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Manifestation of atopy is not related to patient's month of birth

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T. Schäfer [1], B. Przybilla [2], J. Ring [1], B. Kunz [1], A. Greif [3], K. Überla [3]

[1] Department of Dermatology, Hamburg University, Germany; [2] Department of Dermatology, Munich University, Germany; and [3] Department of Data Processing in Medicine and Epidemiology, Munich University, Germany

The first months of life may be an important period for allergic sensitization. Several studies suggest a relationship between the month of birth (MB) and the development of skin sensitivity to aeroallergens or the manifestation of an atopic disease. In 1988 and 1989 we investigated a population of 1066 Bavarian preschool children aged 5–6 years. Skin prick tests were performed with common aeroallergens (grass pollen, birch pollen, house-dust mite, cat epithelia). The personal history of atopic disease (atopic eczema, allergic rhinitis, bronchial asthma) was recorded by a questionnaire, and the presence of overt atopic disease was documented by a personal examination. Positive prick test reactions to the above-mentioned aeroallergens were found in 15.4%, 9.2%, 12.2%, and 10.4% of the subjects, respectively; lifetime prevalence of manifest atopic disease was 22.2% for atopic eczema, 11.7% for allergic rhinitis, and 4.5% for asthma. The MB distributions of children reacting to aeroallergens or of those with atopic diseases were compared with those of subjects with corresponding negative findings. Chi-square tests were performed for each aeroallergen and each of the atopic diseases separately. No significant differences among the MB distributions were found ($P > 0.3$). Thus, in this coherent group, MB correlated neither to allergic sensitization nor to manifest atopic disease.

Key words: atopy; month of birth.

T. Schäfer
Hautklinik am Universitätskrankenhaus Eppendorf
Martinistr. 52
2000 Hamburg 20
Germany

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The atopic diseases (atopic eczema, allergic rhinoconjunctivitis, allergic asthma) develop on the basis of a genetic predisposition, but their actual expression depends largely on environmental factors. The first months of life have been considered to be an especially vulnerable period, in which the risk of sensitization may be increased by exposure to aeroallergens, possibly as a result of the immaturity of the immune system (6, 20). Numerous studies have been conducted to determine whether there is a correlation between the month of birth (MB) and skin test reactivity to aeroallergens or the occurrence of respiratory allergic diseases (1–5, 7, 8, 11–16, 18–21, 24). These investigators have included patients suffering from manifest allergic symptoms and have yielded conflicting results. Some investigators (7, 8, 11, 14, 15, 18) have found a significant correlation between grass pollen sensitization and MB ranging from December to September, or between mite allergy and MB from May to October (7, 13), whereas others could not confirm these findings (12–14, 16, 19). We therefore investigated a group of 1066 unselected children aged 5–6 years for the presence of sensitization to common environmental allergens or prior or present atopic disease. We could not find a significant correlation between MB and manifestations of atopy.

Subjects and methods

Subjects

We contacted a total of 1559 households and asked for voluntary participation in the study. In May and June 1988, and June and July 1989, we investigated 1091 unselected preschool children (584 boys; 507 girls) in different areas of Bavaria (Schwandorf, Selb, Arzberg, Wunsiedel, Furth, Berchtesgaden, Bad Reichenhall). The children were aged 5–6 years. All subjects entered the study voluntarily after written informed consent had been obtained from the parents.

Methods

A personal history was taken concerning atopic diseases (atopic eczema, allergic rhinitis, bronchial asthma) by a mailed questionnaire. An additional personal examination allowed us to determine the presence of manifest atopic disease, especially atopic eczema. Children with prior or present manifestations of one of the above-mentioned diseases were classified as positive for this disease.

Skin prick testing with four common aeroallergens (birch and grass pollens, house-dust mite (*Dermatophagoides pteronyssinus*), cat epithelia) and two food allergens (hen's eggs, cow's milk) was performed on the volar aspect of the forearm with a disposable multipuncture system (Stallerkit, Allmed Pharma, Alpen, Germany). Saline (0.9%) and histamine-dihydrochloride (0.1%) served as controls. Reactions were read after 20 min. Test reactions were read as positive if the wheal diameter was at least 3 mm. For this study, only reactivity to the four aeroallergens was considered. Skin test reactions to allergens were taken into account when there was no reaction to histamine, but not when there was a reaction to the negative control.

The MB distributions of children with positive reactions to aeroallergens or with a prior or present atopic disease were compared with the MB of those with corresponding negative findings. Evaluation was done separately for each of the four aeroallergens and for each of the three atopic diseases. The chi-square test was used to test for significant differences between these groups for each single month. Differences were regarded as significant if P was <0.05.

Results

Data from 1066 children were evaluated. Of these, 285 (26.7%) had at least one positive skin prick test to the tested aeroallergens; 15.4% reacted to grass pollen, 12.2% to house-dust mite, 10.4% to cat epithelia, and 9.2% to birch pollen. There was a positive history of atopic eczema in 22.2% of allergic rhinoconjunctivitis in 11.7%, and of bronchial asthma in 4.5%.

The MB distributions of children with positive and negative prick tests are given for each allergen in Fig. 1. There was no statistically significant difference in the MB distributions between reactors and nonreactors ($P>0.3$). There was also no significant difference when all participants were grouped into reactors and nonreactors irrespective of allergen specificity (Fig. 2).

The MB distributions of subjects with or without prior or present manifest atopic disease did not show significant differences (Fig. 3).

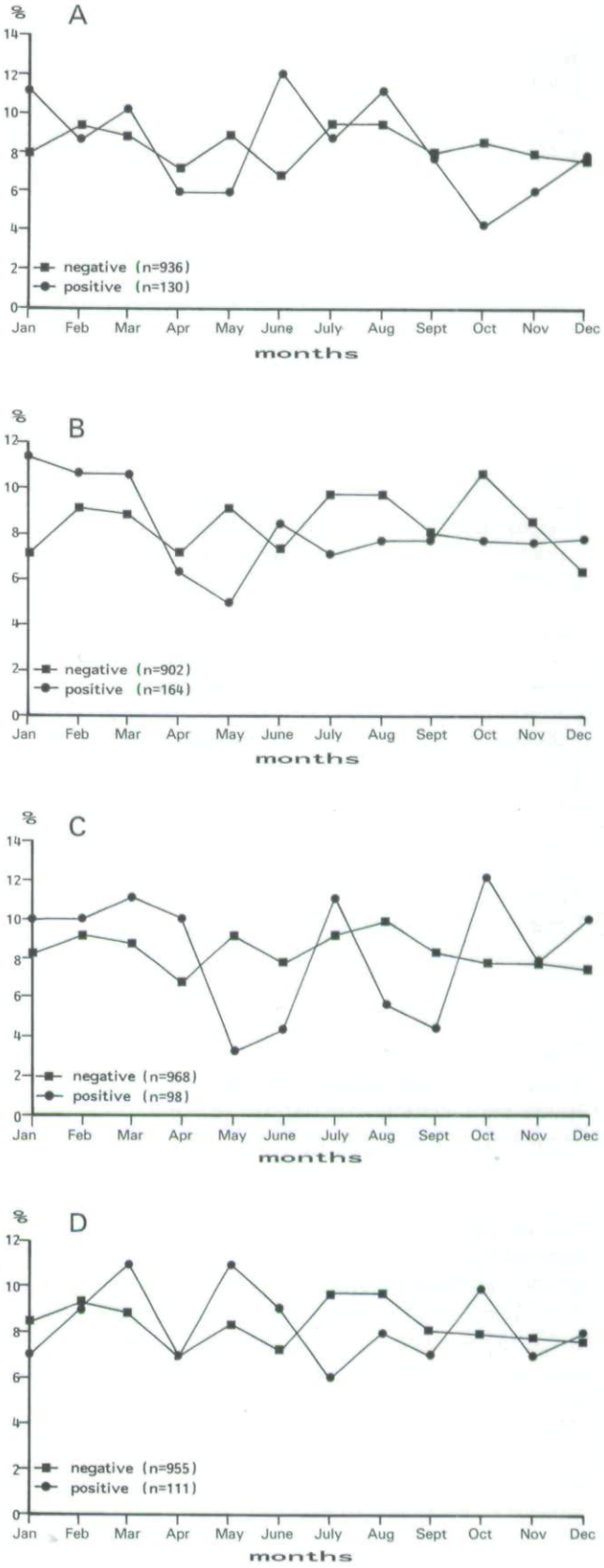


Fig. 1. Month-of-birth distribution of children positive or negative in skin prick test to (A) house-dust mite, (B) grass pollen, (C) birch pollen, and (D) cat epithelia.

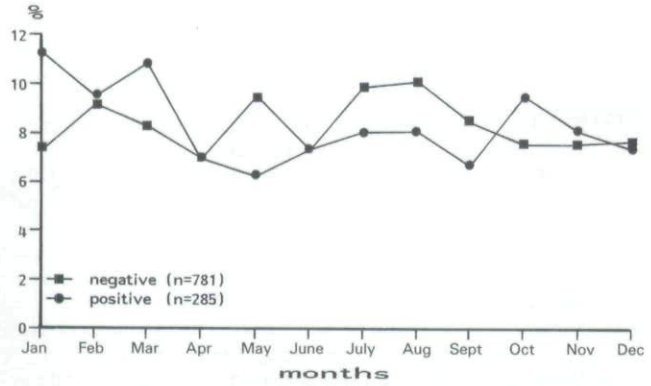


Fig. 2. Month-of-birth distribution of children positive or negative to at least one of the aeroallergens tested in the skin prick test.

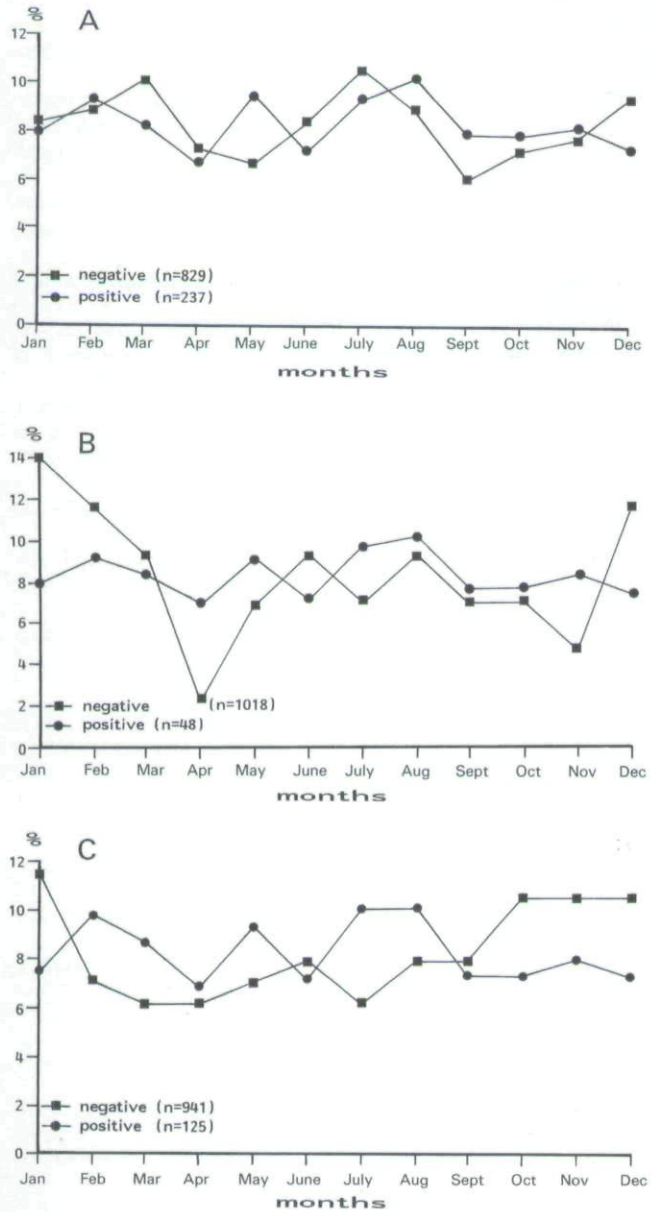


Fig. 3. Month-of-birth distribution of children with (positive) or without (negative) (lifetime prevalence) (A) atopic eczema, (B) bronchial asthma, and (C) allergic rhinitis.

Discussion

An association has been suggested between the MB and allergic sensitization to aeroallergens. This should be due to an increased susceptibility of sensitization in early life because of a transient IgA deficiency, leading to increased penetration of allergens through mucosal membranes (10, 20, 21, 23). The duration of such an incompetence of barrier function is not yet known (9, 22).

Numerous studies have been performed in order to clarify the relationship of MB to allergic disease. The results are conflicting. A significant association has been reported between the MB and clinical grass or birch pollen sensitivity, from the UK, Finland, France, and Italy, showing that a higher percentage of those affected was born between December and June (4, 5, 7, 8, 14, 15). From Finland there has come data suggesting a relationship between a birth date in the months of February to April and skin test sensitivity to birch pollen (4).

Other studies in the USA, Denmark, and the UK were not able to confirm these findings (12, 13, 16, 19). Respiratory allergy (asthma or rhinitis) to house-dust mite (*D. pteronyssinus*) was found to be positively correlated with birth dates between June and September or July and December (7, 13, 24), or not at all (14, 19). Beck & Hagdrup showed a higher birth rate between May and November for patients with atopic eczema and skin sensitization to house-dust mite (2). Björkstén & Suoniemi reported a significantly higher frequency of birth dates in May and September for males who showed skin test sensitivity to small-mammal epithelia (3). Quoix et al. could not confirm these results with regard to cat and dog allergens (15). Sex differences have also been reported, showing significant correlations between MB and pollen sensitivity for females (14) or males (3) only.

This study could not detect significant difference in the MB distributions between children with positive skin prick test to common aeroallergens, those with previous or present atopic diseases, and those negative for these features. Our study design differed from those of others in some important aspects. We had the opportunity to examine an unselected population, which, furthermore, can be considered to be largely homogeneous with regard to possible geographic/climatic influences. Most of the previous studies selected patients seeking medical attention (5–8, 13–16). Moreover, the age ranges in previous investigations were much broader (5, 7, 11, 13, 15, 18).

The selection of the control group is important. Most studies have compared the distribution of MB of allergic subjects with the general population (3, 4, 8, 13–15, 18, 19), data being drawn from population

statistics registries. Our controls were recruited directly from the study population, ensuring a high degree of comparable environmental exposure.

The variant results may also be due to different geographic or climatic conditions or other variables specific for certain localizations, e.g. different allergenity and quantity of aeroallergens from country to country (3, 5, 11–13, 16, 17). Moreover, the impact of environmental factors accumulates in the course of life, and a correlation between the MB may become evident only with increasing age (1, 13, 20). Therefore, direct comparison of available study results must be done with caution.

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