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ORIGINAL ARTICLE

Prevalence of and risk factors for the development of atopic dermatitis in schoolchildren aged 12–14 in northwest Croatia

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Abstract
Background: Atopic dermatitis is a common allergic disorder. A multifactorial background for atopic dermatitis has been suggested, with genetic as well as environmental factors influencing disease development. Our aim was to estimate the prevalence rate and associated factors for atopic dermatitis in northern Croatia using the methods of the internationally standardised ISAAC protocol.
Methods: The study was undertaken among 12–14-year-old schoolchildren. Data were collected using standardised ISAAC written questionnaire Phase One and some selected questions from the ISAAC supplementary questionnaire completed by parents.
Results: A total of 2887 children participated in the study. Estimated lifetime (ever) prevalence rate of atopic dermatitis symptoms was 7.55% and estimated 12-month prevalence rate was 5.75%. The factors found to be associated to the symptoms of atopic dermatitis ever were: positive family atopy, female gender, sleeping on feather pillow and contact with pets after age of seven, and to the symptoms in the past 12 months were: positive family atopy, female gender, sleeping on feather pillow, parasite infestation, and contact with pets in the first year of life.
Conclusions: The results of our study show that northern Croatia is a region with moderate prevalence rates of atopic dermatitis. Following risk factors were family atopy, female gender and sleeping on feather pillow. Because of controversial results of previous studies conducted on the same topic further investigations should be made.

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Introduction

Atopic dermatitis (AD) is a common and chronic inflammatory skin disease that is characterised by relapsing itch and eczema, beginning mostly in infants.[1] AD belongs to the group of allergic disorders that includes food allergy, allergic rhinitis, and asthma.[2] A multifactorial background for AD has been suggested, with genetic as well as environmental factors influencing disease development.[3] Natural history of the clinical manifestations of AD varies with age; three stages can often be identified. In infancy (first phase), the eczematous lesions usually emerge on the cheeks and the scalp with scratching, which frequently starts a few weeks later, causing crusted erosions. During childhood (second phase), lesions involve flexures, the nape, and the dorsal aspects of the limbs, and in the third phase (in adolescence and adulthood) lichenified plaques affect the flexures, head, and neck.[4]

The prevalence rates and risk factors for AD have been the source of many studies including The International Study of Asthma and Allergies in Childhood (ISAAC). ISAAC was developed to ascertain the prevalence rate and risk factors of allergy diseases (asthma, allergic rhinitis and atopic dermatitis) with a standardised tool and methodology in different regions. A full description of the ISAAC study protocol was published previously.[5]

In the present study we evaluated the prevalence rate and associated factors for AD in northern Croatia using the methods of the internationally standardised ISAAC protocol.

Materials and methods

The study was undertaken during the year 2005 among elementary school children in the Međimurje region in northwest Croatia. This region is located between the eastern Alps and the Panonic plain and is characterised by a rural environment. The climate is humid continental, with warm summers and cold winters. The target population was children aged 12 years 0 months to 14 years 11 months (6th–8th grades of school). Data were collected using standardised ISAAC written questionnaire Phase One and some selected questions from the ISAAC supplementary questionnaire, completed by parents. All standardised modules were translated from English to Croatian by physicians specialising in allergy,[6] according to translation guidelines.[7] The correctness of the questionnaire was tested by back-translation by an independent professional translator. Ethical approval was obtained from the local ethics committee before the start of the study. Any inconsistencies found were eliminated in a phone conversation with the parents. Data were then entered into a computer and analysed. Statistical analyses were performed using IBM SPSS Statistics version 19.0.0.1. Basic descriptive summaries of the data were obtained and differences between investigated groups were calculated with cross-tabulation and the chi-square test. Univariate and multivariate logistic regression analyses were used to depict risk factors for atopic dermatitis symptoms ever or in the past 12 months. Variables that could produce the multiple co-linearity problems were excluded from multivariate models (breastfeeding and pet ownership ever). A $P < 0.05$ indicated a statistically significant difference.

Results

Participants

Of the 3298 children invited, completed standardised Phase One and supplementary ISAAC questionnaires were received from 2887 children (participation rate: 87.54%). Children participating in the study were from 27 randomly selected elementary schools (1497 [51.9%] girls; 12-year-olds: $n = 862$, 13-year-olds: $n = 1017$, 14-year-olds: $n = 1008$).

Prevalence of atopic dermatitis symptoms

Estimated lifetime (ever) prevalence rate of atopic dermatitis symptoms was 7.55% with a significantly higher rate in girls (9.01% vs. 5.97% in boys; OR: 1.561, 95%CI: 1.175–2.073, $P = 0.002$). Estimated 12-month prevalence rate of atopic dermatitis symptoms was 5.75% with the same gender difference (girls: 7.08%, boys: 4.32%; OR: 1.689, 95%CI: 1.219–2.339, $P = 0.0016$).

Results are shown in Table 1.

Risk factors for atopic dermatitis symptoms ever

The main factors significantly associated to atopic dermatitis symptoms ever found in the univariate analysis, using the chi-squared test, were the following: positive family atopy (OR 1.934, 95%CI: 1.465–2.552, $P < 0.001$), female gender (OR: 1.561, 95%CI: 1.174–2.074, $P = 0.002$), sleeping on feather pillow (OR 7.424, 95%CI: 5.555–9.922, $P < 0.001$), parasite infestation (OR 1.544, 95%CI: 1.028–2.320, $P = 0.036$), contact with pets in the first year of life (OR 3.276, 95%CI: 1.858–5.778, $P < 0.0001$), and after the age of seven (OR 1.487, 95%CI: 1.089–2.030, $P = 0.012$). Children in contact with pets since the first year of life had fewer symptoms of atopic dermatitis ever (OR 0.134, 95%CI: 0.033–0.546, $P = 0.005$).

We did not observe any statistically significant relationship between atopic dermatitis and maternal smoking during pregnancy, passive smoking, breastfeeding, and socioeconomic status.

Following univariate analysis, multiple logistic regression analysis was made with all the variables. The factors found to be associated to the symptoms of atopic dermatitis ever in children were: positive family atopy (OR 1.552, 95%CI: 1.157–2.081, $P = 0.003$), female gender (OR: 1.510, 95%CI: 1.122–2.032, $P = 0.006$), sleeping on feather pillow (OR 6.867, 95%CI: 5.109–9.229, $P < 0.0001$), and contact with pets after the age of seven (OR 1.438, 95%CI: 1.027–2.012, $P = 0.034$). Children in contact with pets since the first year of life had fewer symptoms of atopic dermatitis ever (OR 0.223, 95%CI: 0.054–0.919, $P = 0.038$).

We found that children with symptoms of atopic dermatitis ever are at increased risk for developing other atopic disorders: asthma (OR 3.553, 95%CI: 1.945–6.489, $P < 0.0001$) and allergic rhinitis ever (OR 2.843, 95%CI: 1.394–5.797, $P = 0.004$).

We did not observe any statistically significant relationship between atopic dermatitis and parasite infestation, maternal smoking during pregnancy, passive smoking,