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Effects of Long Term Breastfeeding on Development and Health of Children

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ABSTRAKT

Purpose: The aim of the researchis the study of the influence of various types of feeding and care for the dynamics of somatic andmetabolic development of children.

Material and research methods:

For the first time, a cohortand a prospective study was conducted with long follow-up care of children from birth to 14 years. The paper researched the physical-somatic development, as well as immunological indices and morbidity of children in relation to the type of feeding and principles of care. For the first time therehas been developed prognostic criteria of risk of development of somatic pathology depending on the types of feeding and principles of care. The paper tried to prove the influence of the type of feeding and the nature of care on the adaptive capacity and imbalance in the system of children's immunity in different age periods. Moreover, for the first time there was proved the correlation between physical, immune and somatic status of children in different age periods.

Clinical and laboratory research methods:

- Complete blood count, urine and feces analysis.

- Biochemical blood test: (glucose, blood lipid spectrum: cholesterol, HDL, LDL, triglycerides)

Keywords: infants, teenagers, nutrition, breastfeeding, development

INTRODUCTION

Breastfeeding has well-established short-term benefits, particularly the reduction of morbidity and mortality due to infectious diseases in childhood. A pooled analysis of studies carried out in

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middle/low income countries showed that breastfeeding substantially lowers the risk of death from infectious diseases in the first two years of life [1]. Based on data from the United Kingdom Millennium Cohort, Quigley et al [2] estimated that optimal breastfeeding practices could prevent a substantial proportion of hospital admissions due to diarrhoea and lower respiratory tract infection.

A systematic review by Kramer et al [3] confirmed that exclusive breastfeeding in the first 6 months' decreases morbidity from gastrointestinal and allergic diseases, without any negative effects on growth. Given such evidence, it has been recommended that in the first six months of life, every child should be exclusively breastfed, with partial breastfeeding continued until two years of age [4]. Building upon the strong evidence on the short-term effects of breastfeeding, the present review addresses its long-term consequences. Current evidence, mostly from high income countries, suggests that occurrence of non-communicable diseases may be programmed by exposures occurring during gestation or in the first years of life (5–7). Early diets, including the type of milk received, is one of the key exposures that may influence the development of adult diseases.

Overweight/obesity increases the risk of several non-communicable diseases, including diabetes, cancer and cardiovascular disease. It has been suggested that breastfeeding may prevent the development of overweight/obesity, not only in early life but also on the long-term [8].

Infants in arms and children in early childhood are subjected to growth stopping and development mainly because of nourishment and care disturbances.

Physical, functional, nervous and psychical development of a child is an integral process that formed out of the whole complex of a great number of morphological and functional indications in their dynamics and intercommunication. The aggregate of factors: biological, genetic, social-economic, daily-round and alimentary influence the rate of growth and development of children.

Investigations conducted by Elliot K.G. et al., revealed the existence of correlation between the size of psychological assistance received by the child, child's growth and nutritious status. Besides, there are a few published works demonstrating direct connection between the educational level of people taking care of the children, their children's health and nutritious status [9].

The results of numerous investigations carried out in different countries of the world show with validity that many technologies applied in medicine were found to be ineffective,

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nevertheless they have been still applied [1,10]. One of the main reasons of children's morbidity and death is the ancient stereotype concerning the necessity of fixing the child's upper and lower extremities, in such a way promoting the limitation of diaphragm excursion, blood circulation reduction, and, in this connection the tendency to frequent respiratory diseases [4,8]. The fixing of extremities is vastlylinked with a high risk of development of sudden infantile mortality syndrome [7, 14].

According to the Global Strategy on nursing of the World Health Organization exclusively nursing (EN) is necessary for optimum growth, development and good health of children during the first six months of their life. In conformity with this, in order to satisfy their requirements in nutrition infants in arms must get adequate nourishing and opportune additional food during more prolonged nursing [11, 13].

Anothermain reason of the growth of children's morbidity is the stereotype of frequent bathing rejection stipulated by the fear of catching supercoiling, umbilical cord infection and the other disturbances [3,6]. According to investigation data, frequent bathing of children with medicinal herbs promotes relaxation of the nervous system that is very important when it is out of order, in addition reducing of susceptibility towards infection and decreasing of intoxication during respiratory diseases development [5].

While using of soap the disturbance of normal biocenosis of skin and its dryness began developing [7, 12]. Careless marketing without cautious observance of international codes enlarges the application of different kind of adsorbents of physiological excrements, especially in medical institutions. In the first place, they present the baby to feel the process of urination and defecation, in addition can lead to the disturbance of urination rhythms and urine-genital system development.

The aim of our research was to investigate the dynamics of physical development of children depending on the kind of rearing and the applied modes of care.

RESULT

Depending on the type of feeding in children, the following patterns were established. As can be seen from the content of haemoglobin, glucose and lipid profile parameters in children, depending on feeding in children on exclusive breastfeeding, indicators are observed in the established normative values; with mixed breastfeeding, a tendency towards an imbalance of laboratory indicators of the metabolic process is established. Pronounced violations in laboratory parameters are observed in children who were fed with mixed breastfeedingand formula feeding.

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When assessing blood glucose indicators, it was found that the glycaemic level in children in all study groups was within the standard values and the data did not differ statistically. The study of the haemoglobin content showed the lowest parameters in the group of children with formula feeding, although the difference was not statistically significant. As for the level of triglycerides, their level in the exclusive breastfeeding group was 0.74 ± 0.08 mmol / L versus 0.78 ± 0.08 mmol / L (in the preferential breastfeeding group), 0.89 ± 0.09 mmol / L (in the group with mixed breastfeeding) and 1.2 ± 0.08 mmol / l (in the formula feeding group, $p < 0.05$). The high density lipoprotein level was the highest in the group of children with formula feedinggroups and amounted to 3.4 ± 0.11 mmol / L in comparison with 2.0 ± 0.01 mmol / L in children with exclusive breastfeeding ($p < 0.05$).

The exclusive breastfeeding groups'level was within the normative values and did not differ significantly in all groups of children. The cholesterol level was the highest in the group of children with formula feedinggroups and amounted to 5.7 ± 0.33 mmol / L versus 3.6 ± 0.08 mmol / L in children with exclusive breastfeeding groups ($p < 0.05$), cholesterol values in the groups of children with preferential breastfeeding and mixed breastfeeding were 3.8 ± 0.05 mmol / L and 3.4 ± 0.09 mmol / L, respectively, and did not significantly differ from the values obtained in children with exclusive breastfeeding groups.

According to the researchers, early-accelerated weight gain and the risk of developing obesity in the future are similarly interrelated. We studied body weight at birth and weight gain on a quarterly basis for 1 year in the same children, depending on the type of feeding in the anamnesis.

The carried out analysis indicates the absence of significant differences in the birth weight of children in all examined groups. However, in the future, as a result of various types of feeding, significant changes in body weight were revealed in children with preferential breastfeeding 1800 ± 130.1 g in comparison with children on exclusive breastfeeding - 2855 ± 28.7 ($P < 0.001$), in children with exclusive breastfeeding it was similar in comparison with formula feedinggroups - 1161 ± 51.6 g ($P < 0.001$) and in children with formula feeding - 2033 ± 86.8 g ($P < 0.01$). In the second quarter, a different picture was observed, which consisted in the maximum weight gain in children with formula feeding.

Thus, in children with formula feeding, the body weight gain in the second quarter was 2665 ± 109.5 g compared to 1585 ± 17.7 g in children with exclusive breastfeeding ($P < 0.01$). In children with preferential breastfeeding and mixed breastfeeding, a similar picture was observed and the body weight gain was lower than in the group of children with formula feedinggroups, 1270 ±

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115.2 g and 1280 ± 51.9 g, respectively, compared with 1585 ± 17.7 (P <0.01 and P <0.01, respectively). In the 3rd and 4th quarters, the greatest body weight gain was observed in children with formula feeding and amounted to 1555 ± 60.3 g in comparison with children on exclusive breastfeeding 1004 ± 27.4 g (P <0.01) and 1749 ± 90.4 g against 1644 ± 26, 2d, respectively.

The next stage of our research is the analysis of clinical and metabolic changes in children, depending on the method of care and the age of children.

The main group with the proposed method of care included 54 children, the control group - 70 children, included children who received traditional methods of care.

The blood glucose content in children 4-6 years old in the main group was within the normal range, in the comparison group the indicators were also within the normal range, but in many children at its upper limit.

The mean values of triglyceride levels practically did not differ in children aged 4-6 years in both study groups. (P <0.05).High- density lipoprotein (HDL) and low -density lipoprotein (LDL) values in some cases increased, but did not go beyond the normative values, while low-density lipoprotein values tended to decrease. (P <0.01).

The mean cholesterol level also did not differ in the study groups in children aged 4-6 years.

In children aged 7-14 years, a more pronounced picture of an imbalance in metabolic disorders is observed. Thus, the average haemoglobin values in children in the main group were not significantly increased compared with the comparison group (115.6 ± 0.12 and 111.9 ± 0.15 g / l, respectively) and had a difference compared to children aged 4- 6 years. The average number of glucose increases, moreover, in the comparison group it is higher than in the main group, although it is not reliable, however, compared with children of 4-6 years old, these indicators are significantly higher, regardless of the methods of care.

Triglyceride indices in the comparison group increased by 1 order of magnitude, which was 1.3 ± 0.05 and 1.5 ± 0.05 mmol / L, however, the data are not reliable, but there is a significant increase in the comparison group in relation to children aged 4-6 years old (P <0.05). There was also an increase in high density lipoprotein cholesterol in children aged 7-14 years in relation to the age of 4-6 years, both in the main and in the comparison group (2.1 ± 0.1 mol / l versus 3.2 ± 0.4 mol / L (P <0.05) low-density lipoproteinchanges in children did not differ significantly in age and in care methods.

A significant increase in cholesterol with age was established, so if in the main group at the age of

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4-6 years its indicators were 5.4 ± 0.1 mol / l, then at the age of 7-14 years they significantly increased (5.7 ± 0.10 mol / L; P <0.05). A similar picture is noted in the comparison group.

By analysing the frequency of detection of laboratory parameters, indicating a violation of fat and carbohydrate metabolism, depending on the methods of care, we found that children in the main group have a less pronounced dynamics of the frequency of occurrence of metabolic disorders in laboratory parameters.

So the incidence of a decrease in haemoglobin below 110 g / l was noted in 25.9% of children in the main group, which is 1.3 times less than in the comparison group. An increase in glucose content was noted in 16.7% of cases in the main group and 21.4% in the comparison group. A similar trend is observed in the interpretation of indicators of cholesterol, triglycerides and low density lipoprotein.

Conclusions:

Thus, the metabolic characteristics of children at different periods of life reflects the general patterns of protective and adaptation processes and manifests itself in different directions and varying degrees of severity of changes depending on the type of feeding and principles of care. Metabolic changes in different age periods were characterized by heterogeneity, so in children aged 4-6 years, laboratory parameters were characterized by a stable state of fat and carbohydrate metabolism indicators, as well as the absence of segments of maximum metabolic stress, which cannot be said about children in adolescence.

1.For a comprehensive assessment of the state of health of children, taking into account the imbalance of microelements in the "Mother-Child" system, an algorithm was developed based on the primary and repeated screening of the infant's condition assessment using the developed special questionnaire cards suitable for screening these conditions in the primary health care setting.

2. For use in the network of primary health care, an algorithm is proposed for a comprehensive assessment of the health status of infants, taking into account the deficiency of macro- and microelements that affect the health of the mother and child.

3. The compiled cartogram reflecting the deficiency of micronutrients in the biochemical regions of the Republic reveals the geographical and epidemiological features of the disease associated with micronutrient deficiency among children.

4. Conducting a multielement analysis of breast milk makes it possible for a nursing mother to

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promptly recommend preventive measures for micronutrient deficiency, as well as monitor the condition and corrective measures for the infant if there are signs of micronutrient deficiency.

5. It is advisable to use the program developed by us: «Software for determining the probability of micronutrient deficiency in children», «Software for determining the probability of folic acid deficiency in children» for the detection of micronutrient deficiencies in children, taking into account the deficiency of micronutrients in children, taking into account the deficiency of microelements and taking into account the types.

6. To assess nutritional support, assess rational nutrition and identify a risk group for micronutrient deficiencies among children over a year old, we have developed a table for calculating the points of nutritional support for mothers and children using national food products.

7. For the prevention of child health disorders caused by micronutrient deficiencies, the following basic principles are proposed:

a) periodic monitoring of microelement status in the body of the mother and child;

b) rationalizing the nutrition of mothers and infants with diets that include foods that contain sufficient trace elements;

c) the use of medicinal preparations of potassium, calcium / sodium, iron, zinc, copper, magnesium, manganese in preventive doses in infants with a high risk group for deficiency of these microelements;

d) the inclusion of an educational component of the prevention system, including explanatory work on combating micronutrient deficiencies among mothers and their, and indeed the entire population.

The results of the research and the introduction of appropriate medical and organizational measures made it possible to reduce the number of applications to rural medical posts by 1.8 times, as well as to reduce the frequency of hospitalization of children.

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