Pediatric Allergy and Immunology at Siriraj Hospital

PAKIT VICHYANOND, M.D.*

Abstract

Like other parts of the world, prevalence of childhood allergic diseases in Thailand, particularly of asthma and allergic rhinitis, has risen sharply over the past decade. Epidemiologic studies in this country indicated that allergic sensitization (mainly to house dust mites, cockroaches and cat dander) is the major important risk factor for the development of asthma. House dust mites are the most important source of allergens causing sensitization among allergic Thai children. A nationwide survey indicated that house dust mites are ubiquitous in Thai homes. Despite the authors' earlier finding that mite allergen levels in Thailand (mean group-I allergen level of 11 mcg/g dust), exceeded the recommended international threshold level to induce asthmatic symptoms (10 mcg/g dust), mite allergen levels in homes within the Bangkok area are in the modest range (5 mcg/g dust). With mattresses in Thailand being commonly laid on hardwood surfaces, the authors demonstrated that only top-covering of these mattresses with locally produced mite-impermeable membrane, mite allergens could be substantially reduced. Other active research in pediatric allergy in Thailand include complete surveys of outdoor aeroallergens and research in pharmacologic managements of allergic diseases. The Thailand Registry of Primary Immune Deficiency has recently been established to collect data on patients with these disorders and to improve means for diagnosis and treatment for these unfortunate patients. Finally, with a recent approval for board certification in pediatric allergy and immunology, it is expected that the number of specialists in this field will increase to a sufficient level to provide adequate care for allergic/immunologic children in Thailand.

Key word : Children, Allergic Diseaes, Asthma, Rhinitis, Dust Mites, Cockroaches, Immune Deficiency

VICHYANOND P
J Med Assoc Thai 2002; 85 (Suppl 2): S569-S578

* Division of Allergy and Immunology, Department of Pediatrics, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

The discipline of pediatric allergy and immunology is not only new to Thailand but also to the world as a whole. During the past three decades, prevalence of allergic diseases in childhood has increased tremendously, worldwide[1]. Such phenomenon does not spare countries in Asia, an area where it was once believed that allergy was not a major health problem. For Thailand, one has witnessed a three-fold increase in the prevalence of childhood asthma within less than two decades (circa 1980-2000)[2]. It is quite obvious that there is an urgent need to increase the country's workforce capable of delivering healthcare to children with a spectrum of such problems in Thailand. Nevertheless, newer concepts on the pathogenesis of allergic diseases emerging over the past twenty years, have not been well conceptualized among Thai practitioners. This is perhaps due to a relatively limited course time allowed to teach allergy and immunology in most Thai medical schools. Moreover, an accredited training program to produce specialists in pediatric allergists and immunologists was not in existence prior to 1998 (neither was a program for adult specialists). It is, therefore, imperative that not only an adequate number of such programs be established over the next decade but there is also a need to gather basic research data on allergic diseases to allow physicians to improve healthcare delivery to children with allergic diseases in this country.

Research on epidemiology of allergic diseases in Thailand

To enable clinicians to understand the factors affecting disease development and its natural course which will ultimately lead to appropriate intervention and remedies, knowledge on disease epidemiology becomes an absolutely essential. The earliest attempt to study epidemiology of allergic diseases in Thailand was initiated over three decades ago by Professor Montri Tuchinda at our Division. In his earliest study on this issue, prevalence of asthma and allergic rhinitis among students attending Mahidol Universities in the 1970's was determined to be 2.4 per cent and 23.6 per cent[3]. A wider scale screening of prevalence of allergic diseases among children residing in Bangkok was reported by Bunyarittipong et al in 1989[4]. Prevalence of childhood asthma and allergic rhinitis in that study was 4.5 per cent and 17 per cent, respectively. In collaboration with the Phase-I of the International Study of Asthma and Allergic Diseases in Childhood (ISAAC-I), the authors studied over 7,000 children residing in the Bangkok Metropolitan area by using a standardized written and video questionnaire. Prevalence of childhood asthma and allergic rhinitis was found to be 13 per cent and 40 per cent, respectively[2]. This represents a 3-fold increase in childhood asthmatic cases over a period of less than 10 years. Obviously, differences between studies could be due to differences in the questionnaires used in the two surveys. However, a close scrutiny of these questionnaires revealed similar decision criteria used for diagnosing asthma and allergic rhinitis. Subsequently, similar surveys from Chiang Mai and Khon Kaen Universities were reported[5,6]. Results of these later studies substantiated a high prevalence of childhood asthma observed in the original ISAAC survey, i.e., Bangkok 13 per cent, Chiang Mai 12.6 per cent and Khon Kaen 11 per cent. Most interestingly, in the authors' most recent ISAAC-III survey (2001), no further increase in the prevalence of childhood asthma was observed in the Bangkok area (prevalence of 13%) indicating a plateau effect of factors responsible for the development of asthma in Thailand (Vichyanond, manuscript in preparation).

Numerous investigations have been conducted in the attempt to identify genetic predisposition and to determine factors affecting the development of allergic diseases both directly and indirectly, particularly for childhood asthma. These studies pointed out that the mode of transmission of allergic diseases are multifactorial in origin. Nevertheless, attempts to localize genes responsible for these diseases have successfully identified genes with linkage to the occurrence of atopic diseases such as gene encoding for IL-4 production (localizing on chromosome 5q)[7]. IL-4 is the major signal for producing IgE[8] which has a direct association with prevalence and severity of allergic diseases, particularly, asthma[9]. IgE levels among Asian children (Indonesian children) have been previously shown to be higher than in Caucasian children[10]. This could explain much a larger size of allergy skin tests among Thai children (such as to house dust mite extracts) than those observed in Western countries (Vichyanond, personal observation). The authors' research on the determination of serum IgE levels in Thai children indicated a similar high trend both in normal[11] and in allergic children[12]. However, a larger scale epidemiologic survey is required to verify such preliminary observations.

In the authors' second epidemiologic survey among both allergic and healthy school children in Bangkok to determine factors influencing development of allergic diseases, atopic sensitization, as defined by either positive skin prick tests or by positive serum specific IgE to prevailing aeroallergens in Thailand was found to be the most important factor for asthma and allergic rhinitis[12]. For example, positive skin prick test to cat dander and to house dust mite extracts rendered an odds ratios of 5 and 4 for developing asthma among those sensitized *versus* those who were not sensitized to these allergens. This is in agreement with studies available from other countries throughout the world[13]. It is interesting that the rate of atopic sensitization among healthy Thai children was quite high (30%, Fig. 1). However, such a high rate of allergic sensitization has been previously reported among Singapore volunteers[14], indicating that genetic predisposition to the development of atopic sensitization is perhaps similar throughout Asia. In the present study, the most important allergen causing allergic sensitization was that of house dust mites (57.8%) followed by cockroaches (21.7%), cats (13.9%) with grass pollens and mold spores responsible for less than 5 per cent of allergic children. This confirmed our earlier findings among 100 asthmatic children attending the Pediatric Allergy Clinic at Siriraj Hospital, underlining the fact that exposure to house dust mite allergens is the most important risk factor in the development of allergic diseases among Thai children [15]. Most recently, our study among adult asthmatics indicated that up to 50 per cent of these patients were sensitized to house dust mites[16] rendering environmental control procedure for house dust mite to be an imperative component for asthma treatment both for children and adult asthmatic patients.

Aeroallergen studies

Aeroallergens causing respiratory allergies (asthma and allergic rhinitis) and with some responsible for atopic dermatitis, could be traditionally divided into (a) indoor allergens (such as house dust mites, cockroaches and indoor molds) and (b) outdoor allergens (such as plant pollens and spores of outdoor molds). Prevailing aeroallergens differ between localities and seasons. For example, in the United States, ragweed pollens are the major outdoor pollens during the fall period, whereas for the Mediterranean countries, spores of *Parietaria judaica* are the most important ones. Therefore, to establish the importance of various aeroallergens for each country, a combination of extensive long-term aeroallergen surveys along with a demonstration of importance of these allergens in the induction of allergic sensitization among allergic patients (either by allergy skin testing or by the measurement of specific IgE by RAST or equivalence) is required.

In Thailand, surveys for outdoor pollens began over 30 years ago with the first report from our Division by Professor Montri Tuchinda[17]. In his survey, utilizing Durham's gravitational pollen/spore collector, the most important plant pollens in the atmosphere of Thailand was shown to be grass pollens prevailing in the winter months (October through February) whereas, the most important mold spores were those of the *Cladosporium* species dispersing throughout the year. The study was criticized by his selection of an instrument which detects predominantly pollens and spores of larger sizes, readily precipitated in such a trap; thereby, reducing pollens and spores of smaller sizes. However, later studies by Phanichayakarn, et al, from Ramathibodi Hospital[18] and by Dhorraninta, et al, from Siriraj Hospital[19] using volumetric samplers (the Rotorods), a device which not only collects particles of all sizes but also is adjustable to calculate the volume of the air sampled, yielded results which were similar to the original study by Tuchinda. Tree pollens are rarely found in the atmosphere of Thailand since most trees in Thailand are tropical in nature and the mode of pollen transmission being insect-borne. The only tree pollens found in significant numbers in Thailand were that of the Acacia tree. Pigweed pollens were the only weed pollens found in moderate amounts throughout the year in Thailand.

Despite these completely available data on outdoor aeroallergens, most studies determining allergy sensitization among the Thais indicated that a small number of patients (particularly in the pediatric age range) were sensitized to these outdoor pollens and spores combined (less than 10-20% [12,15]). The most important aeroallergens for the Thais, however, were those of the indoor category (house dust mites, cockroaches, and cat dander) responsible for over 80 per cent of sensitized patients combined[15,16]. Such a finding has led to intense research interest in Thailand focusing on indoor allergens, particularly those derived from house dust mites, over the past ten years. The authors' earliest

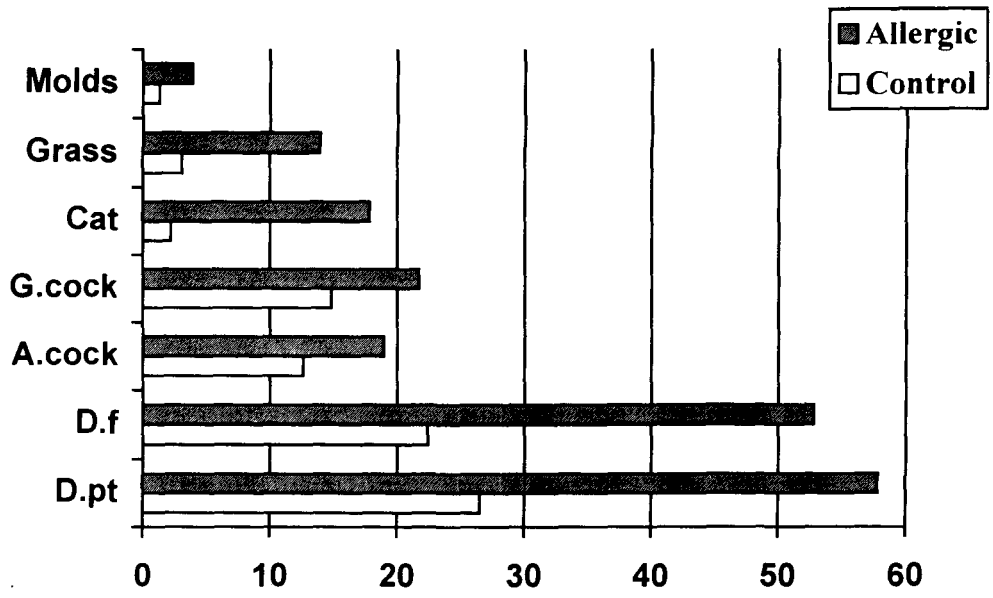

Fig. 1. Percentages of positive allergy skin test among allergic (n = 180) and healthy school children (n = 223) in Bangkok[12].

survey of over 600 dust samples from all over Thailand indicated that over 90 per cent of these samples contained house dust mites with *Dermatophagoides pteronyssinus (Dp)* being the most common species followed by *Dermatophagoides farinae (Df)*[20]. In the present study, the authors also measured the group-I mite allergens, a cysteine protease enzyme found mostly in mite fecal particles, within dusts from the Northern and Northeastern Thailand. The mean level of the group-I allergen in that study was 11 mcg/g dust, the level of which exceeded both the sensitizing and the symptomatic levels for asthma (2 and 10 mcg/g dust) as previously recommended in the International Conference on Indoor Allergens and Asthma[21]. Sources of these mites and their allergens in Thai homes were localized mainly in bedding materials such as in mattresses, pillows and blankets, whereas, other sources such as drapes, filters of air-conditioning system, floor covering (tiles, or hardwood floor), were relatively free of mites. These findings were verified in our later intervention studies evaluating a locally produced mite-impermeable cover[22,23]. Surprisingly, the major mites species found in the intervention studies (conducted at the dormitory for medical officers and students at Siriraj Hospital) were mainly *Df* which was found at a much higher level than previously expected (25 up to 100 mcg/g dust). Differences in the ecology of these mites species in Thailand were not readily apparent. A limited survey was also performed of mites in the homes of allergic children in Bangkok and showed that *Df* could be readily found along with *Dp* with the mean group-I mite allergen level of 5 mcg/g dust[24].

In the intervention studies, the authors demonstrated that the use of only top covering of mattresses laid on hardwood surfaces was sufficient in the reduction of mite allergens at the surface of mattresses (up to 90% reduction[22,23]). Our later study demonstrated that these mites could be killed by exposure to heat over 60°C for a duration of 30 minutes and also by dry heat *via* ironing[25]. Mites were found to bury themselves deeply in the KOK, a commonly used floor covering material in Thailand. Moreover, application of heat over such material could not sufficiently kill these mites lending this type of floor covering unsuitable for mite-sensitive patients. Various types of vacuum cleaners, specially promoted for mite removal, were evaluated in another experiment. The result of which demonstrated that the use of vacuum cleaners, at a frequency commonly employed by the

Thais (less than once a month), did not sufficiently decrease mite allergens[26]. An increase in mite allergens on mattress surfaces was observed perhaps due to the pulling of live mites from deeper layers of mattresses to more superficial layers. Most recently, the authors compared different types of mattresses for their ability to resist mite infestation. The result of this investigation confirmed that mattresses produced from synthetic materials and from kapok collected mites rapidly and at a much high degree than those produced from sponge and from coconut fiber. Nevertheless, differences in mite allergen levels within these types of mattresses became indistinctively different from one another after one year of use[27].

Interestingly, *Blomia tropicalis (Bt)*, a storage mite species, was found to be the most important mite species causing sensitization for allergic individuals not only in Singapore but also to residents in Malaysia and in Indonesia as well[14]. The authors' original mite survey in Thailand, however, failed to uncover a significant amount of this mites species in dust samples recovered from all over Thailand[20]. However, recently, in collaboration with the University of Singapore, using both crude extracts and recombinant allergens of *Bt*, up to 20 per cent of Thai patients were found to be sensitized to these mites species by skin testing[28]. Whether such a finding represents a cross reactivity between the *Blomias* and *Dermatophagoides* or a true sensitization remains to be further investigated.

The second most common indoor allergen causing sensitization among pediatric asthmatics in most of our studies were cockroach allergens (up to 40% of our allergic patients were sensitized to cockroach), For this reason, the authors were compelled to examine further on the ecology of this insect leading to allergic sensitization and disease production among our patients. At present, research on cockroach allergy in Thailand is in its incipient stages with various activities in the planning. These activities include a survey of predominant cockroach species in Thailand, production of monoclonal antibodies to their allergens for constructing means for measurement of cockroach allergens and also an intervention study. Results of these studies, however, are not currently available at the time of thus writing.

Research on pharmacologic interventions

Research interests on pharmacologic therapy of allergic therapy have been strong points among the pediatric allergy community in Thailand during the past 30 years. During the 1970's, when theophylline was the mainstay of asthma therapy, Tuchinda et al observed frequent side effects with the use of sustained-release theophylline among Thai children (such as nausea and vomiting). They documented that with oral administration of sustain-release preparations, the half-life of theophylline among Thai children was longer than in Caucasian children (7 hours *vs* 4 hours)[29]. The investigators postulated that the delay in elimination of theophylline among Thai children could be primarily due to the Thai diet which is rich in carbohydrates and thus could lead to decreased activity of cytochrome P450, an enzyme responsible for theophylline metabolism. However, in this early study, theophylline was administered with food which could delay its absorption, and subsequently leading to a prolongation of its half-life. Vichyanond et al in 1992, documented that with intravenous administration, theophylline elimination half-life among Thai children was approximately 4 hours and was not different from children of other ethnic groups[30]. Since then, studies on bioavailability of various sustain-release theophyllines among Thai populations, both adults and children, have been reported, making theophylline the most extensively studied asthma drug in Thailand[31,32]. However, within the past 20 years, the use of theophylline for acute asthma in Thailand has declined as in other parts of the world possibly due to its side effects[33]. Moreover, its relative low potency of efficacy compared to other modern asthma drugs has led to a decrease of its popularity worldwide.

As in other parts of the world, inhaled beta-agonists have replaced injectable epinephrine as the first-line therapy for acute asthma in Thailand in recent years[34,35]. In contrast to theophylline, our pharmacokinetic study of a long-acting beta-agonist, bambuterol, indicated that elimination of this drug was half the rate of that observed among Caucasian children[36]. With the introduction of newer dry powder devices such as the Turbuhaler, Easyhaler and Accuhaler, the authors have demonstrated that Thai children could master dry powder inhalers with ease[37], rendering these devices popular among patients in Thailand.

As for the controllers, ketotifen remains the most popular drug among pediatricians in Thailand[35] despite the fact that its efficacy is much less certain compared to other asthma controllers such as to inhaled corticosteroids. The authors also

had an opportunity to evaluate the efficacy of a metered-dose inhaler preparation of cromolyn among Thai children and demonstrated that its effects became apparent within 2 weeks of administration [38]. This drug, however, was superseded by the use of inhaled corticosteroids which have proven to be a mainstay of chronic therapy for childhood asthma in recent years[39]. However, the frequency of inhaled corticosteroids use among Thai pediatricians[35] was notably at a much lower rate (9%) compared to 39 per cent observed in Great Britain [40]. In the early 1990's, a non-valved, collapsible bag spacer-The Siriraj Spacer, was devised and was proven to be effective with the use of salbutamol-MDI[41]. However, with the introduction of newer powder inhaler devices and the availability of newer and more efficient spacer devices in Thailand (such as the Aerochamber, Babyhaler, Nebuchamber, etc), the Siriraj Spacer has not received adequate attention among Thai pediatricians. Interestingly enough, the use of the spacer-MDI system, as a whole, was found not to be popular among Thai pediatricians in our last survey[35] since only less than 2 per cent of pediatricians surveyed in 1997 indicated that they prescribed such a system for every day asthma therapy. Currently, evaluations of newer controllers such as montelukast and early use of inhaled steroids during the course of the disease, are on-going at our Division.

Primary immunodeficiency in Thailand

The scope of primary immunodeficiency in Thailand is at a more infantile stage compared to that of pediatric allergy and to pediatric HIV infections. Only a limited number of reports of primary immunodeficiencies are available from Thailand despite extensive unpublished personal experiences [42]. This is perhaps due to the relative lack of medical personnel with special interest in this field rather than due to a low prevalence of patients with these disorders. Recently, the authors reported our experience of patients with XLA (X-linked agammaglobulinemia)[43] and XHIM (X-linked hyper-immunoglobulin M)[44]. The patients in these reports had typical genetic mutations of the genes encoding for BTK protein and of the CD40 ligand molecules. Despite an earlier futile attempt to immunoreconstitute these patients, particularly those with SCID (severe combined immunodeficiency disease), the authors have recently succeeded in bone marrow transplanting an X-linked SCID male infant by using identical allogenic bone marrow graft from his older sibling. Engrafment was evident as early as 30 days post transplantation with a resolution of his opportunistic infections. A grade-IV GVHD (graft *versus* host disease) was observed and subsided with a treatment regimen consisting of corticosteroids, mycophenolate mofetil and topical tacrolimus. Currently, the child is enjoying a normal life with evidence of normalizing both T and B cell functions 8 months post transplantation.

The Thailand Registry of Primary Immunodeficiency has recently been established as a joint effort between the Allergy and Immunology Society of Thailand along with the Royal College of Thai Pediatricians. Our division is acting as the center for such activity. The objectives of the registry are to collect information on both established and suspected patients with primary immunodeficiency diseases and to provide consultations to physicians caring for these patients. In addition, it acts as a center to coordinate activities which could lead to a proper diagnosis of new patients (with establishment of newer diagnostic measures) and also to a better and more specific therapeutic regimen for these patients.

It is hoped that within the next ten years, adequate information regarding the incidence, natural course and outcome of therapy of primary immunodeficiency diseases in Thailand will be established. With such information, one would anticipate improved techniques for disease diagnosis, case findings and also modes of newer therapy for these unfortunate patients.

Fellowship training

With the current number of registered/certified allergists and clinical immunologists less than 100 combined for the country with a population of over 60 million, the ratio of specialists in this field per population exceeds 1:400,000 compared to 1: 50,000 in the United States. Such a situation is similar in countries of Southeast Asia (despite a recent recognition of Allergy and Clinical Immunology as a distinct specialty in Asia). The situations in Japan, South Korea and the Philippines have been somewhat brighter than other countries in this region. This is perhaps due to an earlier esta-

blishment of post-graduate training and certification for this specialty since the early 1990's (particularly in South Korea and the Philippines).

The recognition of a shortage of qualified personnel delivering healthcare for patients with allergic and immunologic problems in Thailand has been recognized by the Allergy & Immunology Society of Thailand, the Royal College of Physicians of Thailand and the Royal College of Thai Pediatricians. Board certifications for physicians completing 2 years of post-graduate training were set up in the late 1990's. Such individuals have to complete their board certification in either Internal Medicine or Pediatrics prior to entering Allergy and Immunology. Unfortunately, with a recent emphasis on producing 'generalists' by the Thai Medical Council, certification in Allergy and Immunology has not been approved by the Council rendering it less attractive for physicians to pursue their career in Allergy and Immunology.

The Division of Pediatric Allergy and Immunology was the first training site approved for the training of pediatric allergy and immunology in Thailand. Over the past 10 years, more than 20 pediatricians have had some training at our Divisions (with 3 certified and 6 eligible for the Board due to the late approval of certification in 1998). Currently, 3 institutions in Thailand (all in Bangkok) have been approved for pediatric allergy/immunology training and 2 for adult training. With the recent arrival of several US-trained and certified allergists/immunologists, expanding numbers of such programs are anticipated with increasing numbers of such specialists becoming available for all regions of Thailand.

SUMMARY

Although the specialty of pediatric allergy and immunology is still in the embryological stage compared to that in the United States and Europe, much progress has been achieved particularly over the past decade. With increasing manpower in this field, an improved healthcare delivery for patients with allergic and immunologic conditions could be achieved. In addition, one expects to witness acquisition of new knowledge through modern research which will ultimately lead to novel therapy generating from this country within the next decade.

(Received for publication on March 10, 2002)

REFERENCES

1. Epidemiology. In: Lenfant C. Editor. Global strategy for asthma management and prevention NHLBI/WHO workshop report. Washington DC: NHLBI Publication, No 95-3659; 1995: 9-24.
2. Vichyanond P, Jirapongsananuruk O, Visitsunthorn N, Tuchinda M. Prevalence of asthma, rhinitis, and eczema in children from the Bangkok area using the ISAAC (International study for asthma and allergy in children) questionnaire. J Med Assoc Thai 1998; 81: 175-81.
3. Tuchinda M. Prevalence of allergic diseases in medical students. Siriraj Hosp Gaz 1978; 30: 1285-97.
4. Bunyarittipong P, Tuchinda M, Balangura K, Visitsuntorn N, Vannaprapara N. Prevalences of allergic diseases in Thai children. J Pediatr Soc Thai 1990; 29: 24-32.
5. 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: 243-8.
6. Teeratakulpisarn J, Pairojkul S, Heng S. Survey of the prevalence of asthma, allergic rhinitis and eczema in school-children from Khon Kaen, Northeast Thailand: An ISAAC study. Asian Pac J Allergy Immunol 2000; 18: 187-94.
7. Marsh DG, Neely JD, Breazeale DR, et al. Linkage analysis of IL-4 and other chromosome 5q31.1 and total serum immunoglobulin E concentrations. Science 1994; 264: 1152-6.
8. Ryan JJ. Interleukin-4 and its receptor: Essential mediators of the allergic response. J Allergy Clin Immunol 1997; 99: 1-5.
9. Burrows B, Martinez FD, Halonen M, Barbee RA, Cline MG. Association of asthma with serum IgE levels and skin-test reactivity to allergens. N Engl J Med 1989; 320: 271-7
10. Kartasamita CB, Rosmayudi I, Demedts M. Total serum IgE and eosinophil count in children with and without a history of asthma, wheezing or atopy in an urban community in Indonesia. J Allergy Clin Immunol 1994; 94: 981-8.
11. Napapongsuriya C, Vichyanond P. Total serum IgE levels in normal Thai children (thesis). Bangkok: Mahidol Univ, 1998: 1-15.
12. Teerarutkul A, Vichyanond P. Prevalence and risk factors for allergic sensitization and for development of allergic diseases among Thai children. Proceedings of the 3th Asia Pacific Congress of Allergology and Clinical Immunology; 1997. Manila, Philippines.
13. Von Mutius E. The environmental predictors of allergic disease. J Allergy Clin Immunol 2000; 105: 9-19.
14. Chew FT, Lim SH, Goh DYT, Lee BW. Sensitization to local dust mite fauna in Singapore. Allergy 1999; 54: 1150-9.
15. Kongpanichkul A, Vichyanond P, Tuchinda M. Allergen skin test reactivities among asthmatic Thai children. J Med Assoc Thai 1977; 80: 67-75.
16. Daengsuwan T, Phankingthongkum S, Visitsuntorn N, Charoenratanakul S, Lee BW, Vichyanond P. Pattern of allergen sensitization to aeroallergens among adult and childhood asthmatics in Thailand (abstract). Proceedings of the XIX International Congress of Allergology and Clinical Immunology; Oct 2000, Sydney, Australia.
17. Tuchinda M, Theptaranon Y, Limsathayourat N. A ten-year surveillance of astmospheric pollens and moulds in the Bangkok area. Asian Pac J Allergy Immunol 1983; 1: 7-9.
18. Phanichyakarn P, Kraisarin C, Sasisakulporn C. Atmospheric pollen and mold spores in Bangkok: A 15 year survey. Asian Pac J Allergy Immunol 1989; 7: 113-8.
19. Dhorraninta B, Kasetsinsombath K, Kraiprayong S, et al. Aeroallergens in Thailand. Siriraj Hosp Gaz 1996; 48: 543-54.
20. Malainual P, Vichyanond P, Phan-Urai P. House-dust mite fauna in Thailand. Clin Exp Allergy 1995; 25: 554-60.
21. Platts-Mills TAE, Vervloet D, Thomas WR, Aalberse RC, Chapman MD. Indoor allergens and asthma; report of the third international workshop. J Allergy Clin Immunol 1997; 100: S1-S24.
22. Jirapongsananuruk O, Malainual N, Sangsupawanich P, Aungathiput V, Vichyanond P. Partial mattress encasing significantly reduces house dust mite antigen on bed sheet surface: A controlled trial. Ann Allergy Asthma Immunol 2000; 84: 305-10.
23. Pootong V, Mahakittikun V, Wongkumchai S, Visitsuntorn N, Vichyanond P. Mite allergens within homes of Bangkok, Thailand (thesis). Bangkok: Mahidol Univ, 2000.
24. Vichyanond P, Uthaisangsook S, Ruangruk S, Malainual N. Complete masttress encasing is not superior to partical encasing in the reduction of mite allergen. Allergy 1999; 54: 736-41.
25. Mahakittkun V, Wongkamchai S, Ahamad MH, Vichyanond P. Killing mites with heat. Allergy 2001; 56: 262.
26. Vichyanond P, Visitsuntorn N, Ruengruk S, Malainual N. Vacuum cleaning does not sufficiently reduce mite allergen from beddings. J Thai Med Assoc 2002 submitted for publication.
27. Chirdjirapong V, Poothong V, Ruangruk S, et al. House dust mite allergens accumulate more rapidly in synthetic and kapok mattresses than in coconut and sponge mattresses. J Allergy Clin Immunol

2002; 109: abs #108.
28. Angus AC, Chua S, Wun ST, et al. Patterns of allergic sensitisation and cross-reactivity between Blomia tropicalis. and Dermatophagoides farinae: A comparative study. J Allergy Clin Immunol 2002; 109: abs #624
29. Koysooko R, Tuchinda M, Habanananda S, Pinthong T, Wattanapermpool J, Geadsomnuig S. Pharmacokinetics of oral theophylline in Thai asthmatic children. Asian Pac J Allergy Immunol 1987; 5: 179-85.
30. Vichyanond P, Aranyanark N, Visitsuntorn N, Tuchinda M. Theophylline pharamacokinetics in Thai children. Asian Pac J Allergy Immunol 1994; 12: 137-43.
31. Trakultivakorn M, Kanthawatana S, Tontayapiwat A, Jiraporncharoen K. Comparative study of pharmacokinetic characteristics of slow release theophylline oral preparations in Thai children with persistent asthma. Asian Pac J Allergy Immunol 1999; 17: 255-9.
32. Rojanasthein N, Kovjiriyapan K, Manorot M, Pothirat C. Comparative steady-state bioavailability of sustained-release theophylline preparations: Theodur, Unidur and Xanthium. Asian Pac J Allergy Immunol 2001; 19: 69-78.
33. Visitsuntorn N, Udomittipong K, Punnakan L. Theophylline toxicity in Thai children. Asian Pac J Allergy Immunol 2001; 19: 177-82.
34. Visitsunthorn N, Sittichhokananon N, Tuchinda M. Childhood asthma: Cases admitted to Siriraj Hospital in 1992. Siriraj Hosp Gaz 1995; 47: 313-421.
35. Vichyanond P, Hatchaleeha S, Jintavon V, Kerdsomnuig S. How pediatricians manage asthma in Thailand. Pediatr Pulmonol 2001; 32: 109-14.
36. Ahlstrom H, Alvero J, Alvero R, et al. Pharmacokinetics of bambuterol during oral administration to asthmatic children. Br J Clin Pharmacol 1999; 48: 299-308.
37. Vichyanond P, Phanichyakarm P, Omar AH, Tan A, Wong E. Ease of handling and efficacy of Bricanyl Turbuhaler in Asian asthmatic children. Asian Pac J Allergy Immunol 1994; 12: 1-6.
38. Tuchinda M, Vichyanond P, Visitsunthorn N, Hababbonda S. The role of disodium cromoglycate-metered dose aersol inhaler in the management of asthma in Thai children. Asian Pac J Allergy Clin Immunol 1990; 8: 117-21.
39. Establish medication plans for long-term management. In: Lenfant C. Editor. Global strategy for asthma management and prevention NHLBI/ WHO workshop report. Washington DC: NHLBI Publication No 95-3659; 1995: 77-117.
40. Warner JO. Review of prescribed treatment for children with asthma in 1990. Br Med J 1995; 311: 663-6.
41. Vichyanond P, Chokephaibulkit K, Kerdsomunnig S, Visitsunthorn N, Tuchinda M. A clinical evaluation of the Siriraj Spacer in asthmatic Thai children. Ann Allergy 1992; 69: 433-8.
42. Lolekha S, Chulajuta R, Srichamorn S. Primary immune deficiency diseases in Thailand. Ramathibodi Med J 1978; 1: 17-28.
43. Vichyanond P, Visitsunthorn N, Tuchinda M. X-linked agammaglobulinemia in Thailand: Report of two new cases and review of a current progress of its immunogenetics. Siriraj Hosp Gaz 1996; 47 (Suppl): 159-64.
44. Santadusit S, Visitsunthorn N, Ochs HD, Vichyanond P. X-linked hyper IgM syndrome: A report of the first case in Thailand with a confirmed mutation of CD40 ligand gene. Asian Pac J Allergy Immunol 2000; 18: 165-8.

สภาวะปัจจุบันของโรคภูมิแพ้และอิมมูโนวิทยาในเด็กที่โรงพยาบาลศิริราช

*ปกิต วิชยานนท์, พ.บ.**

ในช่วงระยะ 30 ปีที่ผ่านมา อัตราความชุกของโรคภูมิแพ้ในเด็ก เช่น โรคหอบหืดและโรคภูมิแพ้ทางจมูกได้เพิ่มขึ้นอย่างมากมายพร้อม ๆ กันทั่วโลก การศึกษาทางด้านระบาดวิทยาในประเทศไทย โดยเฉพาะจากการศึกษาจากหน่วยโรคภูมิแพ้ของภาควิชากุมารศิริราช บ่งชี้ว่าความชุกของโรคหอบหืดได้เพิ่มขึ้นถึง 3 เท่าตัว (จากร้อยละ 4 เป็นร้อยละ 13) การศึกษาถึงปัจจัยเสี่ยงในการเกิดโรคภูมิแพ้ในเด็กพบว่าสภาวะการแพ้ (allergic sensitization) เป็นปัจจัยเสี่ยงที่สำคัญที่สุดที่มีความสัมพันธ์กับการเกิดโรคภูมิแพ้ในเด็กไทยในกรุงเทพมหานคร สารแพ้ที่พบว่าประชากรเด็กไทยแพ้มากที่สุดได้แก่ สารแพ้จากไรฝุ่น (โดยแพ้ถึงประมาณร้อยละ 70–80) จึงทำให้การวิจัยเกี่ยวกับสารแพ้จากไรฝุ่นได้รับความสนใจเป็นอย่างสูงในช่วงระยะเวลา 10 ปีที่ผ่านมา การวิจัยดังกล่าวจากหน่วยโรคภูมิแพ้ ภาควิชากุมารเวชศาสตร์ และภาควิชาปรสิตวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล พบว่าสารแพ้จากไรฝุ่นสามารถพบได้ในบ้านที่อยู่อาศัยของประชากรไทยมากกว่าร้อยละ 90 และปริมาณสารแพ้จากไรฝุ่นดังกล่าวอยู่ในระดับที่สูงกว่ามาตรฐานสากล การวิจัยยังพบว่าการใช้ผ้ากันไรฝุ่น (บางชนิด) สามารถลดปริมาณสารแพ้ไรฝุ่นในที่นอนได้อย่างมีประสิทธิภาพ นอกจากนี้พบว่าผู้ป่วยเด็กไทยแพ้สารแพ้จากพืชและจากเชื้อราเป็นจำนวนน้อยกว่าการแพ้สารแพ้จากไรฝุ่น

การศึกษาเกี่ยวกับโรคภูมิคุ้มกันบกพร่องปฐมภูมิกำลังได้รับความสนใจมากขึ้นในประเทศไทย และคาดว่าผู้ป่วยด้วยโรคในกลุ่มนี้มีจำนวนไม่น้อย แต่ผู้เชี่ยวชาญในการให้การดูแลยังมีจำนวนน้อยอยู่ ด้วยเหตุผลดังกล่าวสมาคมโรคภูมิแพ้และอิมมูโนวิทยาแห่งประเทศไทย และราชวิทยาลัยกุมารแพทย์แห่งประเทศไทยจึงได้เริ่มโครงการการฝึกอบรมกุมารแพทย์ที่มีความเชี่ยวชาญในการรักษาโรคภูมิแพ้และอิมมูโนวิทยาในเด็กขึ้นในปี พ.ศ. 2541 ซึ่งคาดว่าในช่วงระยะ 10–20 ปีต่อไปจะมีผู้เชี่ยวชาญในสาขานี้มากพอที่จะให้ความดูแลแก่ผู้ป่วยด้วยโรคในสาขานี้ได้อย่างเพียงพอในประเทศไทย

คำสำคัญ : โรคภูมิแพ้, หอบหืด, ไรฝุ่น, ภูมิคุ้มกันบกพร่องปฐมภูมิ

ปกิต วิชยานนท์
จดหมายเหตุทางแพทย์ ฯ 2545; 85 (ฉบับพิเศษ 2): S569–S578

* สาขาวิชาโรคภูมิแพ้และอิมมูโนวิทยา, ภาควิชากุมารเวชศาสตร์, คณะแพทยศาสตร์ศิริราชพยาบาล, มหาวิทยาลัยมหิดล, กรุงเทพ ฯ 10700