

Wheezing presenting in general practice

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SUMMARY General practice records of 1058 children were studied to determine the incidence, prevalence, natural history, diagnosis, and treatment of wheezing presenting in the first 21 years of life. Up to 7 years of age, boys were more likely to present with wheeze and to have recurrent episodes. Later there was a higher incidence in girls and a substantial rate of remission among boys, both contributing to changes in prevalence during later childhood and adolescence. All those diagnosed as asthmatic and two thirds of those with recurrent wheeze received bronchodilator treatment.

Epidemiological studies of asthma and wheezing in childhood have relied mainly on reports by parents of symptoms or diagnoses,¹⁻⁶ and as most have been cross sectional in design, few studies have provided data on incidence, particularly during later childhood and adolescence.⁷⁻⁸ Since two early reports,⁹⁻¹⁰ general practice records have not been used for this purpose. This paper presents the findings from a review of the records of three cohorts of children chosen to permit longitudinal analysis from birth to the age of 21 years.

Methods

The records studied were those of all patients born in 1962, 1969, 1975, and 1976 and registered with the West Granton Medical Group, Edinburgh in October 1983. This large practice (currently 11 full time, two part time, and two trainee practitioners) serves an area of predominantly local authority housing, including one of the most socially deprived areas of the city. The records of patients born in 1962, 1969, and 1976 were analysed up to and including entries dated 1983. As the numbers in the 1976 group were small, equivalent information was obtained from the records of children born in 1975 by analysing up to and including entries dated 1982. Thus, three cohorts of children were studied, aged 7, 14, and 21 years at the time of analysis. All records were reviewed by the author.

Entries in the notes with a record of wheeze, rhonchi, or 'bronchospasm' were termed wheezing illnesses. Those with a mention of cough, wheeze, or breathlessness or auscultatory signs in the chest were termed lower respiratory illnesses; these in-

cluded all the wheezing illnesses. Coryza, pharyngitis, and otitis media were excluded but an isolated symptom of cough was considered to be a lower respiratory illness.

In the analysis of treatment offered, only specific anti-asthma medication (oral and inhaled β_2 sympathomimetic agents, oral and inhaled steroids, sodium cromoglycate, and theophylline preparations) was included. Antibiotics, cough suppressants, antipyretics, and other non-specific treatment were excluded.

Statistical analysis was by χ^2 test.

Results

A total of 1058 records were studied; 94% were complete for the past two years and 83% for the past seven years. The only group in which patient mobility may have introduced appreciable bias is girls of the 21 year old cohort, for whom 87% of records were complete for two years and 70% for seven years.

Consultations over the past two years were analysed in those records complete for this duration (Table 1). The period prevalences of wheezing and other lower respiratory illnesses show a similar U shaped pattern with age in girls, but in boys these patterns differ. This results in significantly different sex ratios at different ages. The noticeable fall in the prevalence of wheezing between 7 and 14 years of age would be consistent with a substantial rate of spontaneous resolution of early cases of wheeze, but an alternative explanation could be that children continue to wheeze but no longer present with this symptom to the general practitioner. It is therefore

Table 1 Percentage of population consulting for various reasons over a two year period

Sex	Age (years)	Total No	% Consulting over 2 years for			
			Any reason	Lower respiratory illness (including wheeze)	Any episode of wheeze	Two or more episodes of wheeze
Boys	5-7	211	82	40	16	5
	12-14	145	83	30	6	6
	19-21	179	78	11	8	3
Girls	5-7	208	81	36	8	2
	12-14	109	87	18	6	5
	19-21	142	94	23	10	4
B:G ratio	5-7		1.0	1.1	2.0*	2.5
	12-14		1.0	1.7*	1.0	1.2
	19-21		0.8	0.5*	0.8	0.8

χ^2 test; *P<0.05, **P<0.01, ***P<0.001.

of interest that the prevalence of lower respiratory illness other than wheeze remains high in boys during early adolescence. Much of the variation in the prevalence of wheezing is attributable to single episodes; if these are excluded recurrent wheezing seems to be, if anything, most common at 12 to 14 years, at which age the total prevalence of wheezing is at a minimum.

The records in each cohort that were complete for 7 years were studied to determine the incidence of new cases of wheezing. In the 14 year old cohort, 17 children had presented for the first time over the past 7 years with wheeze; in 15 of these, records were complete from birth. In the 21 year old cohort, although only 12 of the 21 new wheezers had complete records from birth, in 20 the records were complete from 5 years of age, implying a wheeze-free interval of at least 10 years. It was therefore considered reasonable to regard these as true incident cases (Table 2). The proportion of these new cases that developed further wheezing or had a recorded diagnosis of asthma are also shown in

Table 2. As follow up was limited to a seven year period these figures should be regarded as an underestimate, particularly for wheezing commencing shortly before the date of the records study.

Although boys present with wheeze more commonly in early childhood and are more likely at this age to develop further episodes, after 7 years of age there is a noticeable reversal of the sex differential in both respects. Although the numbers are small, a similar change with age is seen in the proportion of incident cases ultimately diagnosed as asthma. Although the incidence figures have not been obtained from the same birth cohort of children, and may not therefore be strictly comparable, the figures suggest that by 21 years of age as many as one half of children in this population will have presented to their general practitioner at some time with wheeze.

The treatment of episodes of wheeze was initiated in most cases by the general practitioner. Eleven per cent of children who had wheezed over the past seven years had been admitted to hospital over the same period with asthma, bronchiolitis, or wheezy

Table 2 Incidence (%) of first episodes of wheeze and the percentage of cases presenting again with wheeze and with a recorded diagnosis of asthma, analysed by age and sex

Age (years)	Total no		Incidence of wheeze (%)			% New cases developing			
	B	G	B	G	B:G	Further wheeze		Asthma	
						B	G	B	G
Under 1	188	181	13	10		72	39		
1 and 2	188	181	7	6		58	18		
3 and 4	188	181	11	4		71	43		
5-7	188	181	6	5		25	11		
0-7	188	181	37	25	1.5*	61	29	13	2
7-14	135	100	4	11	0.4	17	36	0	18
14-21	162	114	4	13	0.3*	17	40	0	7

Significance of difference of boy:girl ratio from unity by χ^2 test: *P<0.05.

Table 3 Percentage of children ever recorded as receiving bronchodilator treatment over a seven year period by age, sex, frequency of wheezing illness, and diagnosis

	Single episode of wheeze	Two or more episodes but no diagnosis of asthma	Recorded diagnosis of asthma
All cases	27 ← ... →	64 ← ... →	100
Age 0-7	33	70	100
7-14	25	50	100
14-21	7 } ***	57	100
Sex Boy	42	73 } *	100
Girl	15 } *	40 } *	100

χ^2 test; *P<0.05. **P<0.01. ***P<0.001.

bronchitis and a further 7% had received outpatient supervision. These proportions varied little with age or sex.

The treatment received by children presenting with wheeze was analysed in relation to age, sex, diagnosis, and frequency of presentation with wheeze (Table 3). No child received oral theophyllines without also receiving a beta₂ sympathomimetic agent; inhaled or oral steroids and sodium cromoglycate had been prescribed only to children diagnosed asthmatic. A substantial proportion of wheezy children received bronchodilators without a diagnosis of asthma being recorded. Boys were more likely to be treated, regardless of the frequency of wheezing, and, although single episodes of wheeze during adolescence were more common in girls, this does not entirely account for the sex difference observed.

Discussion

Longitudinal studies of asthma or wheezing in childhood have been few, and hitherto have been based on data obtained by questionnaire from parents.^{2 5 7 8 11} This study has established that an alternative approach is feasible and that the records studied were complete enough to permit retrospective analysis over at least seven years.

General practice records exclude cases that do not result in a consultation and may be deficient, particularly for home visits. Although some cases may be included on the basis of chest signs in the absence of audible wheeze, any assessment of the prevalence of symptoms in the community should probably be regarded as an underestimate. Information on prevalence and natural history can, however, be more directly related to illness presenting to the clinician, and data from records is free from the problems of unreliable parental recall and inter-

pretation of symptoms that arise in questionnaire studies. Differences in clinical interpretation between doctors are less likely to relate to history or examination than to diagnosis. For this reason, and because it has been suggested that childhood asthma is underdiagnosed,¹² disease episodes were defined in terms of clinical presentation rather than recorded diagnosis.

As socioeconomic status may influence the prevalence of wheezing⁴ and the diagnostic label applied,^{2 4} prevalence figures from a predominantly working class area should be extrapolated with care to other populations. The patterns of diagnosis and treatment in this practice may also be unusual. Thus, although many preschool children received bronchodilators, a diagnosis of asthma was rarely recorded at this age, suggesting that treatment was not usually dependent upon prior diagnosis, contrary to the findings elsewhere.^{12 13}

Changes in prevalence with age and differences between the sexes are less likely to have been influenced by the study of a single working class practice population. The most striking findings relate to the differences between boys and girls in the patterns of incidence and prevalence of wheezing over the first 21 years of life. In common with other studies from general practice, most children first present with wheeze in the first seven years of life, often before age 3 years.^{9 10} This study, however, has suggested a continuing incidence in girls and spontaneous resolution in many cases of early wheeze, between 7 and 21 years of age.

The longitudinal study of Melbourne schoolchildren¹¹ provides a comprehensive account of the natural history of wheezing present at age 7 years, confirming spontaneous improvement or remission in most patients over the subsequent 14 years. The incidence of wheeze in previously wheeze-free subjects over the same time span has been less well studied. In the National Child Development Study,² 4% developed asthma or bronchitis between 7 and 11 years of age. An American survey noted a substantial incidence of wheezy breathlessness (2.8% per year) through adolescence, particularly in girls.⁷ The incidence pattern in this study is consistent with these observations, and suggests that the changes in current prevalence of wheeze during later childhood and adolescence are attributable as much to a higher incidence among girls as to a higher rate of spontaneous remission among boys.¹¹

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