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Assessment Of Risk Factors For The Development Of Allergic Diseases In Children

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Abstract: Allergy is a pathology of countries with a high index of socio-economic development and most of all residents of large cities. By 2025, according to the WHO, 50% of the world's population will suffer from allergies [14]. This article examines the main risk factors for the development of allergic diseases in children under the age of 18 in Tashkent. The most significant factors were: the presence of an inherited predisposition on the line of one (RCh 1.9) or both parents (OR 5.6), closely related marriages between parents (RCh 2.8), the age of parents over 40 at the time of conception of the child (RCh 1.4) and some others.

Keywords: allergic diseases, allergic rhinitis, bronchial asthma, morbidity, children, adolescents.

1. INTRODUCTION

In the XX - XXI century, the development of new technologies, advances in science and production not only significantly improved and made life easier for the population, especially in large cities, but also increased the volume of industrial and household waste, exhaust gases, the number of used household chemicals increased, the choice and availability of medicines and cosmetics. New technologies in the production and storage of food products have led to a change in the food culture of the population, the rejection of traditional forms of food and life. All this, in turn, changed the usual picture of the structure and dynamics of the incidence of the population [7,9,10, 12,13].

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Allergy, considered for many centuries to be an insignificant pathology, becomes a global problem in the 21st century. In view of the widespread prevalence, the WHO characterizes this group of pathologies as an "allergy epidemic." [2,6], 8% of first graders, and every second eighth-grader (53.4%) and every third first-grader (30.5%) suffer from allergic rhinitis [8,11]. Although the official data is several times less [own]

The basis for the development of AD is an immunopathological reaction caused by sensitization (increased sensitivity of the immune system) of the body to the substances habitual for a healthy person - allergens, the ingress of which into the sensitized organism triggers a number of immunological reactions [10]. Risk factors (RF) play an important role in the development of these reactions, which are expressed in various forms of allergic diseases and their manifestation. The pathogenesis of AD is based on the interaction of genetic and environmental factors. RF development of AD in children is very diverse and numerous. They are both endogenous (gender, heredity, concomitant diseases) and exogenous (the age of the parents, the nature of the mother's diet during pregnancy, poor living conditions, smoking of the parents, etc.) [3, 4, 5].

Purpose of the study

Identification of the most significant risk factors for the development of allergic pathology (allergic rhinitis, allergic dermatitis, bronchial asthma) based on an anonymous survey of parents of children with and without allergic diseases.

2. MATERIALS AND RESEARCH METHODS

To establish possible risk factors and their role in the occurrence of AD in children in Tashkent, according to the data of a sociological survey, a comparative assessment of the level of exposure of risk factors on two groups of children living in the city - the main and control

• Group 1 - 300 children from birth to 18 years old with diagnosed diseases of allergic rhinitis, bronchial asthma, allergic dermatitis

• Group 2 - 120 practically healthy children from birth to 18 years old without signs of allergic pathology

For a more detailed determination of the possible cause of the occurrence of AD in children, a multivariate analysis was carried out with the construction of contingency tables (B.M. Mamatkulov, V La Mort, N. Rakhmanova, 2011). Potential risk factors for allergic diseases in children and adolescents were divided into blocks: genetic, biological, social, and behavioral factors.

All data obtained in the course of the study were statistically processed on a personal computer using the EXCEL 2016 program. At all stages, indicators with a probability of at least 95% ($P < 0.05$) were taken for analysis. To determine the reliability of the data, the methods of parametric statistics were used with the calculation of the arithmetic mean (M), standard deviation (σ), standard error (mm and mP). The value of t is determined from the Student's table. The level of reliability $P \leq 0.05$ was taken as statically significant changes. This made it possible to obtain reliable data with a probability of an error-free forecast of more than 95%.

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The Republic of Uzbekistan and the city of Tashkent are characterized by a "young" population with a high proportion of people aged 0 to 18 years in its structure, which make up more than 25 - 30% of the population. According to official statistics, the child population of the republic is characterized by a fairly low incidence of AD, which is lower than the average for the CIS countries and Europe. However, the geographical location and features of economic activity determine the presence in the country of the main exogenous factors that can contribute to the growth of allergic pathology among the population: this is increased solar radiation, sudden changes in air temperature, chemical carcinogens (pesticides, defoliants, mineral, industrial emissions, etc.), which as a result of irrigated agriculture, surface water and agricultural products are polluted, air pollution from automobile exhaust, traditions in the diet of the population (increased consumption of bakery products, milk, legumes, dried fruits and nuts, etc.), poor access of the population to clean drinking water, especially in rural areas, etc. All this is reflected in the level of general morbidity of the population.

The biological RF of the occurrence of some forms of AD includes the sex of the child. Among children with AD, there were significantly more boys, 62.7 ± 2.8% than in the control group, 45.0 ± 4.5% (RCh - 1.4) (P <0.05).

Table 1.1.Distribution of children of the main and control groups by age (in% of the number of respondents)

Factors	Children with AD in% n = 300	Healthychildren in% n = 120	Odds ratio
0 - 3 лет	22,3±2,4	12,5±3,0	1,8
4 - 6 лет	11,3±1,8	25,8±4,0	0,4
7- 10 лет	25,0±2,5	20,1±3,7	1,3
11-14 лет	14,0±2,0	20,8±3,7	0,7
15 - 18 лет	27,3±2,6	20,8±3,7	1,3

There are no positive data in the literature on the effect of age on the occurrence of AD. With different types of allergies, they are diagnosed more often at a particular age. The data obtained in the course of the study also did not confirm the effect of age on the risk of developing AD. The highest level of relative risk of developing AD (Table 1.1) is significantly (P <0.05) associated with age groups) from 0 to 3 years (RCh -1.8), 7-10 years and 15-18 years (OR - 1.3.). The influence of the level of education of parents on the likelihood of developing AD in a child was revealed, so this chance increases with higher education in the father by 1.8 times 30.7 ± 2.7% in the main group and 17.5 ± 3.5% in the control group (P <0.05). The mother's higher education also significantly increases the risk by 1.5 times. 40.0 ± 2.8% in the main group and 27.5 ± 4.1% in the control group (P <0.05).

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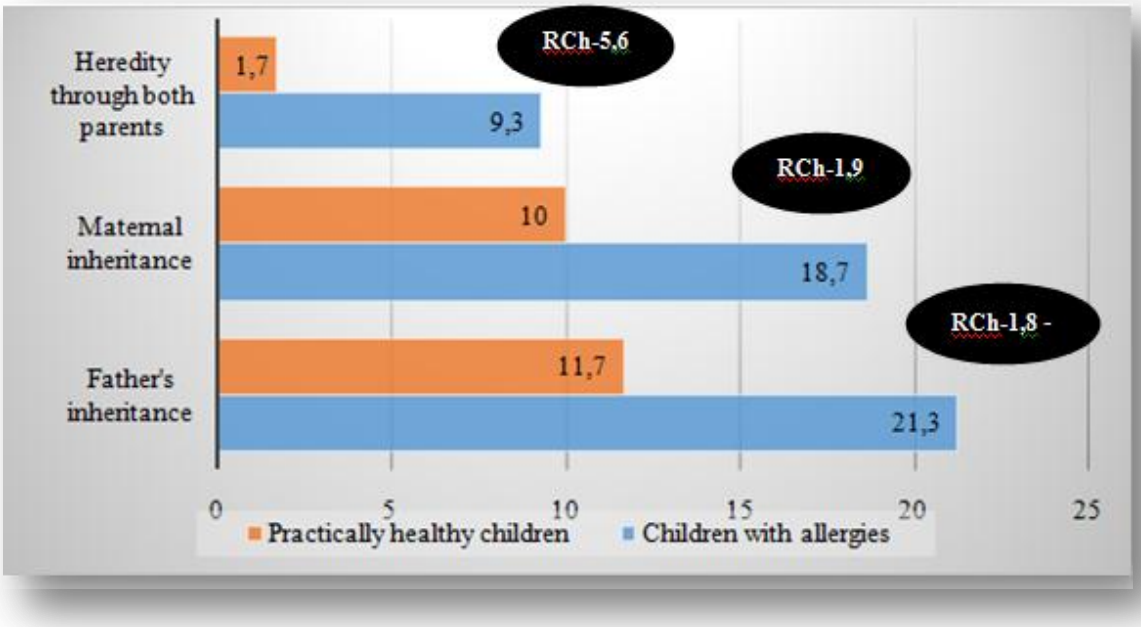
Figure 1.1.Structure of families surveyed by hereditary predisposition to allergies (per 100 respondents)



Another factor that significantly increases the risk of developing AD in a child is the presence of allergic pathology in one or both parents (Fig. 1.1.). So if in the main group heredity is burdened by the father or mother, the chance of having AD in a child increases 1.8 and 1.9 times, respectively, and if both parents in the family have AD, then the risk increases 5.6 times (9.3 ± 1.7% in the main group and 1.7 ± 0.6% in the control group) (P <0.05).

The presence of closely related ties between the parents of the child is realized in the genetically determined occurrence of various pathologies in the child, including allergies. Moreover, the closer the relationship, the higher the risk of developing the disease with a cousin RCh is 2.8; with more distant 1.3; if the parents are not relatives decreases to 0.8 In the group of sick children, 18.3 ± 2.2% of the parents were in a cousin relationship and 13.3 ± 2.0% were more distant relatives, however, a significant difference (P <0.05) between the main and control groups according to this factor was noted only in case of cousin relationship. A rather high percentage of closely related ties in our republic (27.9 ± 1.4% in total for both groups) can be considered and with low health literacy in relation to the risk of AD in children and other diseases in one way or another associated with a genetic predisposition.

There was a significant difference between the groups by the age of the parents at the time of pregnancy with the proband: the average age in the main group of fathers was 29.7 ± 0.3; in the control - 28.9 ± 0.5 years; the average age in the main group of mothers was 27.3 ± 0.3; in the control group - 25.9 ± 0.4 years The maximum RCh of the development of AD in a child (1.4) was observed when the father was over 40 years old (14.8 ± 2.0 in the main group versus 10.8 ± 2.8% in the control). With a mother's age over 30, RCh = 1.3 (24.7 ± 2.5 in the main group versus 18.3 ± 3.5% in the control group) (P <0.05). At the same time, the risk of developing allergic pathology increases (1.4) if a woman over 30 has this first pregnancy (P <0.05).

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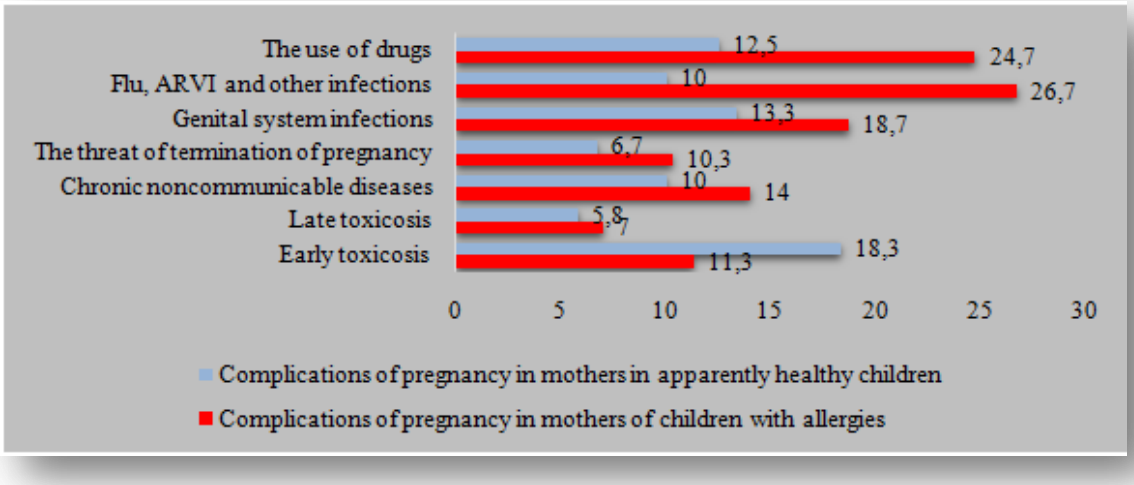
The condition and behavior of the mother during pregnancy also influences the risk of developing AD in a newborn baby. Probably, this can be associated not only with the true state of health of the mother, but also with her lifestyle before and during pregnancy, since it is one of the factors in the occurrence of complications of pregnancy (Fig. 1.2). Influenza and ARVI transferred during pregnancy increase the risk of developing AD in a child by 2.7 times, uncontrolled drug intake by 2.0 times, the threat of termination of pregnancy by 1.8 times, chronic somatic diseases and infections of the genital system by 1.4 times (P <0.05).

Figure 1.2. Structure of interviewed mothers by complications during pregnancy (per 100 respondents)



An important role in the formation of allergic pathology in children is played by the eating behavior of women during pregnancy, so 42.0 ± 2.8% of women from the main group and only 29.2 ± 4.1% of pregnant women from the control group consumed confectionery and other sweets daily, which increased the risk of AD by 1.4 times (P <0.05). The consumption of products from the fast food group (chips, Kirieshki, chewing gum, nuts, flakes, corn sticks, etc.) increased the risk of developing AZ in a child by 1.3 times 38.0 ± 2.8% of pregnant women in the main group and 29, 2 ± 4.1% of women in the control group (P <0.05). Daily consumption of natural cow's milk by a pregnant woman (1.1) slightly increases the risk of developing pathology in an infant. At the same time, frequent consumption of raspberries, strawberries, oranges, lemons, kiwi, bananas, traditionally considered allergic-provoking foods during pregnancy, did not increase the risk (0.8) for the child (P <0.05).

However, the risk (2.9) of the development of the disease in the child whose mothers smoked during pregnancy increases most sharply (19.3 ± 2.3 in the main group versus 6.7 ± 2.3% in the control group) (P <0.05) .Only an anonymous questionnaire made it possible to reveal the fact that every fifth woman in the main group smoked during pregnancy - this is a flaw in preventive conversations with pregnant women, both at GP doctors and at obstetrician-gynecologists of polyclinics.

Factors associated with the birth of a child can also affect the risk of AD in a child during later life, as follows: cesarean section and other operations accompanying the birth of a child with complicated childbirth, leading to the subsequent use of drugs in the postpartum woman

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lead to an increase in risk of AD in 1.8 times. Such operations were undergone by 30.3 ± 2.7% of mothers in the main group and 16.7 ± 3.4% of mothers in the control group (P <0.05). Thus, of the 420 women we interviewed, 111 (26.4 ± 4.0) underwent various surgical interventions during childbirth, which indicates a rather low level of obstetric care in maternity hospitals in the city (P <0.05).

The birth of a child prematurely or with a birth weight of less than 2500 grams, as well as signs of intrauterine infection, increase the risk of subsequent development of AD by 1.5 and 1.4 times, respectively.

However, the highest risks of developing allergic pathology in a child are associated with nutritional disorders of the infant in the first year of life (Fig. 1.3.) 2.8% of babies, and in the control group 12.5 ± 3.07%. With the introduction of early (from 1-3 months of life) complementary foods, the risk of AD increases by 1.3 times (31.3 ± 2.7 in the main group versus 24.2 ± 3.9% in the control group) (P <0.05) ... The type of complementary foods also matters. If complementary feeding of a child in the first year of life was carried out with natural cow's milk, then the risk of developing allergies already in the first year of life increases by 2.3 times. With the introduction of complementary foods with conventional infant formula, the risk increases 1.5 times, the minimum risk of allergic pathology (1.0) in the baby is caused by special hyper allergenic mixtures (NutrilonPepti Allergy, NutrilonPeptiGastro, Alfare, Nutrilakpeptidi SCT, Pregestimil, Nutramigen, Frisopep AS). However, according to international recommendations, adapted infant formula based on soy protein isolate can only be used in children over 6 months of age, taking into account individual tolerance.

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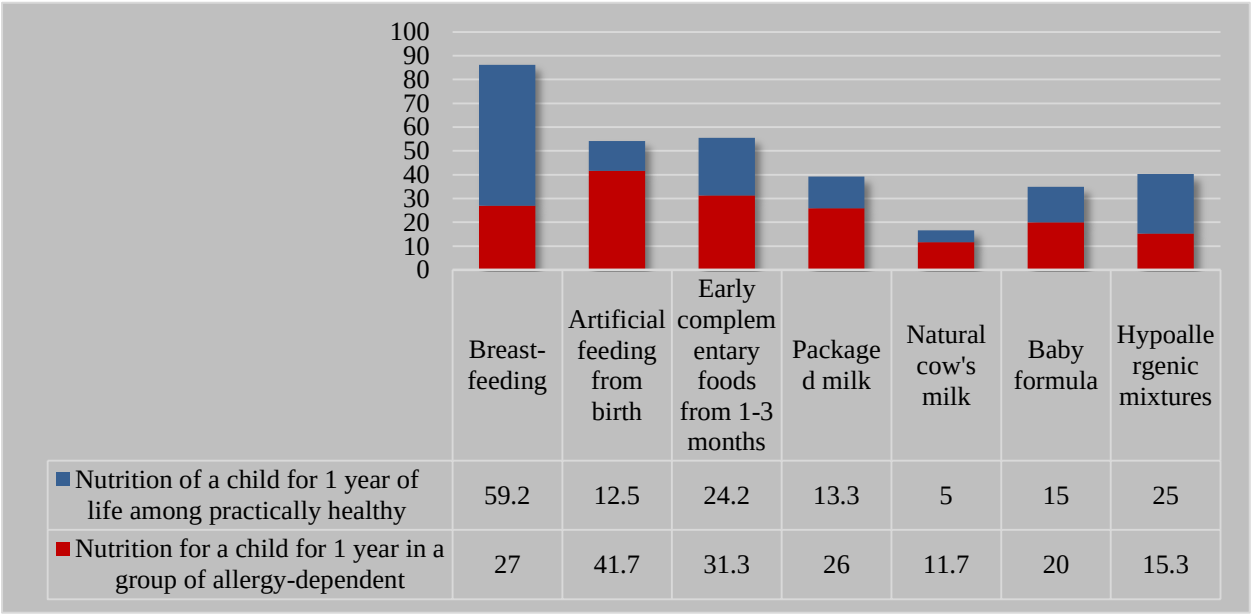
Figure 1.3.The structure of the main and control groups by the nature of feeding in the first year of life (per 100 respondents)



Considering the state of health of children with and without allergic pathology, it should be noted that according to the literature and the results of this study, some diseases can either provoke the occurrence of AD, or aggravate their course. These diseases primarily include pneumonia, especially with the risk of developing asthma, which increase the risk by 1.8 times. Thus, in the main group at least once in their life, 15.3 ± 2.1% of children had pneumonia, and in the control group, 8.3 ± 2.5% (P <0.05). Frequent (more than 4 times a year) cases of colds (flu, acute respiratory viral infections, acute respiratory infections, tonsillitis) increase the risk by 1.6 times - 47.8 ± 2.9%. children in the main group and 29.2 ± 4.1% in the control group (P <0.05). Chronic diseases of the digestive system, which most often change the normal intestinal microflora of a child, provoke the risk of developing AZ in 1.2 times (10.7 ± 1.8 in the main group versus 9.2 ± 2.6% in the control group, but in this case the difference between group indicators are not reliable) (P ≥0.05).

Table 1.2.Distribution of children of the main and control groups according to the influence of social factors (in% of the number of respondents)

Factors		Children with AD in % n = 300	Healthy children in% n = 120	Odds ratio (P ≥0.05)
Child passive smoking as a result	Smoking mother	36,7±2,8	29,2±4,1	1,3 (P<0,05)
	Smoking father	10,7±1,8	5,8±2,1	1,8 (P<0,05)
	Smoking by both parents	9,3±1,7	4,2±1,8	2,2 (P<0,05)
The psychological	Calm	54,0±2,9	61,7±4,4	0,9 (P<0,05)

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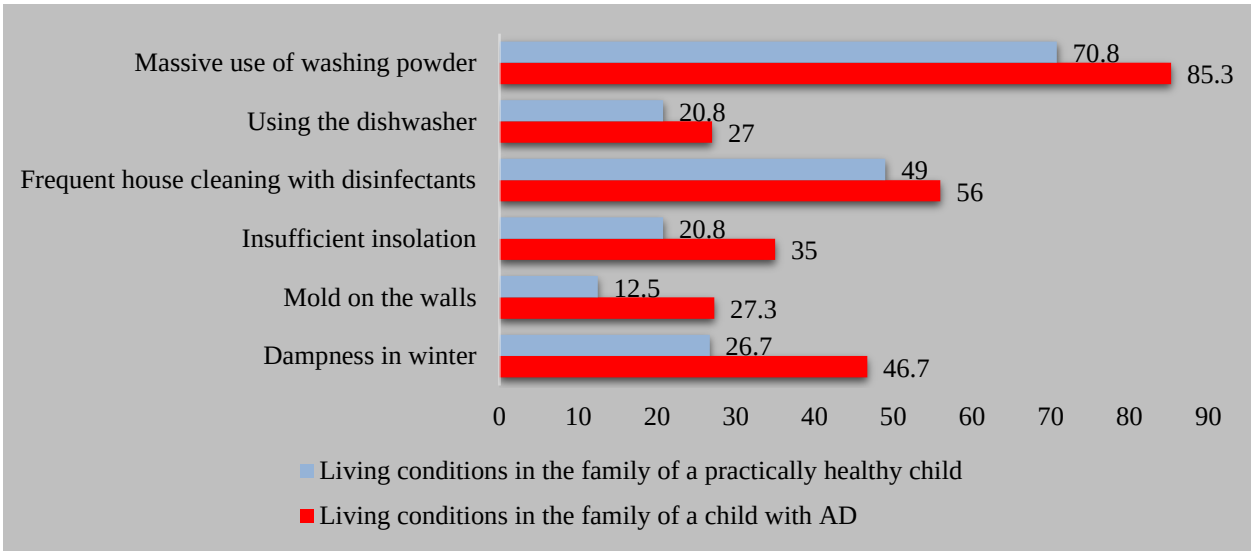
climate in the family	Rare conflicts	27,7±2,6	25,0±4,0	1,1 (P≥0,05).
	Adverse	18,3±2,2	13,3±3,1	1,4 (P<0,05)
A family	Full	60,7±2,8	68,3±4,2	0,9 (P<0,05)
	Not complete	39,3±2,8	31,7±4,2	1,2 (P<0,05)
The family lives	Separately	47,3±2,9	56,7±4,5	0,8 (P<0,05)
	With parents	28,3±2,6	18,3±3,5	1,5 (P<0,05)
	Several families in one apartment	24,3±2,5	25,0±4,0	1,0(P ≥0,05).

Among social and household factors (Table 1.2), influencing the formation of allergic pathology in children, first of all, it is necessary to pay attention to the smoking of parents. So if as a result of smoking by both parents, the risk increases by 2.2 times, then when smoking only the mother, which is quite common in incomplete families (an incomplete family also increases the risk of developing AD in a child by 1.2 times), the risk increases by 1, 3 times. If only the father smokes in the family, then the child's risk of developing AD is 1.8. If at the same time the family does not live in a separate cell, but together with the parents and the psychological climate in the family is unfavorable, then the risk of developing AD in a child increases by 1.5 and 1.4 times, respectively.

Living conditions that most adversely affect the baby's health (Figure 1.4) and the risk of AD progression are: the presence of mold on the walls (RCh-2.2) in damp and poorly heated living quarters (RCh-1.8), poorly lit from insufficient insolation during the day of the room (RC h-1.7).

Figure 1.4. Structure of the main and control groups by the nature of unfavorable living conditions (per 100 respondents)



An important role in the development of AD in children, according to many studies, is also played by an increased desire for purity. Thus, frequent cleaning in the house (more than 1 time per week) with the use of chemicals and disinfectants leads to an increase in the risk of

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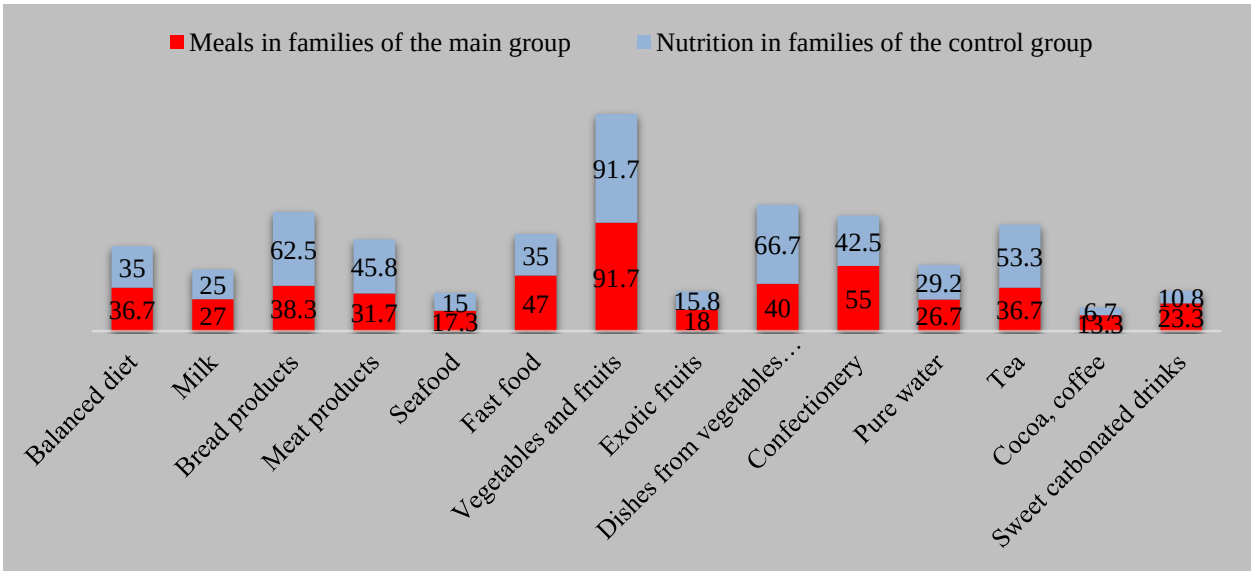
developing allergic pathology by 1.1 times. At the same time, cleaning similar in frequency without the use of chemicals leads to a 0.9-fold reduction in this risk. Residues of synthetic detergents on dishes and linen when washing dishes in a dishwasher or washing in an automatic mode (using a large amount of powder, conditioners, etc.) increase the risk of developing AD in children by 1.3 and 1.2 times, respectively.

In older children, family eating habits play a significant role in the development and progression of allergies. According to some authors, despite the fact that Uzbekistan has sufficient access to fresh vegetables and fruits all year round, their percentage in the family's diet is often insufficient. Fashion and advertising for the use of fast food elements and sugary carbonated drinks in the diet, which increase the risk of developing allergic conditions in a child, are of particular importance in a child's nutrition.

Figure 1.5.The structure of the main and control groups by the nature of nutrition (per 100 respondents)



According to the results of this study (Figure 1.5), the consumption of sweet and carbonated drinks by children of the main group was 23.3 ± 2.4%, and in the control group they were consumed significantly less often than 10.8 ± 2.8% (OR-2.2). Cocoa (RCh-2.0) was another drink that increased the risk of allergy development. Frequent consumption of sweets, lollipops, chocolate, cakes and other confectionery products, as well as fast food - chips, chewing gum, nuts, flakes, corn sticks increased the risk of developing AD by 1.3 times. Sea fish and seafood, which are rarely consumed in the diet of children in Uzbekistan, can nevertheless increase the risk by 1.2 times. Natural milk and the use of exotic fruits - kiwi, bananas, oranges, etc. increased the risk of developing allergies in children in the study group by 1.1 times.

Thus, in the city of Tashkent, in the process of the formation of allergic diseases in children, various factors are involved that affect the body of both parents and the child himself in the antenatal and postnatal periods of development. Significant reasons for the risk of AD were: closely related marriages between parents, burdened heredity in parents, parents' age over 40 at the time of conception. Aggravated by viral or bacterial infections and the threat of termination of pregnancy, an obstetric and gynecological history, most often associated with

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the intake of a large number of pharmaceuticals, smoking of the mother during pregnancy. A reliable relationship was established between the refusal to breastfeeding and the level of risk of developing AD in a child. A reliable relationship was revealed between the characteristics of the family's living conditions (the nature of living conditions, the psychological climate in the family, the child's passive smoking, the nature of the family's diet) and the development of allergic pathology in the child. The resulting tables of indirect risk allow us to assess the relationship of factors and the risk of developing allergies in a child, as well as to solve the issues of their primary prevention.

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