| | Main group | Control group | | Main group | Control group | |
| Fruit | 2 | 2 | N/S | 3 | 1,5 | P<0,05 |
| Vegetables | 1,2 | 0,9 | N/S | 1,2 | 0,6 | P<0,05 |
| Fish | 0,3 | 0,2 | N/S | 0,3 | 0,1 | P<0,001 |
| Milk products | 1 | 0,8 | N/s | 1,3 | 0,7 | P<0,05 |
| Porridges and cereal dishes | 0,9 | 0,5 | P<0,05 | 0,9 | 0,5 | P<0,05 |
| Junk food | 0,3 | 0,3 | N/S | 0,3 | 0,6 | P<0,05 |

**Students' lifestyle**

The analysis of the data collected during one week allowed us to define the main types of students' life activities and their average duration. Most of the children have a sedentary lifestyle. They give much of their time to learning (lessons at school, homework at home), as well as watching TV programmes or web-activities. Such types of activities as morning exercises, sport and walking are less popular. Prevalence of sedentary lifestyles among the young generation is a critical trend, noticed by many researches and education courses have not broken it.

There are no significant differences connected with participation in the programme and/or age of children in this case. The general results (without age split) of students' lifestyle analysis are

summarized in the Table 5. At the same time we can notice that the level of participants' involvement in physical activities is still higher in comparison with non participants. The programme can stimulate children to do morning exercise, walk much and do sport more often.

Table 5. The percentage of children involved in the main daily activities and the average duration of the main daily activities

| The daily activities | The main group (8-9 y.o. and 10-12 y.o students, n=167) | The control group (8-9 y.o. and 10-12 y.o students, n=188) |
|---|---|---|
| Morning exercises | 27% (10 min a day) | 24% (9 min a day) |
| Walking | 68% (1 hour a day) | 62% (47 min a day) |
| Sports | 56% (90 min a week) | 51% (80 min a week) |
| Watching TV / computer game (more than 1 hour a day) | 57% (90 min a week) | 63% (90 min a week) |
| Learning (school lessons, homework) | 100% (7 hours a day) | 100% (7 hours a day) |

## Conclusion

To include the healthy nutrition programme, in the general plan of school activities aimed to promote a healthy lifestyle among children, it is necessary to be informed of the results that can be obtained by the nutrition education.

The nutrition culture of children is a multicomponent personality issue, measured by a number of characteristics. Some of these characteristics can be changed or developed by education. The others are outside the direct educational impact.

Our research demonstrated that the nutrition education broadens children's knowledge in this sphere. There is a significant difference between the levels of awareness in the main and control groups.

But it also proved that the training do not develop taste preferences of schoolchildren. The answers of children describing their "favorite products" in both groups are the same. Social and economic factors tend to play the main role (presence of particular types of products on a family menu, family culinary traditions etc.). For the same reason the lists of typical food of weekly ratio are similar in both groups.

Although the training is not capable of changing the list of the typical products consumed by children, it can stimulate the children-participants to consume some of the products (vegetables, fruits, dairy products) more often and some (junk food) less often in comparison with non participants. So the educational programme positively affects childrens' diet by changing the frequency of consumption of certain products.

It was also revealed that participation in the programme motivates children to follow a healthy regime. There is a significant difference between the number of daily meals in groups of participants and non participants.

The special nutrition education did not change the key characteristics of children's lifestyle. The lifestyle of children involved and not involved in the programme can be defined as sedentary in general. Despite this, there are more children who do morning exercise, sports or walk in the open air in the main group. The differences between groups are not significant in this case and can be considered only as a suggestion. Studying healthy nutrition (as one aspect of a healthy life) contributes to developing a more caring attitude towards health in general.

Thus the contribution of the programme to development of nutrition culture among children involves the following issues: building up general knowledge about nutrition, increasing the frequency of healthy products consumption, decreasing the frequency of consumption of unhealthy

food, improving nutrition regime. So we suggest to schools, participating in the programme, to expect such kind of outcomes when planning healthy life school activities.

It is also necessary to take into account the programme's influence on students' personal characteristics can be both stimulating and supportive. The training expands children's awareness about nutrition. At the same time the educational programme supports their adherence to a healthy regime and frequency of healthy products consumption. These characteristics of diet in the main group do not get worse as students get older.

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