

SHORT COMMUNICATION

Prevalence of asthma, eczema and allergic rhinitis: Two surveys, 6 years apart, in Kota Bharu, Malaysia

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QUAH BS, WAN-PAUZI I, ARIFFIN N and MAZIDAH AR. *Respirology* 2005; 10: 244–249

Objective: This study was undertaken to determine the prevalence of asthma, eczema, and allergic rhinitis in school children in Kota Bharu, Malaysia, and in so doing to determine the differences in symptom prevalence rates of asthma, and atopic diseases in Kota Bharu school children between 1995 and 2001.

Methodology: In two studies (1995 and 2001), year one primary school (PS) pupils (6–7 years old) and secondary school (SS) year two pupils (13–14 years old) were randomly selected from the district of Kota Bharu, Kelantan, Malaysia. In 1995, 3939 PS children and 3116 SS children participated, and in 2001 3157 PS children and 3004 SS children participated. The Phase I International Study of Asthma and Allergies in Childhood prevalence written questionnaire and video questionnaire (only shown to SS children) were used in both studies.

Results: The written questionnaire showed no significant changes in the prevalence (1995, 2001) of ever wheeze (8.3%, 6.9% $P = 0.06$), current wheeze (5.4%, 4.3% $P = 0.08$), exercise-induced wheeze (EIW; 3.9%, 3.7% $P = 0.63$), and rhinoconjunctivitis (4.6%, 5% $P = 0.42$) among PS children. The prevalence of flexural itchy rash increased from 14% to 17.6% ($P = 0.004$) and night cough decreased from 20.4% to 17.5% ($P = 0.005$). There were also no significant changes in these symptoms among SS children (1995, 2001): ever wheeze (10.7%, 12% $P = 0.37$), current wheeze (6.8%, 5.7% $P = 0.20$), EIW (9.9%, 11.6% $P = 0.28$), night cough (21.6%, 24% $P = 0.39$), rhinoconjunctivitis (11%, 15% $P = 0.11$), and flexural itchy rash (12%, 13% $P = 0.11$). The video questionnaire showed no significant changes in the prevalence of symptoms in the previous 12 months (1995 vs 2001) for wheeze at rest (3.8%, 2.8% $P = 0.12$), EIW (6.9%, 8.8% $P = 0.32$), waking with wheeze (1.7%, 1.7% $P = 1.0$), and severe wheeze (2.1%, 3% $P = 0.12$). Night cough in the previous 12 months increased significantly from 5.1% to 8.3% ($P = 0.007$).

Conclusion: Although asthma and atopic disorders are common in this country, the results revealed no major changes in the prevalence rates of these diseases over a period of 6 years.

Key words: asthma, eczema, prevalence, rhinoconjunctivitis.

INTRODUCTION

Asthma is a worldwide problem, and the burden of the disease and the costs to public and private health care systems are substantial. The Phase I International Study of Asthma and Allergies in Childhood (ISAAC) surveys, conducted among school children of

two age groups (13–14 and 6–7 years), have shown wide variations in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema between different centres throughout the world.^{1–4}

In many countries, in populations studied using the same methods on two or more occasions, the prevalence of asthma has increased significantly.^{5–16} Although there have been previous prevalence studies on respiratory symptoms in this country, the trends for asthma prevalence could not be reliably determined as no study had used the same methodology in the same geographical area on separate occasions. The aim of this study was to determine the symptom prevalence rates of asthma, eczema, and

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Received 31 December 2003; revised 28 July 2004; accepted for publication 28 July 2004.

allergic rhinitis and to compare these prevalence rates with data from a similar study performed in 1995. We report the changes in prevalence rates of asthma, eczema and allergic rhinitis symptoms.

METHODS

Two studies were performed, in 1995 and in 2001. The study populations on each occasion consisted of school children in the district of Kota Bharu, Kelantan, Malaysia. In the 1995 study,¹⁷ data was collected from February to August, and in 2001 from March to August. In both studies, primary and secondary public schools were randomly selected from the district of Kota Bharu. In 1995, 33 of 94 primary schools (PS) and 13 of 34 secondary schools (SS), and in 2001, 29 of 94 PS and 12 of 35 SS were selected for the study. In the schools selected, all year one pupils in PS and all year two pupils in SS were eligible for the study. In the only Chinese secondary school included in 1995, year one pupils (not year two) were studied, as their ages were similar to those of the year two pupils at the other schools. Schools studied in the 2 years were not necessarily similar, as schools were randomly sampled during each survey.

In the 1995 survey,¹⁷ 3939 PS children and 3116 SS children participated, and in the 2001 survey, 3157 PS children and 3004 SS children participated. The overall response rate was 95.8% in 1995 (PS 95.7%, SS 96%) and 91.9% in 2001 (PS 91%, SS 92.8%). Approval for the study was obtained from the Ministry of Education, Malaysia and the Research and Ethics Committee, School of Medical Sciences, Universiti Sains Malaysia.

Questionnaires

An identical Malay language ISAAC prevalence written questionnaire, which had been previously translated,¹⁷ was used in both studies. An environmental questionnaire developed by ISAAC was added to the prevalence questionnaire during the 2001 survey. Results from the environmental questionnaire are not included in this report. The international composite video questionnaire (ISAAC AVQ 3.0) was shown only to pupils in secondary schools, after completion of the written prevalence and environmental questionnaires. Primary school children were handed the written questionnaire by their teachers and these were to be completed by their parents or guardian at home, while secondary school pupils completed the questionnaire themselves in the classroom. All questionnaires contained an introductory letter to parents explaining the nature of the study.

Data analysis was performed using STATA version 7 for Windows (Stata Corporation, College Station, Texas, USA) and standard errors were adjusted using the school as the primary sampling unit. Point estimates for prevalence rates were calculated as the proportion of respondents who answered 'yes' out of the total number of respondents. Differences in prevalence rates of symptoms between years were

compared using χ^2 analysis. The standard error for the difference in prevalences between 2001 and 1995 was calculated from the combined variance (adjusted for cluster sampling) of point estimates for 2001 and 1995.¹⁸ Logistic regression was used to examine the possible confounding effects of race and gender on the differences in prevalence rates between 1995 and 2001. A *P*-value of ≤ 0.05 was considered significant.

RESULTS

The age distribution of school children was as follows: PS 1995–1996 (0.2%) 5 years, 2817 (71.5%) 6 years, 1116 (28.3%) 7 years; PS 2001–2002 (60.5%) 6 years, 1245 (39.4%) 7 years, 1 (0.03%) 8 years; SS 1995–1998 (0.3%) 12 years, 2004 (65.6%) 13 years, 1064 (34.1%) 14 years; SS 2001–2002 (0.07%) 12 years, 1192 (39.7%) 13 years, 1792 (59.7%) 14 years, and 18 (0.6%) 15 years. The children studied in both years were predominantly Malay (93.2% in 1995 and 98.9% in 2001). The proportion of Chinese children studied in 2001 was significantly less in both PS (5.2% in 1995 and 0.2% in 2001; $P < 0.001$) and SS (7.4% in 1995 and 0.3% in 2001; $P = 0.002$). This was because one primary school and one secondary Chinese school were selected during the 1995 survey and no Chinese schools were included in the 2001 survey. The proportion of boys studied was not significantly different between the years: PS 1995 50.2%, 2001 46.7% ($P = 0.23$); and SS 1995 57.9%, 2001 51.4% ($P = 0.26$).

Results from the written questionnaire (Table 1) showed that the overall prevalence of current wheeze was significantly lower in 2001 compared to 1995 ($P = 0.05$). Among PS children there was a significant reduction of night cough in the last 12 months (2.9% $P = 0.005$) and a significant increase in itchy flexural rash (3.6% $P = 0.004$). There were no significant differences in symptom prevalence rates among SS children between the years. The prevalence of severe asthma, wheeze attacks more than threefold per year, and severe attacks limiting speech were also not significantly different between 2001 and 1995.

The video questionnaire (Table 2) only showed significant differences in the prevalence of night cough among SS children. Night cough ever, night cough in the last 12 months, and frequent night cough during the last month had increased significantly by 3.8%, 3.2% and 1.3%, respectively. The prevalence of wheeze was not significantly different between the years.

The confounding effects of gender and race on the differences in prevalence rates between the years were examined using logistic regression. Symptoms that remained significant between years included the following: night cough in the last 12 months (odds ratio, 0.8; 95% CI, 0.7–0.9; $P = 0.001$) and itchy flexural rash (odds ratio, 1.3; 95% CI, 1.1–1.5; $P = 0.004$) among primary school children; and night cough ever (odds ratio, 1.5; 95% CI, 1.0–2.1; $P = 0.03$) and night cough in the last 12 months (odds ratio, 1.6; 95% CI, 1.1–2.5; $P = 0.02$) in secondary school children (video questionnaire).

Table 1 Differences in prevalence rates of asthma, rhinitis and eczema symptoms for primary and secondary school children between 2001 and 1995 using the written questionnaire

Symptoms	Overall			Primary school			Secondary school					
	1995 [†] <i>n</i> = 7055	2001 [†] <i>n</i> = 6161	Difference [‡] (95% CI)	<i>P</i> -value	1995 [†] <i>n</i> = 3939	2001 [†] <i>n</i> = 3157	Difference [‡] (95% CI)	<i>P</i> -value	1995 [†] <i>n</i> = 3116	2001 [†] <i>n</i> = 3004	Difference [‡] (95% CI)	<i>P</i> -value
Ever wheeze\$	9.4	9.3	-0.1 (-1.9-1.8)	0.99	8.3	6.9	-1.4 (-3.0-0.1)	0.06	10.7	12.0	1.3 (-1.5-4.1)	0.37
Current wheeze*	6.0	5.0	-1.0 (-2.1-0)	0.05	5.4	4.3	-1.1 (-2.4-0.1)	0.08	6.8	5.7	-1.1 (-2.8-0.6)	0.20
Wheeze attacks 1-3 per year	5.3	4.9	-0.4 (-1.5-0.7)	0.50	4.5	3.7	-0.8 (-1.9-0.2)	0.11	6.2	6.1	-0.1 (-1.9-1.8)	0.94
Wheeze attacks >3 per year	1.4	0.9	-0.5 (-0.9-0.03)	0.08	1.1	0.6	-0.5 (-0.9-0.03)	0.08	1.7	1.2	-0.5 (-1.3-0.3)	0.23
Severe attack limiting speech in last 12 months	1.1	1.1	0 (-0.5-0.4)	0.94	1.0	0.9	-0.1 (-0.5-0.4)	0.74	1.3	1.3	0 (-0.7-0.8)	1.00
Ever diagnosed asthma††	9.4	10.0	0.6 (-1.1-2.3)	0.50	10.1	11.0	0.9 (-0.4-2.3)	0.16	8.6	9.0	0.4 (-3.0-3.7)	0.85
Exercise-induced wheeze in the last 12 months	6.5	7.5	1.0 (-1.4-3.4)	0.40	3.9	3.7	-0.2 (-1.1-0.7)	0.63	9.9	11.6	1.7 (-1.4-5.0)	0.28
Night cough in last 12 months	20.9	20.8	-0.1 (-3.4-3.1)	0.94	20.4	17.5	-2.9 (-5.0 to -0.9)	0.005	21.6	24.2	2.6 (-3.4-8.7)	0.39
Rhinoconjunctivitis in the last 12 months‡‡	7.5	9.8	2.32 (-0.7-5.4)	0.12	4.6	5.0	0.4 (-0.6-1.4)	0.42	11.0	14.8	3.8 (-0.8-8.2)	0.11
Flexural itchy rash\$§	13.2	15.5	2.3 (-0.6-5.3)	0.12	14.0	17.6	3.6 (1.3-5.9)	0.004	12.1	13.4	1.3 (-4.6-7.1)	0.11

[†]Prevalence rates in each year are presented as percentages.[‡]Difference in prevalence rates (percentage) between the years 2001 and 1995 (95% confidence interval).[§]Children who had wheezed at any time in their life.^{††}Children who had wheezed in the last 12 months.^{‡‡}Children who responded 'yes' to the question 'Have you/your child ever had asthma'.^{§§}Children who had a problem with sneezing, or a runny or blocked nose when they did not have a cold or flu in the last 12 months associated with itchy watery eyes^{§§}Children with itchy rash affecting any of the following places during the last 12 months: the folds of the elbows, behind the knees, in front of the ankles, under the buttocks, or around the neck, ears or eyes.

Table 2 Differences in prevalence rates for asthma symptoms for secondary school children between 2001 and 1995 using the video questionnaire

	1995 [†] <i>n</i> = 3116	2001 [†] <i>n</i> = 3004	Difference [‡] (95% CI)	<i>P</i> -value
Mild wheeze while at rest				
Ever	5.0	4.5	-0.5 (-2.3-1.1)	0.49
In the last 12 months	3.8	2.8	-1.0 (-2.3-0.3)	0.12
Once or more/month	2.5	2.1	-0.4 (-1.4-0.7)	0.46
Wheeze after exercise				
Ever	10.9	13.1	2.1 (-3.6-7.8)	0.45
In the last 12 months	6.9	8.8	1.9 (-1.9-5.7)	0.32
Once or more/month	4.9	5.1	0.3 (-2.4-2.9)	0.86
Waking with wheeze				
Ever	2.9	2.3	-0.6 (-1.6-0.5)	0.26
In the last 12 months	1.7	1.7	0.0 (-0.7-0.7)	1.0
Once or more/month	1.2	1.1	-0.2 (-0.8-0.5)	0.63
Any wheezing (yes to any of questions 1-3)				
Ever	14.2	16.2	2.0 (-4.2-8.3)	0.52
In the last 12 months	9.4	11.0	1.6 (-2.7-5.9)	0.46
Once or more/month	6.5	6.9	0.3 (-2.7-3.3)	0.84
Waking with cough				
Ever	8.4	12.2	3.7 (0.9-6.5)	0.01
In the last 12 months	5.1	8.3	3.2 (1.1-5.2)	0.007
Once or more/month	3.4	4.7	1.3 (0.1-2.6)	0.04
Severe wheezing attack				
Ever	3.4	4.0	0.6 (-0.7-1.8)	0.38
In the last 12 months	2.1	3.0	0.8 (-0.2-1.9)	0.12
Once or more/month	1.3	1.9	0.5 (-0.2-1.2)	0.17

[†]Prevalence rates in each year are presented as percentages.

[‡]Difference in prevalence rates (percentage) between the years 2001 and 1995 (95% confidence interval).

DISCUSSION

Except for night cough there were no significant differences in the prevalence rates of asthma symptoms among primary and secondary school children between 2001 and 1995. There was no significant change in the prevalence rate of rhinoconjunctivitis between 2001 and 1995 among primary school children but the prevalence rate among secondary school children was higher by 3.8%. The prevalence rates of eczema among secondary school children were similar but it was 3.6% higher among primary school children.

The findings of this survey are consistent with recent reports of a plateau or decline in the prevalence of asthma in some countries. In the US, asthma prevalence increased from 3.6% in 1980 to 7.5% in 1995 but decreased to 6.2% in 1996.¹⁹ In Italy, the prevalence of asthma increased significantly from 1974 to 1992 but remained stable from 1992 to 1998.²⁰ In a survey of incidence of new episodes of asthma presenting to general practitioners, quadratic trends in episodes of asthma were evident in each of the age groups with peaks in 1993/1994.²¹ Although not significant, the figures for primary school children in this survey suggest that the prevalence of ever wheeze and recent wheeze in this community was lower in 2001

compared to 1995. However, among secondary school children the trend is inconclusive because of the wide confidence intervals, especially in responses to the video questionnaire.

A decline in prevalence in recent years suggests that previously observed increases in prevalence may have been due to environmental factors, as genetic susceptibility is unlikely to have changed. The recent plateauing of hospitalizations and deaths may also be due to the impact of clinical and public health intervention and prevention efforts. Published trends in developed countries²² showed a continuous increase in the absolute numbers of prescriptions for corticosteroid inhalers and in the relative ratio of corticosteroid to β -agonist usage. Similar reports on the use of corticosteroids are not, however, available in Malaysia but increased awareness of clinicians, and advances in the treatment of asthma could have affected the prevalence of wheeze reported by parents.

Although the prevalence rates of atopic diseases have been shown to increase in tandem with the prevalence rates of asthma,²³ the lack of a trend and inconsistencies in the prevalence rates of asthma and atopic diseases in this study are not apparent. Night cough which was significantly different between the years may not correlate with asthma prevalence, as

reported symptoms of cough are unreliable.²⁴ Tape recordings of night cough in asthmatics have also been shown to correlate poorly with diary card scores.²⁵ Reported symptoms of itchy rash due to eczema could be confused with that due to streptococcal impetigo among primary school children. Although nasal discharge may result from upper respiratory tract infections, nasal symptoms associated with itchy eyes, which are more specific for allergic rhinitis, have increased among secondary school children.

It is unlikely that prevalence rates in this study could have been affected by the methodology, as both surveys were done in the same geographical area using identical questionnaires. Furthermore, cultural and socioeconomic characteristics of the population have changed little within the 6-year period. The high response rates in both surveys suggest that any bias due to non-responders is minimal. The slight difference in the season of data collection (1995, February to August; 2001, March to August) is unlikely to have affected symptoms as the weather in this region is constant for most of the year except for the monsoon months from October to December.

In conclusion, except for itchy flexural rash and night cough, there were no major changes in the symptoms of asthma and allergic diseases in this community between 1995 and 2001. There were no significant changes in the prevalence of ever wheeze and recent wheeze, ever diagnosed asthma, or exercise-induced wheeze in the last 12 months between 1995 and 2001, among primary or secondary school children. The prevalence of night cough in the last 12 months decreased significantly among primary school children (2.9%) but increased among secondary school children (3.2%) in 2001. There was a non-significant increase in the prevalence of rhinoconjunctivitis in the last 12 months among secondary school children and a significant increase in the prevalence of itchy flexural rash among primary school children during the 6 years. Although asthma and atopic disorders are common in this country, our results suggest that the prevalence of these diseases have not increased to a similar degree as has been reported in developed countries. The data reported will serve not only for comparisons of present trends within Malaysia but also as a baseline for future trends.

ACKNOWLEDGEMENTS

The authors are grateful to Universiti Sains Malaysia and ISAAC for funding this study. The authors also wish to thank the Ministry of Education, Malaysia and the Research and Ethics Committee, School of Medical Sciences, Universiti Sains Malaysia for their approval and support.

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