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ORIGINAL ARTICLE

Time Trends of the Prevalence of Asthma, Rhinitis and Eczema in Thai Children–ISAAC (International Study of Asthma and Allergies in Childhood) Phase Three

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Using the same questionnaire as in ISAAC Phase One study conducted in 1995, the ISAAC Phase Three was carried out in Bangkok and Chiang Mai, Thailand, in 2001, among children aged 6–7 and 13–14 years. There was an increase in the prevalence of the three diseases in the younger age group, i.e., current asthma, rhinitis, rhinoconjunctivitis, and flexural eczema. In the older age group, the prevalence of rhinitis and rhinoconjunctivitis increased. There was no change of prevalence of asthma in Bangkok, but prevalence decreased in Chiang Mai. Prevalence of eczema in older children increased in Bangkok, but remained the same in Chiang Mai.

Keywords ISAAC Phase Three, atopic diseases, trend prevalence, children, Thailand

INTRODUCTION

Atopic diseases are among the most important health problems in children, with prevalence shown to be increasing worldwide (1–3). Reasons for this increase are unclear. The International Study of Asthma and Allergies in Childhood (ISAAC) was launched in 1991 to study the prevalence of asthma, allergic rhinoconjunctivitis, and eczema in children in different populations using standardized methodology (4). The initial ISAAC report, involving 156 centers in 56 countries, demonstrated marked differences in the prevalence of symptoms of asthma (5, 6), allergic rhinoconjunctivitis (7), and eczema (8) in children throughout the world. To examine time trends in the prevalence of atopic diseases, the ISAAC Phase Three must be carried out at least 5 years after the Phase One study (9). In Thailand, the ISAAC Phase One was carried out in 1995 (10, 11). Phase Three study was later conducted in 2001 in 2 cities: Bangkok and Chiang Mai.

The protocol of this study has been approved by the Ethics Committee of both institutes.

METHODS

Participants

School children in Grade 1 (15 schools in Bangkok, and 16 schools in Chiang Mai) and Grade 8 (11 schools in Bangkok, 12 schools in Chiang Mai) were recruited into the study. Most of the schools studied in Bangkok and all of the schools in Chiang Mai also participated in the Phase One study (10, 11). Details of these children categorized by grade and centers

are shown in Table 1. Response rates varied from 77.9% in Bangkok to 98% in Chiang Mai.

ISAAC Questionnaire

The Thai version of the written questionnaire used in this study was the same as that used in the 1995 Phase One study (10, 11). The international version of asthma video questionnaire, consisting of five video sequences similar to the one used in Phase One study (10, 11), was administered to the older children.

The written questionnaire was answered by the parents of the 6- to 7-year-old children. Children between 13 and 14 years old completed the written questionnaire by themselves before proceeding to the asthma video questionnaire.

The prevalence of current symptoms of asthma, allergic rhinoconjunctivitis, and eczema was estimated from positive answer to the written questions for symptoms in the past 12 months, according to the criteria used by ISAAC Steering Committee (12).

The prevalence of current symptoms of asthma was also estimated from positive answer to the video clip for wheezing at rest in the past 12 months. As for current symptoms of rhinitis, its prevalence was estimated from positive answer to the written question “In the last 12 months, have you (has your child) had sneezing or blocked nose when you (or he/she) did not have a cold or the flu?”

DATA COLLECTION AND ANALYSIS

Data were collected in 2001, during the same period of the year as in Phase One in 1995. Information on the questionnaire was entered into the ISAAC Epi-Info data entry package prepared by ISAAC International Data Center, Auckland, New Zealand. Data were analyzed by using

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TABLE 1.—The number of schools, schoolchildren participated in the study.

	Grade 1		Grade 8	
	Bangkok	Chiang Mai	Bangkok	Chiang Mai
Number of schools participated	15	16	11	12
Total number of schoolchildren in particular grade	5781	3702	5037	3696
Number of returned questionnaire	4506	3247	4653	3622
Response rate (%)	77.9	87.7	92.4	98.0
Number of questionnaire included in analysis (in target age ranges)	3629	3106	3713	3538

TABLE 2.—Prevalence of asthma, rhinitis, rhinoconjunctivitis and eczema symptoms (percentage) in ISAAC Phase One and Phase Three studies.

	6–7 Year Olds						13–14 Year Olds					
	Bangkok			Chiang Mai			Bangkok			Chiang Mai		
	I n = 3628	III n = 3430	p-value	I n = 3828	III n = 3106	p-value	I n = 3713	III n = 4669	p-value	I n = 3927	III n = 3538	p-value
Asthma	11.0	15.0	<0.01	5.5	7.8	<0.01	13.5	13.9	0.59	12.6	8.7	<0.01
Wheezing at rest (VQ)	N/A	N/A	—	N/A	N/A	—	14.1	11.5	<0.01	6.0	4.8	0.02
Rhinitis	32.6	43.2	<0.01	18.5	23.5	<0.01	43.4	57.4	<0.01	38.3	46.6	<0.01
Rhinoconjunctivitis	10.0	13.4	<0.01	4.8	6.2	0.01	15.4	23.9	<0.01	15.6	17.2	0.06
Eczema	12.5	13.3	0.33	11.4	16.3	<0.01	6.8	10.4	<0.01	9.6	8.6	0.63

I = ISAAC Phase One (1995).

III = ISAAC Phase Three (2001).

VQ = Video questionnaire (Only in 13–14-year-olds).

TABLE 3.—Percentage of asthmatics with co-existing rhinitis and patients with rhinitis and co-existing asthma in ISAAC 3 study.

		Asthma with Rhinitis		Rhinitis with Asthma	
		6–7-yr-olds	13–14-yr-olds	6–7-yr-olds	13–14-yr-olds
Bangkok	%	73.9	75.7	25.6	18.3
	OR	4.6	2.6	4.6	2.6
	(95% CI)	(3.86–5.64)	(2.15–3.15)	(3.86–5.64)	(2.15–3.15)
Chiang Mai	%	54.4	74.6	17.9	13.9
	OR	4.5	3.8	4.5	3.8
	(95% CI)	(3.44–5.88)	(2.87–4.90)	(3.44–5.88)	(2.87–4.90)

OR = Odds Ratios.

95% CI = 95% Confidence Interval.

Epi-Info statistical package version 6 (Center for Disease Control & Prevention, Atlanta, Georgia, and World Health Organization, Geneva, Switzerland). Data are expressed in prevalence of the three diseases in the younger and older groups, separately. The data of the prevalence gathered in Phase Three were compared with those from ISAAC Phase One to identify changes by using the Chi Square test.

RESULTS

Prevalence of asthma, wheezing at rest from video questionnaire, rhinitis, rhinoconjunctivitis and eczema are shown in Table 2. It can be seen that the prevalence of asthma increased among younger children from both centers while the prevalence of asthma in older children stabilized in Bangkok but decreased in Chiang Mai. Decreasing wheezing at rest from video questionnaire from both centers confirmed findings from the written questionnaire.

In contrast to asthma, the prevalence of rhinitis and rhinoconjunctivitis among both age groups increased in both centers (Table 2). Such increase was more marked in the older age group, particularly those from Bangkok.

Increase in eczema prevalence was observed among older children from Bangkok (from 6.8% to 10.4%) and younger children from Chiang Mai (from 11.4% to 16.3%).

Table 3 shows the co-morbidity between rhinitis and asthma. Rhinitis was observed in 55–75% of children with

asthma with the calculated Odds Ratios of 2.6 to 4.6 (compared to those without asthma). Although a lower percentage of children with rhinitis had asthma (13.9–25%), similar Odds Ratios were also observed.

Table 4 demonstrates the onset of eczema among younger children among which most occurred below 4 years of age with the mean of 3.4 and 3.5 years old, in Bangkok and Chiang Mai, respectively.

DISCUSSION

This survey of prevalence of allergic diseases in Thailand was based on reported symptoms from the ISAAC questionnaire. The results show that there is a trend of increasing prevalence of all 3 atopic diseases among children surveyed. A marked increase of rhinitis/rhinoconjunctivitis was observed from both centers. This is similar to the trend observed in the ISAAC Phase Three throughout the world (12). Furthermore, a marked increase of eczema prevalence is observed among younger children from Chiang Mai. While Bangkok is the capital city with commercial importance, Chiang Mai

TABLE 4.—Age of onset of eczema in 6–7-year-old children.

Age of onset	Bangkok	Chiang Mai
<2 years	21.3%	18.5%
2–4 years	39.1%	40.2%
>5 years	39.6%	41.3%
Mean (years)	3.4	3.5

is a semi-agricultural city. A major difference between the two cities concerns the climate: Bangkok is all-year-round warm but the temperature in Chiang Mai is lower, especially in winter.

It must also be mentioned that Bangkok is heavily polluted with diesel exhaust particles while the pollution in Chiang Mai is caused by smoke only during the dry season. Whereas hygiene hypothesis could account for higher prevalence of rhinitis and asthma in Bangkok, this does not explain why eczema was more common in Chiang Mai. Since exacerbation of eczema is commonly observed in area with cooler climate and low humidity, higher elevation in Chiang Mai could partly explain higher number of children with eczema observed in this study.

The results from most countries in Asia Pacific region participated in ISAAC Phase One and Three demonstrated an overall increase in the prevalence of atopic diseases which is more obvious in younger children (12–16). Similar to Thailand, studies in Japan (12) and Hong Kong (12–13) revealed an increase in the prevalence of most atopic diseases, except asthma in older children. In contrast, the results from Indonesia showed an increasing prevalence of asthma in older children but a decreasing prevalence in younger children (12).

According to worldwide reports, there was a change in prevalence of at least one disorder in most centers, with increases being more common than decreases, and these increases occurred more common in younger than in older children. The international results also showed that for asthma symptoms in older children, decreases were more common (12), the trend of which is confirmed in our findings. The ISAAC Steering Committee postulated that this pattern might have resulted from a greater effect of environmental change in younger children, or a cohort effect, where an environmental change took place at a later date and affected the prevalence in the younger, but not the older, children (12).

Confirming the concept of “the united airway” that asthma and allergic rhinitis usually co-exist (17–19), our findings showed that most asthmatic patients also had rhinitis, and a portion of patients with rhinitis also had asthma.

With regard to eczema, the age of onset showed that it is a disease of early childhood in this population, consistent with the reports from other parts of the world. More than half of the children (60%) with flexural eczema had rash before they reached the age of 4.

In conclusion, the result of ISAAC Phase Three from Thailand showed a marked increase of symptoms of rhinitis in both age groups while asthma prevalence has become stabilized in older children. Increase in eczema prevalence was observed among younger children from Chiang Mai, where the climate is relatively cooler compared to Bangkok. Most of Thai children with asthma had coexisting rhinitis, and about 14–25% of the children with rhinitis also had coexisting asthma. The age of onset of eczema occurred in early childhood. However, the reason for the increasing prevalence of allergic diseases in younger children calls for further study.

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REFERENCES

1. Bauman A. Has the prevalence of asthma symptoms increased in Australian children? *J Pediatr Child Health* 1993; 29:424–428.
2. Weitzman M, Gortmaker SL, Sobol AM, Perrin JM. Recent trends in the prevalence and severity of childhood asthma. *JAMA* 1992; 268:2673–2677.
3. Burney PG, Chinn S, Rona RJ. Has the prevalence of asthma increased in children? Evidence from the national study of health and growth 1973–86. *Br Med J* 1990; 300:1306–1310.
4. Asher MI, Keil U, Anderson HR, et al. International study of asthma and allergies in childhood (ISAAC): rationale and methods. *Eur Respir J* 1995; 8:483–491.
5. The International Study of Asthma and Allergies in Childhood (ISAAC) steering committee. Worldwide variation in prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema: ISAAC. *Lancet* 1998; 351:1225–1232.
6. The International Study of Asthma and Allergies in Childhood (ISAAC) steering committee. Worldwide variations in prevalence of asthma symptoms: the International Study of Asthma and Allergies in Childhood (ISAAC). *Eur Respir J* 1998; 12:315–335.
7. Strachan DP, Sibbald B, Weiland SK, et al. Worldwide variations in prevalence of symptoms of allergic rhinoconjunctivitis in children: the International Study of Asthma and Allergies in Childhood (ISAAC). *Pediatr Allergy Immunol* 1997; 8:161–176.
8. Williams H, Robertson C, Stewart A, et al. Worldwide variations in the prevalence of symptoms of atopic eczema in the international study of asthma and allergies in childhood. *J Allergy Clin Immunol* 1999; 103:125–138.
9. Ellwood P, Asher MI, Beasley R, Clayton TO, Stewart AW; ISAAC Steering Committee. The International Study of Asthma and Allergies in Childhood (ISAAC): phase three rationale and methods. *Int J Tuberc Lung Dis* 2005; 9:10–16.
10. Vichayanond P, Jirapongsananurak O, Visitsunthorn N, Tuchinda M. Prevalence of asthma, rhinitis and eczema in children from Bangkok area using ISAAC (International Study of Asthma and Allergies in Children) questionnaires. *J Med Assoc Thai* 1998; 81:175–184.
11. Trakultivakorn M. Prevalence of asthma, rhinitis and eczema in northern Thai children from Chiang Mai (International Study of Asthma and Allergies in Childhood, ISAAC). *Asian Pac J Allergy Immunol* 1999; 17:243–248.
12. Asher MI, Montefort S, Björkstén B, et al. Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys. *Lancet* 2006; 368:733–743.
13. Lee SL, Wong W, Lau YL. Increasing prevalence of allergic rhinitis but not asthma among children in Hong Kong from 1995 to 2001 (Phase 3 International Study of Asthma and Allergies in Childhood). *Pediatr Allergy Immunol* 2004; 15:72–78.
14. Wang XS, Tan TN, Shek LP, et al. The prevalence of asthma and allergies in Singapore; data from two ISAAC surveys seven years apart. *Arch Dis Child* 2004; 89:423–426.
15. Quah BS, Wan-Pauzi I, Ariffin N, Mazidah AR. Prevalence of asthma, eczema and allergic rhinitis: two surveys, 6 years apart, in Kota Bharu, Malaysia. *Respirology* 2005; 10:244–249.
16. Hong SJ, Lee MS, Sohn MH, et al. Self-reported prevalence and risk factors of asthma among Korean adolescents: 5-year follow-up study, 1995–2000. *Clin Exp Allergy* 2004; 34:1556–1562.
17. Poachanukoon O, Chanwanpen E, Thanuwong N. Association of disease characteristics and quality of life in Thai asthmatic children. *Thai J Pediatr* 2005; 44:120–128.
18. Leynaert B, Neukirch C, Kony S, et al. Association between asthma and rhinitis according to atopic sensitization in a population-based study. *J Allergy Clin Immunol* 2004; 113:86–93.
19. Wright AL, Holberg CJ, Martinez FD, Halonen M, Morgan W, Taussig LM. Epidemiology of physician-diagnosed allergic rhinitis in childhood. *Pediatrics* 1994; 94:895–901.