

Asthma and the month of birth

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Analysis of the month of birth of 4520 children with asthma in Manchester, born between 1964 and 1979, showed a statistically significant excess of asthmatic births in certain months. The explanation for these excesses is obscure. The peak months varied from year to year. Asthma may not be a good model to test the theory of infantile sensitization to allergens, because of the numerous possible causative allergens. Mothers wishing to avoid having asthmatic children cannot do so by choosing a particular season of birth.

Introduction

It has been suggested that the first few months of life constitute a sensitive period, during which exposure to certain allergens may predispose to the subsequent development of atopic disease [1]. As some allergens, for example grass pollen, show a seasonal variation, a relationship between the month of birth and the subsequent development of atopic disease might then be expected. We have therefore examined the month of birth of a group of children with asthma.

Patients and methods

The sample comprised 4795 children under the age of 16 years admitted to hospital in Manchester with a discharge diagnosis of asthma. Data for Booth Hall Children's Hospital (1972–1982), the Royal Manchester Children's Hospital (1972–1982), the Duchess of York Hospital (1972–1982), and St Mary's Hospital (1975–1982) were obtained from Hospital Activity Analysis records. Hospital numbers and dates of birth were studied so as to prevent the inclusion of an individual patient more than once.

The birth dates extended from 1957 to 1982. There were fewer than 100 cases born in any year prior to 1964 and any year after 1979, and these years with small samples were excluded. The final sample comprised 4520 children. For each year the observed distribution of births was compared with the expected distribution obtained from the Office of Population, Censuses and Surveys monthly birth data for England and Wales. Results were studied for each of the 16 years separately and also with all 16 years' data combined.

Results

The observed and expected figures for month of birth for the whole 16-year period are shown in Table 1. The difference between the two distributions was highly significant, $\chi^2_{(11)} = 34.1$, $P < 0.001$. A similar analysis was performed for each year separately, and the results shown in Table 2. This shows a statistically significant ($P < 0.05$) difference between the observed and expected distributions of months of birth in 12 out of the 16 years studied.

Table 1. Month of birth of children with asthma in Manchester, 1964–1979, the expected distribution being that of live births in England and Wales

Month	Expected number of births	Observed number of births
January	378	438
February	358	314
March	434	404
April	380	369
May	395	366
June	377	387
July	385	354
August	374	345
September	371	399
October	367	404
November	345	344
December	356	396

Examination of Table 2 reveals inconsistencies in the data. Thus, for example, the peak month was December in 1976 but May in 1977. Furthermore, peaks are often adjacent to troughs, and trends tend to be quite different in adjacent years.

For the months of January, June, September, October and December the number of asthmatic births exceeded the expected figures (see Table 1). However, when the figures for each year (see Table 2) were examined separately, an excess of asthmatic births was only present in 9/16 months of January, 7/16 months of June, 11/16 months of September and October, and 9/16 months of December.

Discussion

These results demonstrate a significant excess of asthmatic births in certain months. The explanation for this finding is obscure. There are numerous internal inconsistencies. The peak months (January, June, September, October and December) are not confined to a single season and peak months such as October and December or June and September are separated by months where the birth of asthmatics was less than the expected figure. Further, even when the five peak months year by year are examined, there are clearly many years when one or more of these five months are not peak months. Finally, examination of the monthly results, year by year, shows a general lack of consistency, such that even months with a large excess of observed over expected asthmatic births are commonly preceded and followed by the reverse trend. Whatever

Table 2. Month of birth of children with asthma in Manchester, 1964–1979, the expected distribution being that of the monthly live birth distribution for England and Wales

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	<i>n</i>	χ^2 *	<i>P</i>
1964															
O	6	7	9	9	5	19	4	17	13	12	5	9	110	29.0	<0.01
E	9.0	8.9	9.95	9.5	9.7	9.2	9.6	8.9	9.1	8.9	8.3	8.8			
1965															
O	19	4	20	11	17	10	4	10	9	20	13	27	164	40.7	<0.001
E	13.7	13.1	15.0	14.0	14.2	13.7	14.1	13.6	13.6	13.4	12.7	12.9			
1966															
O	15	15	19	16	10	15	18	11	22	11	12	12	176	9.0	NS
E	14.8	13.9	16.0	14.7	15.2	14.7	15.1	14.9	14.7	14.3	13.2	14.2			
1967															
O	24	25	39	10	16	20	24	13	23	22	17	16	249	24.3	<0.05
E	21.3	20.4	23.3	21.3	22.1	20.6	20.9	20.4	20.3	19.9	18.7	19.9			
1968															
O	18	13	25	19	16	16	19	12	21	25	24	27	235	15.5	NS
E	19.8	19.2	21.5	19.9	20.8	19.6	19.9	19.8	18.9	19.0	18.0	18.7			
1969															
O	19	24	32	11	31	20	17	13	25	36	19	17	264	28.0	<0.01
E	23.2	21.4	24.9	22.9	23.5	22.1	22.1	21.6	21.3	21.2	19.5	20.3			
1970															
O	18	17	15	16	13	41	41	16	19	30	31	22	279	47.7	<0.001
E	22.9	21.7	25.0	23.6	24.3	23.4	23.9	23.0	22.5	22.6	22.4	23.5			
1971															
O	24	21	17	45	27	23	28	19	29	18	36	40	327	37.8	<0.001
E	28.4	26.5	30.5	28.1	29.1	27.5	28.1	26.2	26.6	26.3	24.7	25.0			
1972															
O	40	23	20	38	22	26	39	25	37	33	25	18	346	25.0	<0.01
E	20.4	28.4	31.7	28.8	30.4	29.2	29.6	28.9	28.4	27.6	26.6	27.0			
1973															
O	47	17	29	28	23	21	8	36	34	29	25	30	327	40.0	<0.001
E	27.9	26.3	30.7	27.4	29.0	27.7	27.7	26.7	25.8	26.7	25.2	26.0			
1974															
O	19	29	33	12	27	26	16	19	23	23	27	20	274	18.1	NS
E	23.6	21.2	24.7	23.1	24.2	22.6	23.9	23.4	22.9	22.7	20.8	20.8			
1975															
O	26	23	18	28	21	36	20	33	21	37	17	29	309	22.5	<0.05
E	26.7	24.4	28.0	26.6	27.5	25.9	27.1	25.6	25.3	24.9	23.0	23.8			
1976															
O	35	26	36	24	24	22	28	31	24	21	15	41	327	21.9	<0.05
E	27.2	27.0	30.4	27.6	28.5	28.2	28.0	27.0	27.4	26.2	24.4	24.9			
1977															
O	28	13	29	16	40	30	19	13	23	32	28	19	290	28.6	<0.01
E	23.9	22.3	25.3	23.6	25.8	24.3	24.9	24.6	25.2	22.7	24.5	22.5			
1978															
O	36	16	18	27	32	23	21	31	36	16	28	30	314	21.6	<0.05
E	24.5	23.3	27.1	25.7	26.9	26.0	26.6	27.0	27.7	27.1	25.5	26.5			
1979															
O	28	14	13	28	19	23	26	27	28	16	14	17	253	19.2	NS
E	20.4	19.3	22.3	21.2	22.5	21.6	22.1	21.3	21.0	21.3	20.1	20.0			

* 11 degrees of freedom.

seasonal trends were operating, whether it be a high pollen count in the summer or a high quantity of housedust mite antigen in the autumn or winter, one would expect adjacent months to show similar trends. It is conceivable that aero-biological variations could have a profound effect on the degree of allergen exposure in any one year, and it is even possible that there could be large swings in allergen concentration from month to month. Nevertheless, over a period of 16 years one would expect some consistent monthly or seasonal trend if exposure to a single seasonal allergen caused such asthmatic symptoms.

Asthma may not be a good model to test the theory of neonatal sensitization to allergens because of the numerous allergens involved. Thus the present study does not exclude the possibility that there is a causal relationship between high allergen exposure in early life and the subsequent development of atopic disease. One might argue that in this study a relevant month of birth trend was missed by including all asthmatics and not just confining the study to those with mite-sensitive asthma, but this argument carries little force since most asthmatic children are allergic to housedust mite [2]. There are drawbacks to using data based on hospital activity analysis, partly because the coding is performed by non-medical clerks who have particular difficulty when the diagnosis is not clearly stated in the notes. Where a child with asthma has been labelled as having 'wheezy bronchitis', 'bronchitis', 'croup' or 'allergic airways disease' he may not have been included in this study and this may be a possible further source of error, although such omissions should not be a source of bias in this study.

The results of previous studies, most of which are based on small numbers, are conflicting. Asthmatics in Birmingham appear to be more likely to be born between May and October [3], whereas those with mite-sensitive asthma in London were more likely to be born between July and December [2]. Those with asthma and/or rhinitis and positive skin tests to the house dust mite living in Denmark were more likely to be born between May and September [4]. However a previous study from Manchester, hampered by a small sample size (476 patients) suggested an excess of asthma births between December and February only in pollen sensitive patients and no monthly trend in mite-sensitive patients [5]. A previous British study found relationships between the month of birth and various indicators of respiratory disease, but these were not consistent [6]. A study from New Zealand did not find a significant relationship between asthma and the month of birth [7].

There is currently much interest in the notion that atopic disease may be preventable by allergen avoidance in early infancy, by such measures as breast feeding or selecting a month of conception to avoid birth during a peak of pollen or dust mite antigen. It has been suggested, for example, that in Finland if all children were born in July and August then the incidence of allergy to the pollens of the birch tree, grass and mugwort might be reduced by 25% [1]. For those wishing to avoid asthma in Britain there is no comparable scientifically valid advice.

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