

Positive skin tests to aero-allergens and month of birth

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The month of birth distribution for 1301 French patients born between 1953 and 1975 with at least one positive skin test was compared to that of the whole population. A chi-square test was performed, and the expected birth month distribution of the groups calculated from the INSEE* data for 1953-1975. All patients underwent skin testing with house dust, *Dermatophagoides pteronyssinus* (Dpt), cat and dog allergens, grass, tree and weed pollens, and moulds. The only study criterion was a positive skin test unrelated to any specific disorder. A significant difference in month of birth distribution was observed 1) for patients with positive skin test to grass pollen, with a high rate of births from January to May, and 2) for patients with mould sensitization, with a low rate of births in April, May and December. Tree and weed pollens, house dust and Dpt showed no significant relation with month of birth. For cat and dog allergens, the observed and expected distributions of birth month were similar. For the whole sensitized population the birth rate tended to be low in December except for the cat and dog sensitized. Our study confirms the well-known seasonal peak of births in the first 5 months of the year for grass pollen sensitized patients. No consistent monthly or seasonal tendency could be statistically demonstrated for other allergens except moulds.

Key words: Aero-allergens; month of birth; positive skin test; season.

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Atopic diseases are related to numerous factors, the best known of which are the environmental. Genetic factors are also involved, atopy being undoubtedly hereditary. As some allergens have great seasonal variation, such as pollens, it has been suggested that the first few months of life constitute a vulnerable period. Some studies confirm this hypothesis with evidence of a relationship between month of birth and the subsequent development of asthma or hay fever. This led us to study whether in a French patient population there is any relation between cutaneous allergy without clinical relevance and the month of birth.

MATERIAL AND METHODS

Between 1968 and 1984, 3962 out-patients were followed up at the Department of Allergology in the University Hospital of Strasbourg.

The 1509 French patients born between 1953 and 1975 were compared with the whole population born during the same period with regard to year and month of birth. Data were obtained from the INSEE; before 1953 month by month data were not available and the number of patients born after 1975 was too small. Only cutaneous sensitization to various allergens was considered; the type of disease (asthma, hay

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fever, conjunctivitis, etc.) was not relevant. All patients underwent intradermal tests, with house dust (w/v: 1/50,000), *Dermatophagoides pteronyssinus* (w/v: 1/100,000), cat and dog allergens (w/v: 1/10,000), moulds (w/v: 1/1000) and scratch tests with grass, Betulaceae and weed pollens (w/v: 1/20).

The two groups of moulds comprised: Group I, *Alternaria*, *Aspergillus*, *Cladosporium*, *Penicillium*, and Group II, *Botrytis*, *Mucor*, *Rhizopus*, *Stemphylium*. The two groups of weed pollens comprised: Group I, *Artemisia*, *Chrysanthemum*, *Taraxacum* and *Solidago*, and Group II, *Urtica*, *Plantago*, *Medicago*, *Sinapis*, *Rosa* and *Trifolium*.

Intradermal tests were considered positive when half the mean weal cross diameter was > 12 mm. Scratch tests were considered positive when half the mean weal cross diameter was > 10 mm.

Cumulative distribution month by month of each population with a given positive skin test was compared with the theoretical distribution of month of birth obtained from the reference population: the number of patients expected to be born during a given month is obtained by the equation:

$$E = 0 \frac{R_o}{n}$$

where E is the number of patients expected to be born during a given month, 0 the observed number of patients born during that month between 1953 and 1975, R_o the number of persons from the reference population born during that month between 1953 and 1975 and n the total number of births from 1953 to 1975 in the reference population.

When possible the same comparison was made year by year. Statistical comparisons between observed and expected number of patients were performed using the χ^2 test.

For better illustration the figures in this study will not show the observed and the expected number of patients for each month but the observed/expected ratio.

RESULTS

Among the 1509 patients, 1301 had at least one positive skin test. There was no significant dif-

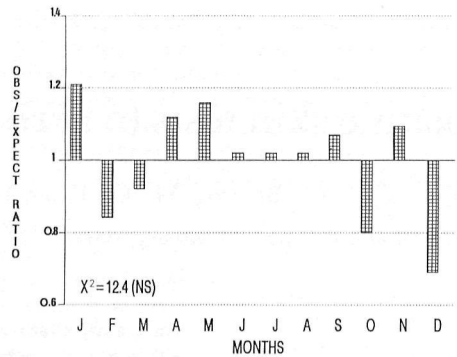


Fig. 1. Month of birth distribution of the 556 patients with positive skin test to Dpt.

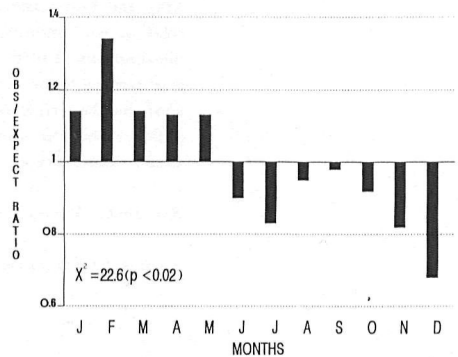


Fig. 2. Month of birth distribution of the 735 patients with a positive skin test to grass pollen.

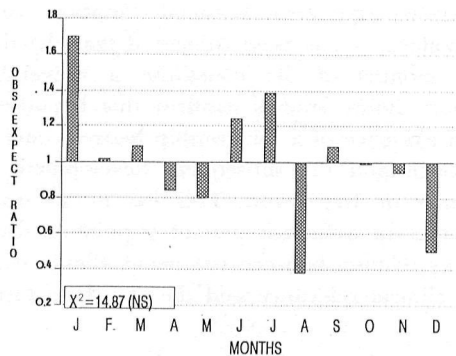


Fig. 3. Month of birth distribution of the 125 patients with a positive skin test to Betulaceae pollen.

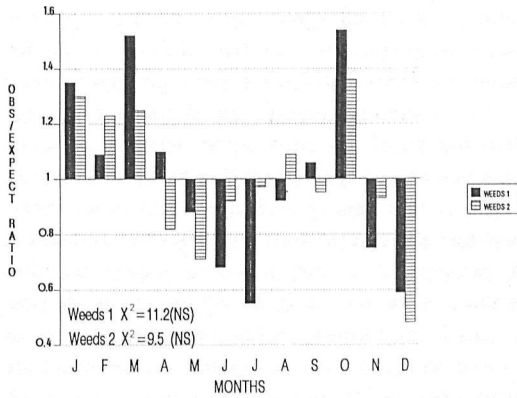


Fig. 4. Month of birth distribution of the 105 patients with a positive skin test to Group I pollens (■) and of the 155 patients with a positive skin test to Group II pollens (▨).

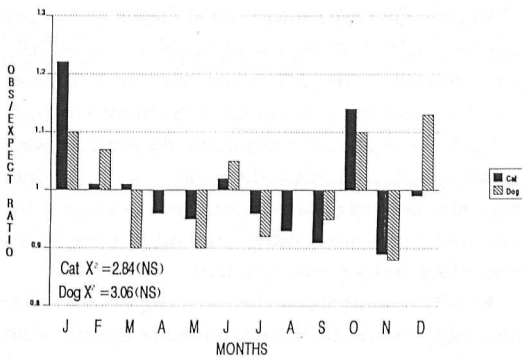


Fig. 5. Month of birth distribution of the 338 patients with a positive skin test to cat allergen (■) and of the 429 patients positive to dog allergen (▨).

ference in month of birth between the study patients and the whole population born between 1953 and 1975. The same comparison by sex also showed no significant difference. When compared year by year, there was significant difference ($P < 0.05$) in only one year (1963).

881 patients had positive intradermal skin tests to house dust and 556 to its major allergenic component: *Dermatophagoides pteronyssinus* (Dpt). These populations showed no significant difference in the month of birth (Fig. 1) compared with the reference population,

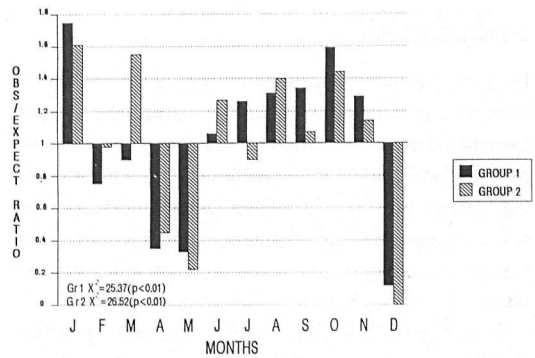


Fig. 6. Month of birth distribution of 101 patients with a positive skin test to Group I moulds (■) and of the 103 patients positive to Group II moulds (▨).

although there was a trend towards a low rate of births in December particularly among the women.

The birth month distribution for the 735 patients with a positive skin test to grass pollen (Fig. 2) differed significantly from that for the whole population ($P < 0.02$). 50.2% of patients were born during the first five months compared to a theoretical percentage of 42.72. The same comparison by sex showed no significant difference.

When comparison is done year by year the only one showing a significant difference is 1963 with $P < 0.01$.

Birth month distribution among patients with a positive skin test to tree pollens did not differ from the expected (Fig. 3). However, there is a trend towards high birth rates in January, especially among women, and low rates in December. The birth month distribution among patients with positive skin tests to weed pollens did not differ from the expected (Fig. 4). Also, there was no significant difference for patients with positive skin tests to dog and cat allergens (Fig. 5). The birth month distribution among patients with positive skin tests to moulds was significantly different ($P < 0.01$) from the expected in the two groups (Fig. 6). When the comparison was made by sex, there was a significant difference only for men in Group I.

DISCUSSION

In our patient population the only selection criterion is a positive skin test unrelated to any specific disease. However, this was hampered by the fact that our population was referred to the out-patient department mostly because of such symptoms as rhinitis, asthma, or conjunctivitis supposedly related to an allergic disease.

Some patients may have multiple positive skin tests with a possibly allergic disease related to only one, two or all of them; and it must be remembered that a positive skin test without consistent clinical history is insufficient for predicting allergy.

Finally, one more problem is the grouping of allergens in a single skin testing: for example mould Group I comprises four different types, two with a summer seasonal peak (*Alternaria* and *Cladosporium*), the other two being perennial. The *Betulaceae* have seasonal peaks between January and April depending on which variety.

All these factors may affect the results of our study. Our reference population has been carefully selected and this is of interest when we consider the great year to year variation in month of birth even if some trends remain the same. This variation and its importance has already been noted in another study (3). More than half of our total patient population, i.e. foreign people and those born before 1953, had to be left out as we did not have reference data for month of birth. In spite of all these limitations most of our results are consistent with those of other studies: patients with hypersensitization to grass pollen are born predominantly during March, April, May (2, 7). The slight variations in peak values between studies are due to geographic difference in the seasonal peak of grass pollen (6).

The observed predominance of births a few months before the peak of the grass pollen season could reinforce the hypothesis regarding the role of early exposure to allergens in the incidence of atopic disease. However, for tree and weed pollen allergy we found no significant difference in month of birth. The clustering in a

single test of allergens with varying seasonal peaks may obscure any true difference in the month of birth distribution for a given allergen.

We found no significant difference in the distribution of month of birth between patients sensitized to the perennial dog and cat allergens and the reference population. However, these findings are inconsistent with those of Björkstén & Suonemi (1) who report a significant difference (with a peak in May) for males allergic to small mammals' epithelium. We have no explanation for this discrepancy as the selection criterion was identical in both studies (positive skin test), the only difference being that we reported on allergy to cat and dog allergens separately. The χ^2 for both allergens is so low that we can note the perfect similarity of distribution of month of birth to that of the reference population.

Reports on house dust mite allergy are conflicting with either an excess of births between July and December (8) or between May and September (4), or no influence at all of the month of birth (5). All these studies were made on patients with asthma and/or rhinitis. Dpt increase in the late summer months (i.e. mite season) is well known, but there is considerable intersubject variation regarding indoor environment.

Finally, in our study the most important influence of month of birth on cutaneous sensitization was observed for moulds. In the two groups, each with four different types of allergens, there were differing seasonal peak values with a slight summertime predominance. However, there was no increase of births a few months before this slight seasonal peak value (a significant lack of births was observed in the 2 groups in April, May, December). Except for cat and dog allergy there was a general trend towards a lower rate of births in December than expected.

The male excess sex ratio in our study was identical to that previously reported. The separate comparison of the distribution of male and female birth months, observed against expected, was somewhat hampered by only a joint global distribution for reference. However, there is no striking difference in month of birth distribution between males and females.

In conclusion, most of the studies about the influence of birth month on allergy show conflicting results, and the reasons are several: clinical considerations, clustering of allergens in a single test, multiple hypersensitivities (e.g. tree pollen and Dpt), geographical differences, patient sample unsuited for statistical analysis, year to year variation in distribution of the reference and patient population, and existence of additional factors, such as cord blood IgE levels (2). One consistent result is that patients allergic to grass pollen are mostly born during the spring (a few months before seasonal peak value).

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REFERENCES

1. Björkstén, F. & Suonemi, I.: Dependence of immediate hypersensitivity on the month of birth. *Clin. Allergy* 6, 165-171, 1976.
2. Croner, S. & Kjellman, N.-I. M.: Predictions of atopic disease: Cord blood IgE and month of birth. *Allergy* 41, 68-70, 1986.
3. David, T. J. & Beards, S. C. Asthma and the month of birth. *Clin. Allergy* 15, 391-395, 1985.
4. Korsgaard, J. & Dahl, R. Sensitivity to house dust mite and grass pollen in adults. Influence of the month of birth. *Clin. Allergy* 13, 529-536, 1983.
5. Pearson, D. J., Freed, D. L. J. & Taylor, G.: Respiratory allergy and month of birth. *Clin. Allergy* 7, 29-33, 1977.
6. Robert, J., Caron, R. & Bourgeois, M. Pollinose et mois de naissance. *Bull. Act. Thé.* 80, 451-453, 1980.
7. Schata, M., Noebel, A., Fabry, H. & Jorde, H.: Zusammenhänge zwischen Pollinosis und Geburtsmonat. *Allergologie* 6, 372-377, 1983.
8. Warner, J. O. & Price, J. F.: House dust mite sensitivity in childhood asthma. *Arch. Dis. Child.* 53, 710-713, 1978.

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