

Special aspects of Ukrainian schoolchildren's eating behavior

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Abstract

Purpose: analysis of school age children's eating behavior.

Material: in questioning 408 schoolchildren (15-16 and 17-18 years' age) participated. Distribution by sex was practically equal: 56.62% were girls and 43.38% - boys. The questionnaire included questions about frequency of eating some food during recent 30 days. Separate block of questions was devoted to eating habits and presence of the so-called "food trash" in diet. The bent to alimentary diseases was assessed by incidence of excessive body mass in respondents' families.

Results: The determined food consumption permitted to assume the presence of certain eating stereotype: for boys it is directed at development of muscular mass and for girls – mainly of limiting character, connected with diets for correction of constitution. Analysis of some food eating frequency permitted to mark out alimentary risk factors, which require correction and prophylaxis.

Conclusions: the found special aspects of eating behavior permit to assess children's health state as pre-nosology of alimentary genesis, manifested in excessive body mass, deficit of essential vitamins, minerals and food fibers; functional disorders of digestion.

Keywords: eating, schoolchildren, diet, eating behavior, physical activity.

Introduction

The existing social-economic situation in Ukraine facilitates increase of children's pre-nosological states of health [34]. In the worked out prophylaxis programs optimization of eating takes important place. It permits to substantially raise children's adaptation potential, ensure organism with required biologically active substances [2, 40]. As on to-day eating is considered to be one of the most important life components, conditioning health [7].

Turconi et al. [41] studied eating habits and behavior of Italian adolescents. Among the tested, persons with unhealthy eating and low knowledge in this field prevailed. Scientists from Iran [27] found that increased physical activity and consumption of milk food facilitate reduction of body mass index. Influence of increased motor functioning on body composition is noted also in works of Polish authors [18, 20]. Rather wide scale research [6] was devoted to study risk factors of chronic diseases in USA secondary school pupils. Among them substantial place is taken by factors, connected with eating. In other works the parents' role in formation of children's eating habits, is underlined [21]. Important factor is also environmental conditions, which influence on children's and adolescents' eating [19].

Eating habits are closely connected with body mass and children's way of life [4]. Disordered eating behavior and messy food influence on adolescents' body composition [9, 23, 37]. Adolescents-girls are seriously troubled and unsatisfied with their body shapes. It is a potential mediator in changing their eating behavior [30]. Especially dangerous is influence of food commercials in

primary school on children's consuming habits [24].

In opinion of Hummel and Hoffmann [16] eating behavior is a complex phenomenon. With its assessment it is necessary to consider cause-effect dependences between food consumption and health. Population studies, conducted in different countries [10, 13, 38] proved significance of eating behavior as mean of diet optimization.

The purpose of the research is analysis of school age children's eating behavior.

Material and methods

Participants: as source material we used results of anonym questioning of 408 schoolchildren – pupils of 9th (15-16 years' age) and 11th (17-18th years' age) form. Distribution by sex was practically equal: 56.62% were girls and 43.38% - boys.

The research was conducted in compliance with WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects, 2013 [44].

The design of the research implied questioning. The questionnaire included questions about frequency of eating some food during recent 30 days. Separate block of questions was devoted to eating habits and presence of the so-called "food trash" in diet. The bent to alimentary diseases was assessed by incidence of excessive body mass in respondents' families. The research was conducted in spring. It permitted to assume that in diet there was variable assortment of food.

Statistical analysis of the received data was fulfilled with the help of licensed Excel and SPSS programs. Statistical processing included application of variation statistic indicators as well as parametric and non-parametric parameters.

Results

Study of some food products' eating frequency permits to sufficiently exactly assess variability and completeness of diet. It also permits to prognosticate food influence on functional state of the research participants [35].

The fulfilled analysis showed some gender specific features of main food products' eating. Meat is confidently ($p < 0.05$) more frequent in daily diet of boys – $31.79 \pm 3.55\%$ (girls – $21.78 \pm 2.91\%$). Though, girls eat meat more frequently 2-3 times a week – $50.00 \pm 3.53\%$ (boys – $36.99 \pm 3.68\%$). At the same time boys oftener prefer everyday eating of cooked sausages and frankfurters – $26.47 \pm 3.39\%$ (girls – $17.83 \pm 2.53\%$). In respect to smoked sausages the situation is opposite: $83 \pm 2.53\%$). In respect to smoked sausages the situation is opposite: girls informed that they do not eat them at all – $28.14 \pm 2.97\%$ of girls informed that they do not eat them at all (boys – $18.34 \pm 2.99\%$).

Fish is present in boys' diet the most frequently. $33.57 \pm 4.01\%$ of boys (girls – $22.91 \pm 2.80\%$) % said that they eat it regularly. $17.18 \pm 2.51\%$ of girl against 0.71 ± 0.71 do not eat fish at all.

Certain distinctness was found in analysis of milk and milk food consumption, which are irreplaceable in children's eating. With absence of noticeable distinctions in frequency of everyday consumption, girls' monthly diet contained these products oftener: $10.43 \pm 2.02\%$ against $4.76 \pm 1.65\%$. At the same time they oftener eat fermented milk products: $45.89 \pm 3.29\%$ against $34.68 \pm 3.63\%$, ($p < 0.05$).

This assumption is proved by analysis of fresh vegetables and fruits' eating. Everyday consumption of fresh vegetables is oftener among girls: $76.52 \pm 2.80\%$ against $63.58 \pm 3.57\%$. The same tendency was observed in everyday consumption of fresh fruits: $76.75 \pm 2.80\%$ against $64.71 \pm 3.68\%$. With it, boys much oftener noted full absence of fresh vegetables and fruits in their diets.

Considering the age of our respondents it was interesting to compare frequency of confectionary consumption. It was found that boys' eating of candies is confidently more frequent: $31.79 \pm 3.55\%$ against $21.78 \pm 2.91\%$. Girls eat these products regularly mainly 2-3 times a week ($50.00 \pm 3.53\%$) against $36.99 \pm 3.68\%$.

Concerning pastries and other fancies we did not find substantial differences by gender belonging. About 20% of respondents said about everyday eating and 40% - about regular.

Analyzing consumption of ice-cream, mayonnaises, ketchup and sauce we found practically no gender distinctions. But prevalence of these products in diets also causes certain trouble. Nearly 30% of children informed about everyday eating of ice-cream and 40% - about its regular presence in diet.

Only 16% of children informed about everyday consumption of sauces, ketchups and mayonnaises and 25-30% - about regular.

Definite distinctions were determined in comparison of food consumption in respect to age. For example, older girls pointed that they eat less meat everyday:

$40.95 \pm 4.82\%$ against $53.60 \pm 4.48\%$, ($p < 0.05$). In older boys regular eating of smoked sausages is less expressed: $12.24 \pm 4.73\%$ against $30.83 \pm 4.23\%$, ($p < 0.05$). Besides, 11th form girls noted that they more regularly eat curd than younger schoolgirls, accordingly: $39.22 \pm 4.86\%$ against $26.19 \pm 3.93\%$, ($p < 0.05$). At the same time consumption of fermented milk products in general is oftener in junior schoolgirls: $53.97 \pm 4.46\%$ against $36.19 \pm 4.71\%$, ($p < 0.05$). Though about regular consumption of such products senior schoolgirls informed: $41.90 \pm 4.84\%$ against $22.22 \pm 3.72\%$, ($p < 0.05$). Besides, in younger group everyday ice cream consumption was more frequent: $44.44 \pm 4.44\%$ against $22.12 \pm 4.09\%$, ($p < 0.05$).

Much more frequent eating of pastries and fancies was in 9th form girls. In 11th form girls the frequency of such products' consumption was $27.42 \pm 4.02\%$ against $12.50 \pm 3.26\%$, ($p < 0.05$).

Separate block of questions was devoted to consumption of the so-called "Food trash". The received data permits to say that such products are rather popular among schoolchildren. Besides, the presence of certain gender specific features was found. Chips and baked breads are confidently more frequent in boys eating: $22.67 \pm 3.20\%$ of them informed about regular eating such food; girls, on the contrary oftener informed about full denial of such products $39.13 \pm 3.23\%$ against $19.77 \pm 3.05\%$.

At the same time 9th form pupils consume chips and baked breads everyday oftener than 11th form pupils $9.76 \pm 2.69\%$ against $2.04 \pm 2.04\%$, ($p < 0.05$).

Fast food products are confidently oftener consumed by boys $11.18 \pm 2.42\%$ against $3.04 \pm 1.14\%$. Girls much oftener note their full absence in diet. Concerning street food eating (shawarma, hot-dogs, pies) situation also can not be called favorable. Only 1-2% of schoolchildren informed about everyday consumption of such food. More than 50% noted that they do not consume such food at all. However, everyday consumption of such food is more frequent among boys: $15.20 \pm 2.75\%$ against $3.91 \pm 1.28\%$. Girls much more frequently refuse street food at all: it was informed by $71.74 \pm 2.98\%$ of girls against $47.37 \pm 3.83\%$ of boys. Results of fast food consumption frequency confirm their higher popularity among boys. For example $11.24 \pm 2.44\%$ of boys informed about their regular presence in diet. It is much higher than in girls $3.93 \pm 1.29\%$.

In order to approximately assess possible disorders of alimentary status we analyzed prevalence of excessive body mass in respondents' families. It was found that in pupils' parents it is met more frequently: $28.65 \pm 3.27\%$ informed about its presence in fathers and $22.40 \pm 3.02\%$ – in mothers. Besides, $41.67 \pm 3.57\%$ of the questioned proved excessive body mass in grandmothers and grandfathers.

Discussion

Study of main food products consuming frequency shall be carried out, considering inter-connections in system, "eating-health". Special aspects of any diet are

connected with specific characteristics of health and depend on knowledge in this field. Analysis of primary school age children's eating [32] showed the deficit of main food substances and average level of knowledge in this field. The highest quantity of knowledge gaps was found with assessment of role of different food groups.

The applied method of assessment of food consumption frequency is commonly accepted and sufficiently precise that is rather important in studies of eating. For example, Humphries L.L. и Gruber J.J. [17] used the method of 24 hours analysis of eating, studied eating behavior and control of university students' body mass. They found great specific weight of errors of situation by respondents. It requires correction of the received information.

Pilot study of eating organization in Italian schools [37] points at high incidence of diseases, connected with eating disorders. It requires realization of prophylaxis and educational programs.

The found by us more frequent consuming of meat and fish products by boys illustrates increase of irreplaceable amino acids. Refusal of smoked food by girls is a manifestation of healthy orientation of eating (considering great quantity of food ads in smoked food).

Such distribution of food consumption (as main source of proteins) permits to assume the presence of certain eating stereotype: for boys – directed at development of muscular mass; for girls – mainly of restrictive character, connected with demand and desire of body constitution's correction. About the presence of stereotype Martinchik A.N., Maev I.V., Ianushevich O.O. [26] informed, when they studied eating behavior of adolescents, influencing on their health.

Similar results were received also in other works Chang Y.-J., Lin W., Wong Y. [5] The authors studied correlations of eating, eating behavior and health. In 17.11% of Taiwan secondary schools disorders of eating behavior were proved. Especially frequent eating behavior disorders are in adolescents, who follow limiting diets. They result in deficit of energy, proteins, carbohydrates, zinc, vitamins B6 and B12. Disorders of eating behavior were assessed as risk factor for digestion.

Visser J., Notelovitz T., Szabo C., Fredericks N. [42] studied incidence of eating behavior disordering and weight loss in Jude girls-adolescents. They found that every fifth participant had wrong eating behavior. Every third girl considered her weight excessive. They also proved great incidence of restrictive diets. More than 60% of the participants used them and 19.1% applied extreme weight loss methodic. Close connection of eating behavior, eating and knowledge in this field was proved by Dixit S. и др. [8]. These authors analyzed the state of girls-adolescents, living in India, in countryside. Insufficient eating is a risk factor for health and can cause obstetric complications in the future.

Certain eating stereotype, mentioned in our research, is also proved by analysis of milk and milk products consumption. Increase of fermented milk share in diet reflects orientation on healthy eating, connected with restriction of fats.

Hart M. [14] thinks that eating behavior disordering. It is the main reason of digestive problems, especially of restrictive character. Its normalization ensures prophylaxis of diseases.

Comparative analysis of fresh vegetables and fruits consumption also illustrates certain specific features of eating. Earlier we have already assumed that orientation on healthy eating differs depending on sex. These facts permit to assume great risk of vitamins' deficit, as well and mineral substances and food fibers in boys. The results, received by us prove eating behavior data of other authors. For example, Oosthuizen D., Oldewage-Theron W., Napier C. [38] analyzed eating structure of primary and secondary school age children. They determined the most frequently consumed food products; assessed correlations between knowledge in this field and food consumption. The diets, they studied, had expressed carbon-hydrate character, with high content of refined sugar and fats and insufficient consuming of beans vegetables and fruits.

Feldman R. H. L., Mayhew P. C. [11] in their promising work studied eating behavior, consumption of meat and sodium. Their regression analysis proved prognostic significance of the studied factors and their contribution in health.

Sharkey J. R., Haines P. S., Zohoori N. [39] proved the presence of correlations between peculiarities of eating and health disorders. The persons with high eating risk have functional disorders 2.4 times more frequently. They also made conclusion about eating characteristics' importance as screening for required correction.

Bordi P. L., Cranage D. A., Lambert C., Smith J. [3] studied eating behavior of secondary school, age children. They assessed the quantity of food intakes, habits and proclivities, connected with eating. They found wrong eating regimes (the most often it was missing of breakfast). Eating habits were connected with preference of certain food.

The available information about confectionary consumption can also be assessed as unfavorable in respect to health: excess of sweets is a risk factor for digestion and caries. Consuming of pastries and other fancies shall be assessed as alimentary risk factor. Their excess can facilitate excessive body mass and in the future can cause many chronic non-infectious diseases (obesity, diabetes, atherosclerosis and etc.).

Analysis of confectionary and ice-cream consumption permits to assume that diet is overloaded with monosaccharide. Considering modern technologies, we can also speak about overloading by food ads.

Rather frequent consumption of fat-containing sauces permits to assume latent increase of fats' specific weight in eating. It results in increase of overloading with food ads, which are widely used in their production as well as in strengthening of chemical irritating impact of food. All these shall be assessed as alimentary risk factor.

Thus, analysis of some food products' consumption frequency permitted to find a number of gender distinctions, which characterize eating stereotype of modern schoolchildren, as well as to mark out alimentary

risk factors, which require correction and prophylaxis. It should be pointed that sociological method of research is rather subjective. That is why its addition with objective methods, permitting to prove assumptions, can be rather promising. In context of health monitoring the preference shall be given to screening assessment.

Williams P. [43] carried out comparative analysis of Australian children and adolescents' breakfasts. He found that typical breakfast of young Australians was characterized by low content of fat, high content of carbohydrates and sufficient quantity of thiamine, riboflavin, niacin, calcium and magnesium. If not to include cereals in breakfast the probability of the mentioned above elements' deficit increases. Regular breakfast is considered a sign of healthy eating. The received data are proved by results of other works [1, 12, 31].

Analysis of the so-called "food trash" consuming can serve as one more proof of earlier assumption about healthier eating of girls. Thus, analysis of "food trash" products' consumption brings us to the following conclusions:

- These products are rather frequent in diet, and their regular consuming shall be assessed as risk factor for digestion;
- Hygienic literacy of girls is much higher than boys'; it is proved by prevailing of girls' denials of such products;
- Propaganda of healthy eating is insufficient that conditions the demand in such measures' including in prophylaxis complex.

Analysis of eating organization in schools of province Bluefontane (South Africa) permitted for Meko L. et.al. [29] to conclude that its organization was unsatisfactory. As one of important risk factors for health they assessed prevailing of sweets, fast food and chips in diets.

During three weeks they conducted educational program devoted to eating in secondary school [22]. Effectiveness of these classes reflected in improvement of eating assessment and in more frequent consuming healthy food.

Loomes S., Croft A. [25] fulfilled analysis of Australian students' eating behavior. Besides, specificities of diet they studied the level of knowledge in this field, eating

style (independent or at eating places), consumption of fast food, correlation with health indicators.

Concerning excessive body mass in respondents' families, these indicators are also important for assessment of correlations in system "eating-health". The received data shall also be estimated as additional risk factor: family and relatives greatly influence on schoolchildren's eating and eating behavior. If two generations of relatives have excessive body mass, its development in the third generation has probability of 100%.

McCaughy N., Fahlman M., Martin J. J., Shen B. [28] underline importance of educational programs in the field of eating for prophylaxis of obesity and preservation of health. Application of such program would facilitate the change of secondary school children's eating behavior.

Hopper C. A., Gruber M. B., Munoz K. D., Herb, R. A. [15] inform about significance of parents' participation in educational programs, devoted to healthy eating. Combination of school and family efforts permits to raise the level of knowledge in this field and facilitates optimization of schoolchildren's physical condition and physical fitness.

Conclusions

Thus, the received results prove validity of eating behavior studying in the frame of school age children health monitoring, considering its specific characteristics for creation of targeted prophylaxis programs. The found peculiarities of eating behavior permit to assess respondents' health as pre-nosological of alimentary genesis, which is reflected in excessive body mass, deficit of essential vitamins, mineral substances and food fibers, functional disorders of digestion. All these require working out targeted measures, directed at eating and alimentary status correction. Substantiation and working out of eating behavior objective criteria for adding of information about health; establishing of "feedback" of alimentary factor's influence on it are rather important and relevant tasks.

Conflict of interests

The authors declare that there is no conflict of interests.

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