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Nutritional status of babies and influence of unmodified cow's milk on allergic reactions according to the epidemiological study from Ukraine

Stan odżywienia niemowląt i wpływ niemodyfikowanego mleka krowiego na powstanie reakcji alergicznych według badań epidemiologicznych z Ukrainy

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ABSTRACT

Introduction: Recently in most countries there has been a continuous increase in the number of various allergic diseases. Early introduction of unmodified cow's milk (UCM) into the baby's diet may provoke the development of food allergies, allergic and food hypersensitivity reactions. **Aim:** The aim of our study was to examine the peculiarities of baby's nutrition in Ukraine, to estimate the impact of early cow's milk proteins (CMP) consumption on frequency of food hypersensitivity and allergic reactions in toddlers within two years of life, depending on the time of CMP introduction. **Materials and methods:** 5354 full term infants aged of 1–12 months were enrolled into the crosssectional study. Retrospective evaluation of incidences of food hypersensitivity and allergic reactions was done in a selected cohort of 1000 babies who were divided into 3 groups depending on their nutrition. 135 babies did not receive UCM (the first group). 471 – received UCM during the first year of life (the second group). 394 babies were fed with UCM starting from the second year of life (the third group). **Results:** Significant difference on frequency of food hypersensitivity reactions we found in 1, 2, 3 groups of toddlers when they consumed products that contained cow's milk protein (2.99% *vs.* 7.64% and 10.94%; $p = 0.01$); eggs (2.22% *vs.* 8.49% and 10.41%; $p = 0.013$); citrus (6.67% *vs.* 19.96% and 18.78%; $p = 0.001$); chocolate (2.96% *vs.* 13.61% and 14.5%; $p = 0.002$) and some other foods (4.44% *vs.* 14.01% and 10.41%; $p = 0.006$). **Conclusions:** Introduction of UCM into baby's diet during the first and second year of life is associated with increased risk of a variety of allergic and food hypersensitivity reactions, accompanied by a higher frequency of hospitalizations and taking medications.

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Introduction

Recently in most countries there has been a continuous increase in the number of various allergic diseases among children and adults. Clinical manifestation of allergic reactions in infancy is mainly related to peculiarities of nutrition. Nowadays there are no clear epidemiological data on the incidence of food allergies in early childhood [1, 2].

Food allergies among babies are mainly represented by hyperergic (immunological) response to one or more of the proteins in cow's milk [3].

Its precise prevalence in infants is unknown, and it is estimated to be between 2 and 6% [4, 5]. Clinical manifestations of cow's milk protein allergy (CMPA) decrease or disappear by the end of the first year of life in half of the children and in nearly 80% – within the first 3 years of life [6, 7]. At the same time clinical manifestations of food hypersensitivity in babies occur 4 times oftener than CMPA, but parents and physicians sometimes cannot differentiate them. Quite often this diagnosis is based on the presence of rash, seborrhea, dermatitis, functional disorders of the digestive system, breathing, nasal disorders, sleep disorders [8, 9].

Clinical tolerance to cow's milk proteins (CMP) is formed in majority of the children up to 3 years of age, but atopic dermatitis, allergic rhinitis, bronchial asthma, ''atopic march'' may develop in some percentage of children with CMPA later [10, 11].

Nowadays, optimum age of the child to administer unmodified cow's milk (UCM) is debatable. Early introduction of UCM into the baby's diet may provoke the development of food allergy and allergic reactions. Most of the world does not recommend using unmodified cow's milk to children of the first year of life, but in some countries (Canada, Sweden, Denmark) the use of cow's milk is considered acceptable from 9 or 10 months of age [12]. In Ukraine UCM is allowed after 9 months according to National Protocol [15]. However in a number of European countries for children up to 3 years is recommended to use special modified dairy products, which are called ''growing up milks'' [13, 14]. Increased consumption of dairy products (''growing up milks'' or GUM) is observed in Europe and most other countries of the world [14].

To clarify the situation with toddler's nutrition in European countries large-scale surveys and relevant epidemiological studies were conducted involving large number of toddlers and their families. In Ukraine the situation remains insufficiently defined and requires careful study.

Aim of the study

The aim of our study was to examine the peculiarities of baby's nutrition in Ukraine, to estimate the impact of early CMP consumption on frequency of food hypersensitivity and allergic reactions in toddlers within two years of life, depending on the time of CMP introduction.

Materials and methods

During the first study phase we conducted a survey of 6000 families who had full term infants from 0 till 18 months. They were the residents of the city of Kyiv, L'viv and L'viv region. Parents of 5457 children from 0 to 18 months passed the questionnaires, and 5354 infants (0–12 months) were included into the cross-sectional study.

At the second stage, which was held a year later, in a retrospective cohort study we estimated morbidity and frequency of allergic and food intolerance reactions in 1000 toddlers from the previous cohort, which was divided into 3 groups depending on type of their nutrition and UCM introduction time. 135 babies did not receive UCM for the first and second year of life (the first group). 471 babies received UCM during the first year of life (the second group). 394 children were fed with UCM starting from the second year of life (the third group; Fig. 1).

Average age, average height, average birth weight, frequency of artificial feeding and average duration of breastfeeding statistically did not differ in the groups. The average age of toddlers in groups was about two years at the time of the survey. The study was conducted by direct questioning and by telephone survey of parents, using specially designed questionnaires.

Standard methods of descriptive, comparative and categorical analyses were used. If normally distributed continuous data are presented as average ± standard deviation (SD). Two-way ANOVA was used to compare continuous variables between 3 groups. Chi^2 or Fisher's exact test were used for comparison of categorical (nominal) variables. All differences between the groups were considered significant if $p < 0.05$.

The statistical analysis was conducted with the use of software Statistica 8 (StatSoft Inc., 2008; USA).

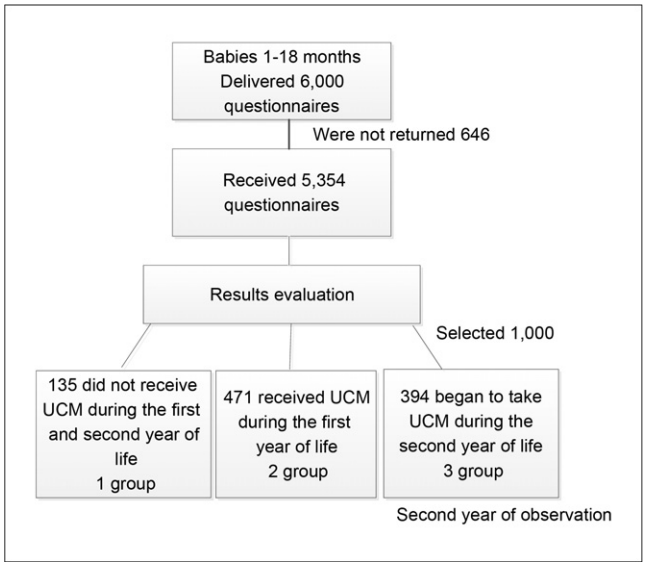

Fig. 1 – Structure of epidemiological study
Ryc. 1 – Struktura badania epidemiologicznego