THE INFLUENCE OF THE ENVIRONMENTAL FACTORS ON INFANTS HEALTH

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The inspection of 117 children of first-year of life, resident in industrial city and 245 children from the city of average is conducted. The role of social, economic and domestic factors is set in development of infants. The disorders of microbiota and of immune system as well as of physical development in children which permanently reside in the big industrial city are established.

Keywords: children, environment, socio-economic factors, microbiocenosis.

Introduction

The health status of children their growth and development have significant social and medical value and these are the main factor of well-being and health of the general population [J.G. Antypkin, O.H. Shadrin, A. Mukvich, 2008]. It is well known that in recent years the state of children's health in Ukraine deteriorated, due to a number of reasons (environmental pollution, low social level of the general population, a violation of sanitary norms, including the quality of food, increasing drug abuse and alcohol dependability). One of the primary problems today is the growth of ecologically-deterministic pathology among children in Ukraine. The promising direction of clinical pediatrics research is scientifically sound development of comprehensive criteria for evaluating the health status of children of different age groups, a system for monitoring the health of children in regions with different socio-economic and environmental conditions.

The question of anthropogenic pollution is particularly important in Ukraine. Clearly, one of the ways to solve the problem is to study not only the incidence but also the functioning of the various systems of homeostasis in children living in environmentally disadvantaged by instrumental and laboratory methods.

Respiratory and gastrointestinal tracts react one of the first changes in the environment. Although these pathological processes pose no direct threat to the life of the child, they significantly reduce the quality and prolonged existence may cause the formation of chronic diseases. Important role in the prevention of disease formation plays normal microbiota of the child since the first days of life [S.A. Kramarev, 2008]. Dynamic balance support between Macro-organism and microbiota of the digestive and respiratory systems and the environment is the great importance in ensuring the health of tender age children. This explains the increasing attention of scientists to normal state of intestinal microflora and huge role of microbial ecosystems in shaping the health of children and adults [J.G. Antypkin et al., 2008; L. Omelchenko et al, 2007]. At present insufficiently understood regularities in changes of intestinal microflora under the influence of various environmental factors. A comprehensive study of the health of children by ecopathogenic influence on immune status is conducted at different times in some regions, which vary according to the nature of influence of pollutants, but such data in infants living in the industrial city, is not established. Now for the prevention and treatment microecological disorders in children and adults are increasingly used probiotic agent that are drugs or foods containing living cells healthful microorganisms [V.V. Berezhnoy, D.S. Jankowski, 2008]. Therefore, the issue of prevention and correction of microbiota respiratory and digestive systems in children living in ecologically unfavorable conditions, is one of the central importance in research.

The purpose of research is to determine the effect of socio-economic and environmental factors on the development and health of the children who live in regions with significant anthropogenic impact.

Materials and methods of research

The study involved 362 practically healthy baby's first year of life. The group studies (1st) included 117 children (aged 12 months) who live in a large industrial city, a group comparison (2nd) — 245 babies first year of life, living in a city with low anthropoge-

Table 1

Infant feeding

Marker	Group	
	1st (n=117)	2nd (n=245)
Duration of breast feeding, months	8.33	9.18
Supplemental feeding (juice), months	5.31	4.28
Artificial feeding, %	57.8*	30.5
Breast feeding, %	42.2*	69.5
Children received adapted mixture, %	32.8*	6.4
Children fed by mixture of domestic production, after 6 months, %	42.6*	77.5
Children fed by imported mixture, after 6 months, %	57.4*	22.5
Dysbiosis, %	40.2	20.5
Children prophylactically probiotic treated, %	35.0	45.5

Note. * — Significant difference p<0.05 compared with a group of children who live in a city with low anthropogenic impact.

Table 2

Results of bacteriological analisys of feces and oropharynx for dysbacteriosis

Marker	Group	
	1st (n=117)	1st (n=117)
Bacteriological analisys of feces		
Bifidumbacterium, lg CFU/g	8.04±0.07*	8.85±0.05
Lactobacterius, lg CFU/g	6.83±0.07*	7.1±0.04
E. coli, lg CFU/g	4.46±0.07	4.4±0.04
Opportunistic enterobacteria, lg CFU/g	2.05±0.23	1.7±0.15
Nonhemolytic acid-negative staphylococcus, lg CFU/g	2.07±0.15	2.0±0.07
fungi of the genus Candida, lg CFU/g	1.99±0.14*	1.45±0.07
Bacteriological analysis of oropharynx		
pathogenic streptococcus, lg CFU/g	1.94±0.14*	1.45±0.09
pathogenic stafilococcus, lg CFU/g	1.95±0.13*	1.48±0.10
Haemoph.infl, lg CFU/g	1.09±0.15*	0.6±0.07
fungi of the genus Candida, lg CFU/g	1.01±0.16*	0.6±0.07
enterobacteria, lg CFU/g	0.39±0.08*	0.16±0.03
enterococcus, lg CFU/g	0.4±0.07*	0.15±0.03
nonfermentative gram-negative bacteria, lg CFU/g	0.58±0.10*	0.24±0.04

Note. * — Significant difference p<0.05 compared with a group of children who live in a city with low anthropogenic impact.

nic impact. All children conducted survey by the standard method, measurement of anthropometric parameters, bacteriological analisys of feces and oropharynx for dysbacteriosis, complex immunoassay with assessment of cellular and humoral immunity and determination of secretory IgA in saliva. All parents gave informed consent to participate in the research.

Results and discussion

During the treatment and the results revealed the following features are received. Children of the 1st group often were born from high-risk pregnancy than children of the 2nd one. Birth weight of children in both groups had no significant differences, whereas the age of 1 year, children of the 2nd group had a mass of 300 g higher than a lot of the same age of the 1st group. The prevalence of major diseases of children in the first year of life was significantly lower in children of the 2nd group. So, oligotropy was observed in 18% of infants of the 1st group, each ten (11%) children of the 2nd group. The incidence of acute respiratory disease (ARD) in children of the 1st group 3.06 cases per year in children of the 2nd group — 2.82. Diseases of the nervous system in children under 1 year was 46.2% of the 1st group versus 34% of children of the 2nd group. After a year on the regular medical check-up with a diagnosis of «Perinatal affection of the central nervous system» remaining 14.1% of children living in a large industrial

Table 3

Immunological indices infants depending on the area of dwelling

Marker	Group		limits of variation
	1st	2nd	
leukocytes,10^9/l	7.91±0.33*	8.41±0.41	6.0–11.5
lymphocyte, %	52.0±1.17	52.27±1.26	45–60
neutrophil, %	46.67±1.67	46.34±1.56	35–51
CD 3, %	53.47±1.04*	58.27±1.27	49–65
CD 4, %	36.47±0.59*	41.8±0.55	32–46
CD 8, %	19.47±1.01	19.27±0.75	15–25
CD 16, %	12.87±0.65	14.2±0.58	9–17
CD 22, %	23.0±0.91*	28.6±0.51	19–31
Ig M, мг/мл	0.91±0.04	0.83±0.04	0.66–1.2
Ig A, мг/мл	0.52±0.01*	0.64±0.04	0.47–1.15
Ig G, мг/мл	5,89±0,16*	6,69±0,15	4,9–8,0

Note. * — Significant difference p<0,05 compared with control group.

city, compared with 9.6% of children from the control group. Trying to characterize the nature of feeding was observed longer duration of breastfeeding (≥6 months) in the cities with little industrial activity, the earlier (from 4 months) introduction of the supplemental feeding in the form of juices from mothers of the 2nd group compared with mothers of the 1st group. Among children who received artificial breast milk substitute from birth, adapted mixture received one-third of children who live in a large industrial city, against 6.4% of the children of the control group. Feeding children older than 6 months who are the city-folks of the small industrial city and are bottle-fed, more frequently were fed by mixtures of domestic production compared with children of the 1st group of 6 months plus after receiving imported mixture. The research found that children who live in a large industrial city, 2 times more likely to have signs of intestine dysbacteriosis and 1.5 times less prophylactically probiotic treated (Table 1).

In assessing the results of bacteriological analisys of feces and oropharynx for dysbacteriosis listed in Table 2, reported a significant decrease of Bifidumbacterium and Lactobacterius, and increased content of pathogenic flora and fungi of the genus Candida in the defecation and increase the number of pathogens in the oropharynx among children living in an industrial city.

Analysis of complex immunological researces showed that in the study area (group 1) compared with control (group 2) reported changes in individual indicators of cellular and humoral immunity, which is manifested, on the one hand, the decline in the number of CD-3 T lymphocytes, CD-4 T-lymphocytes, CD-22 B-lymphocytes (p<0.05), and the levels of IgG, IgA and sIgA (p<0.05), on the other hand (Table 3). Changes in cellular and humoral immunity in children living in the study district indicate disturbances in immune mechanisms to ensure homeostasis. Identified changes of immune status may lead to further development of various immunodeficiency states on the background of immunoregulation mechanisms imbalance that begins.

Such children should be attributed to the risk of possible reasons for the development of their secondary immune somatic pathology (against reducing the number of CD-3, CD-4, CD-22 lymphocytes, the level of IgG, IgA and sIgA) to timely conduct a set of preventive measures.

In the study of children in the saliva content of secretory Ig A reliable fixed lower sIgA in saliva of children of the 1st group versus 2 S (461.62 mg/dL vs 542.4 mg/l), which is clearly associated with significant environmental shifts in such a large industrial center, and Zaporizhzhia.

The following results were returned in the study of mental characteristics of parents. Great choice of child care helped simplify and minimize spending time on hygiene procedures regarding child, which is why in today's diapers (mostly) used constantly. Mothers who used diaper only while walking with a child (1/3 mothers of the 1st group and ? mothers of the 2nd group), more care of their child.

It is expected, data were obtained on education and social status of mothers — most mothers industrial city were educated and were employed, while in a small town most mothers had no education and doing housework. Among the industrial center most

mothers had professional hazard, stress at work, smoked before and during pregnancy compared with the control group (which led to the earlier rejection of breastfeeding). When evaluating data regarding the child's father received such predictable results. In the industrial city of most men-fathers had higher education, permanent employment (workers or employees), often found themselves in stressful situations or had contact with professional hazard.

In studying the features psychological climate in families of both groups was found that in a small industrial impact more favorable type of psychological climate been reported in the family, which contributed to the care of the child, the development of a healthy child and indirectly affect the duration of feeding your baby breast milk. Parents — inhabitants of a large industrial center often lived in a rented room or dormitory, causing stress effect on parents' psychological climate in the family and reflect on the overall development and health of the child. Only a third of the residents of the city rated their living conditions as «good» compared to the majority of parents in the control group. Income of the family member per month ≥1500 hrn/per was observed in 25.4% of the 1st group of respondents, while in the mean figure was 3.6%, which affected and the diet of children. In the big city 6 times more families who consume meat and meat daily and 2 times more likely to eat fish than families with children of the 2nd group, which can not affect the development of diseases such as hypotrophy, rickets , food allergies, dysbiosis, etc.

Conclusions

Thus, it was established in the study environmentally determined changes in the development and health of children who are constantly under the influence of anthropogenic impact.

1. Among infants (residents of a large industrial center) recorded the worst development indicators and health status compared with peers from the city average. Thus, in the group of babies, who live in the city with a significant anthropogenic impact, found higher index ARD, more children, often suffering — by 12.8%, the growth rate of malnutrition — 40%, anemia — 10% disbiosis — twice.

2. Children (over 6 months) who live in the city with little industrial impact and are bottle-fed, almost twice as likely to have used a mixture of domestic production compared with children from the 1st group, after 6 months of receiving imported mixture ($p<0,05$).

3. The development and the health of young children (residents of a large industrial center) significantly affect the socio-economic and household factors.

4. Children who live in a large industrial city, 2 times more likely to have signs disbiosis and 1.5 times less prophylactically probiotic treated.

5. In the oropharynx of children (residents of a large industrial city) registered significantly reduced content of obligate anaerobes, increased pathogenic E. coli, pathogenic bacteria, fungi of the genus Candida and enterococci in the defecation, and the high content of pathogenic strepto-and staphylococci, yeasts and Haemophilus.

6. Among children living in a large industrial city, recorded the development of latent dysbiosis, which is chronic and with the least negative impact can cause persistent clinical manifestations.

7. Children who live under constant anthropogenic recorded changes in cellular immunity in a reduction in the number of T-lymphocytes, T-helper-inducer and T-killer cells against the increase of T-suppressors. Changes of humoral immunity represented a decrease in levels of the major classes of immunoglobulins A, M, G and sIgA.

8. Significant changes were found in the state of the immune status of infants depending on the environmental conditions of residence. Reduced major immune substances cause a possible risk of somatic pathology that occurs as a manifestation of secondary immunodeficiency. Residing in a large industrial impact is a risk factor for immune imbalance in the body babies first year.

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