

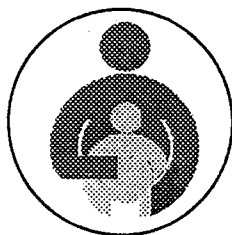
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# PREVALENCE AND SEVERITY OF ASTHMA AND ALLERGIES IN SCHOOLCHILDREN OF HO CHI MINH CITY

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## Abstract:

This is the first international cooperating study based on ISAAC protocol to assess the prevalence and severity of asthma and allergies in childhood at the two age groups 6 - 7 and 13 - 14. We chose randomly 4 district (three urban and 01 rural) from 22 districts of HCM city. **Results:** 8119 children composed of 3879 at the age of 6 - 7 and 4240 at the age of 13 - 14 were asked to complete the questionnaires. The response rate of both age groups was 92.3%. There were 1081 cases at the age of 13 - 14 responding the video questionnaires. The prevalence of rhinitis in 2001 was very high: 53.1%, in which the prevalence of rhinoconjunctivitis was 17.5%. The prevalence of wheezing in 2001 at the two age groups were 17% and 29.1%, respectively. However, the prevalence of diagnosed asthma was only 4.8%. The prevalence of severe wheezing with speech limited was 11.3%. Ninety percent of asthma symptoms in our study were mild and intermittent. Eczema was least prevalent in our study (4%). We found a relation between asthma and other allergies such as rhinoconjunctivitis and eczema. In 2001, there were 5.52% cases with wheezing in which 21.5% cases were associated with rhinitis. There were only 1.79% of patients presenting all three symptoms of asthma, rhinitis, and eczema. **Conclusions:** The prevalence and severity of asthma and allergies in HoChiMinh city are high, equal to those in some developed countries such as England and Australia, higher than those in some Asia Pacific countries. More multicenter surveys are needed to assess these prevalence in the whole the country of Viet Nam. It is also necessary to establish a national program for diagnosis, management, and prevention of the disease.

## I. BACKGROUND:

The prevalence of asthma is increasing the developed and developing countries. The disease affects the patients' work and schooling, increases the cost of treatment in hospitals and puts a burden on the patients' families and the society[8],[9]. Since 1991, the ISAAC (international study of asthma and allergies in childhood) has carried out a survey about prevalence of these diseases all over the world. It is found that the prevalence of wheezing during the past 12 months in children at the age of 6 - 7 and 13 - 14 ranges from 4.1% - 31.1% and 2.1% - 32.2% respectively[1][3]. The documentation has showed that the prevalence of asthma varies wildly depending on geographical areas. In Viet Nam, there were also some studies on this field in the past. However, as their methods and definitions of an asthma case were different from each other, their results could not be compared with other national and foreign studies. Actually, knowing the prevalence of asthma is very important. It paves the way for later studies and national programs on health care of these diseases, especially in childhood. This is the first study in Viet Nam on the prevalence of asthma and allergies based on the protocol of ISAAC.

## II. OBJECTIVES:

### a. General objective:

To assess some epidemiologic factors of asthma, rhinoconjunctivitis, and eczema in schoolchildren.

### b. Special objectives:

1. To assess the prevalence of asthma, rhinoconjunctivitis, and eczema in schoolchildren.
2. To assess the severity of asthma, rhinoconjunctivitis, and eczema in schoolchildren

## III. METHOD OF STUDY:

1. Study design: crosssectional prospective study.
2. Study population: schoolchildren at the age of 6 - 7 and 13 - 14, living in Ho Chi Minh city.

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We used Epi - info 6 software to choose randomly 4 districts from 22 districts of HCM city. In each selected district, we chose randomly at least 3000 children at the two age groups from primary schools and secondary schools.

3. Study duration: from September to December, 2001.

4. Methodology:

We used the self - reported written questionnaires for asthma and allergies of ISAAC to interview both age groups. We sent consent forms to all of parents and children at the age of 13 - 14 to have their permission to take part in our study. Only cases with consent were included in our study.

For the age of 6 - 7, we asked the children to take the consent forms and written questionnaires (WQ) to their parents to complete. We returned to school 3 days latter to collect the answered questionnaires.

The 13 - 14 years old children completed WQ by themselves in the class. We chose randomly 1000 from 3000 children at the age of 13 - 14 to respond the video questionnaires right after they completed the written questionnaires. To some children who were absent in the first survey, we have repeated the interview until they could.

To the children who refused taking part in our study, we collected epidemiologic data such as age and sex based on ISAAC guidelines.

5. Data entry:

We chose two independent persons for double data entry with Epi - info 6.0 software. These data was sent to International ISAAC data center also. We analyzed data by SPSS 10.01 software.

**IV. RESULTS:**

We conducted a survey about prevalence of asthma and allergies in 4 districts ( 2, 3, 11, and HocMon district) chosen randomly from 22 districts of Ho Chi Minh city. There were 8 secondary schools (for the age of 13 - 14) and 9 primary schools (for the age of 6 - 7) chosen randomly to get 8792 children in sample size. However, there were 677 children (7.7%) refusing taking part in our study. Finally, we enrolled 8119 children in both age groups completing the questionnaires. The response rate was 92.3%. The inconsistency rate in answering our questionnaires of asthma, rhinitis, and eczema were 1%; 1,7%; 3,6% at the age of 6 - 7 and 0,5%; 0,4%; 3,6% at the age of 13 - 14, respectively. We excluded these inconsistencies from the analysis [table 3].

**IV.1. Characteristic of survey sample:**

**IV.1.1. Demographic profile:**

**Table 1:**

	Total (%)	6 - 7 age group (%)	13 - 14 age group (%)
No of cases	8119 (100)	3884 (47,84)	4235 (52,16)
Male	3978 (49)	2037 (52,5)	1941 (45,8)
Female	4141 (51)	1847 (47,5)	2299 (54,2)

There were no differences in frequency of sex in both age groups.

**IV.1.1.2. Distribution of survey cases in each district:**

**Table 2:**

Center	School	WQ	VQ	Response rate
Dist. 2	2 primary school (1028)	505		87,05
		523		
	3 secondary school (929)	346	128	
		249	108	
		334	121	
Dist. 3	2 primary school (696)	323		98,42
		373		
	1 secondary school (1371)	1371	181	

Dist. 11	2 primary school (1041)	591		89,29
		450		
	1 secondary school (953)	953	163	
Dist. Hóc Môn	03 primary school (1114)	322		95,02
		228		
		564		
	03 secondary school (987)	169	133	
		415	115	
		403	132	
<b>Total</b>	17 school	<b>8119</b>	<b>1081</b>	<b>92,3%</b>

• Comment: Numbers of cases in each district were equal.

Response rare was 92,3%.

#### IV.2. PREVALENCE AND SEVERITY OF ASTHMA AND ALLERGIES:

Table 3: The number of valid response for asthma, rhinitis, and eczema in each age group.

	6 - 7 age group n = 3879	13 - 14 age group n = 4240	Total
Asthma questionnaires	3840	4219	8059
Rhinitis questionnaires	3813	4222	8035
Eczema questionnaires	3741	4158	7899

#### IV.2.2. Prevalence of symptoms:

Table 4:

	Overa ll	Male	Fema le	6- 7 years	Male	Female	13 -14 years	Male	Femia le
<b>ASTHMA</b>									
No	8059	3945	4114	3840	2013	1827	4219	1932	2287
Ever wheezed	37.5	36.7	38.4	32.5	32.2	31.9	42.5	41.3	43.5
Wheeze in the last year	23.3	22.7	23.9	17.0	17.4	16.5	29.1	28.3	29.8
Wheezing wt ex last year*	10.6	10.4	10.8	5.6	6.4	4.7	15.2	14.6	15.7
Persistent cough last year	18.7	17.7	19.7	18.1	17.9	18.3	19.2	17.5	20.7
Ever diagnosed asthma	4.8	5.2	4.3	4.5	4.7	4.2	5.0	5.7	4.4
<b>RHINITIS</b>									
No	8035	3935	4100	3813	2003	1810	4222	1932	2290
Ever had rhinitis	61.3	59.7	62.9	43.2	43.6	42.8	77.7	76.4	78.8
Rhinitis in the last year	52.1	50.8	53.4	35.1	35.6	34.6	67.5	66.6	68.3
Associated itchy eye last year	17.5	16.8	18.2	10.0	11.1	8.7	24.3	22.8	25.6
Ever diagnosed hayfever	25.2	24.7	25.7	22.6	24.5	20.6	27.5	24.9	29.7
<b>ECZEMA</b>									
No	7899	3858	4041	3741	1961	1780	4158	1897	2261
Chronic rash, ever	5.3	5.7	4.8	5.4	6.1	4.6	5.1	5.3	5.0
Chronic rash in the last year	4.0	4.1	3.9	4.1	4.5	3.7	3.9	3.7	4.0
Chr rash wt typ distr**	2.8	3.0	2.6	3.0	3.2	2.8	2.6	2.7	2.5
Ever diagnosed eczema	5.4	5.2	5.5	3.8	4.1	3.5	6.8	6.4	7.1

\* wt ex = with exercise; \*\* Chr rash wt typ distr = chronic rash with typical distribution

Prevalence of wheeze in the last year was high: 23,3%. Wheeze in the last year was higher at the age of 13 - 14 (29,1%) than that of the age of 6 - 7(17%) P=0.002.

Prevalence of wheeze in the last year of each sex was equal in each age group. Rhinitis in the last year (52,1%).

Chronic rash in the last year was only 4%.

Prevalence of ever diagnosed asthma, hayfever, and eczema were very low: 4,8%, 25,2%, 5,4% respectively.

#### IV.2.3. Severity of symptoms:

Table 5:

	Overall	6-7 years	13-14 years	Male	Female
<b>Wheeze (in last year)</b>					
No of cases	1883	652	1231	899	984
No of wheezing episodes					
• 1 – 3	1406(71,9)	493(75,6)	913(74,2)	651(72,4)	755(76,7)
• 4 – 12	275(14,6)	90(13,8)	185(15)	141(15,7)	134(13,6)
• >12	138(7,3)	45(6,9)	93(7,6)	76(8,5)	62(6,3)
Woken by wheeze					
• Nil	1354(71,9)	399(61,2)	955(77,6)	634(70,5)	720(73,2)
• <1 Per week	468(24,9)	220(33,7)	248(20,1)	233(25,9)	235(23,9)
• ≥1 Per week	49(2,6)	23(3,5)	26(2,1)	26(2,9)	23(2,3)
Limitation of speech during wheezing attack	213(11,3)	55(8,4)	158(12,8)	85(9,5)	128(13)
<b>Rhinitis in last year</b>					
No of cases	4187	1337	2850	1998	2189
Interfere with daily activity					
• Not at all	1286(30,7)	409(30,6)	877(30,8)	581(29,1)	705(32,2)
• Little	2022(48,3)	620(46,4)	1402(49,2)	1001(50,1)	1021(46,6)
• Moderate	703(16,8)	246(18,4)	457(16)	330(16,5)	373(17)
• A lot	144(3,4)	53(4)	91(3,2)	70(3,5)	74(3,4)
<b>Rashes in last year</b>					
No of cases	316	154	162	159	157
Persistent rash without clearing					
Kept awake by rash	123(38,9)	51(33,1)	72(44,4)	63(39,6)	60(38,2)
• Never	225(71,20)	103(66,9)	122(75,3)	115(72,30)	110(70,1)
• < 1 Per week	76(24,1)	38(24,7)	38(23,5)	36(22,6)	40(25,5)
• ≥ 1 Per week	15(4,7)	13(8,4)	2(1,2)	8(5)	7(4,5)

- 90% wheeze in the last year were moderate [GINA 2002].
- Limitation of speech during wheezing attack in the last year: 11,3%.
- Most of rhinitis and chronic rash in the last year (79-85,3%) were not or little interferes with daily activity.

#### IV.2.4. Prevalence of asthma symptoms from video questionnaires:

Table 7

	Overall (%)	Male (%)	Female (%)
Wheezing ever	6,3	6,4	6,2
Wheezing, 12 months	3,6	3,2	4
No. of attacks, 1 month	1,7	1,4	1,9
Exercise wheeze, ever	15,6	18,2	13,4
Exercise wheeze, 12 months	9,5	10,4	8,8
Exercise wheeze, 1 month	5,6	6,6	4,6
Night waking, ever	2,7	2,8	2,6
Night waking, 12 months	1,3	0,8	1,7
Night waking, 1 month	0,6	0,4	0,9
Night cough, ever	18,6	14,8	21,9
Night cough, 12 months	7,6	6,6	8,4
Night cough, 1 month	3,8	3,4	4,1
Severe wheeze (limitation of speech), ever	4,5	4	5
Severe wheeze (limitation of speech), 12 months	3,3	3	3,6
Severe wheeze (limitation of speech), 1 month	1,6	1	2,1

Wheeze in the last year from VQ were 3.6%(compared with 29.1% from WQ)

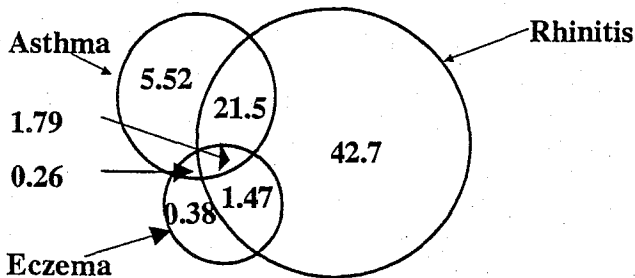
Severe wheeze (limitation of speech), 12 months were 3,3%(compared with 11.3% from WQ).

#### IV.2.5. The relation between 3 diseases:

Table 8: high wheeze prevalence in associated symptom.

	6 - 7 years	13 - 14 years
	Odd Ratio (CI 95%)	Odd Ratio (CI 95%)
Associated with rhinitis	4.19 (3.53 - 4.99)	2.45 (2.09 - 2.86)
Associated with chronic rash	2.78 (2.15 - 3.59)	3.03 (2.34 - 3.94)
Associated with rhinitis and chronic rash	4.07 (3.01 - 5.51)	3.32 (2.50 - 4.40)

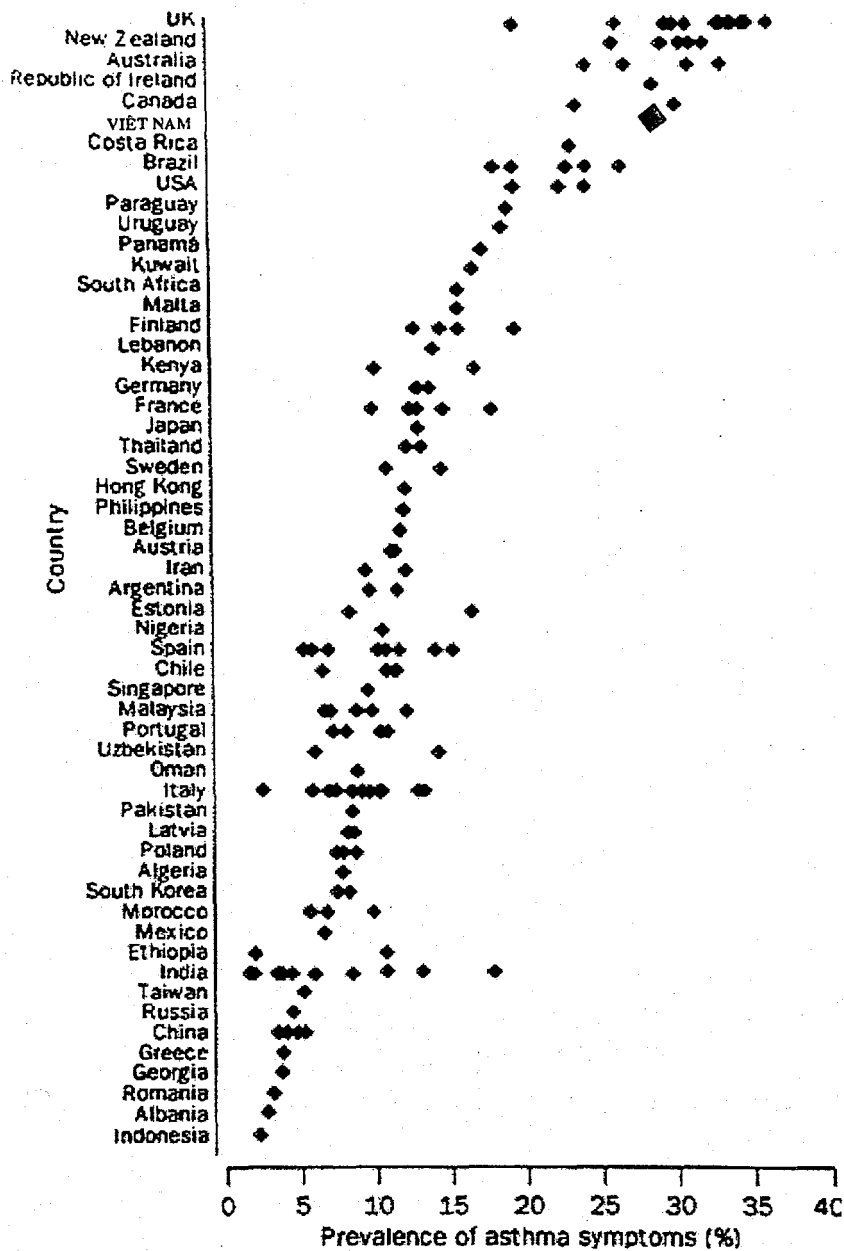
Figure 1:



The relation between 3 diseases

#### V. DISSCUSSION:

This is part of ISAAC established to obtain the optimal values and improve international cooperation in epidemiologic studies for asthma, rhinoconjunctivitis and eczema[3],[5]. Therefore, subjects and method were based on ISAAC protocol. We enrolled 8119 children who agreed to take part in our study with response rate was 92.2% including 3879 children at the age of 6 - 7 and 4240 children at the age of 13 - 14. This response rate is higher than in some studies in Asia. The male - female ratio was the same. Inconsistency ratio in our study was very slow, ranged from 0,4 to 3,6%. This ratio were the same in others studies[5],[6]. Asthma prevalence in our study was very high, in which the prevalence of wheezing was 23,3%, 17% and 29,1% in both age group, at the age of 6 - 7 and 13 - 14 respectively. These prevalence was equal to those in some developed and high prevalent countries such as Australia, England and Newzeland but higher than in some countries in Asia. Prevalence of wheezing last year in HoChiMlnh city at the age of 6 - 7 ranked the second in the region just behind Japan but the highest in Pacific Asia at the age of 13 - 14. Prevalence of wheezing last year at the age of 6 - 7 were: 17,9% in Japan, 15% in Thailand, 10,2% in Singapore. Prevalence of wheezing last year of 13 - 14 age group in some countries were: Singapore: 11,9%, Thailand: 13,9%, Taiwan: 9,7%, Japan: 13,0%, Hongkong: 8,6%, China: 7,2%[4].



This picture shows the prevalence of wheezing last year at the age of 13 – 14 in some countries all over the world[1], [4].

This prevalence shows the high rate of wheezing in schoolchildren in HochiMinh city. This was not the prevalence of asthma symptoms of all Vietnamese children, so we need more multicenter surveys to assess these prevalence in the whole country of Viet Nam. This high prevalence might be due to the urbanization associated with severe air pollution that increase these wheezing prevalence. Another cause may be the misunderstanding in reading comprehension of the written questionnaire because of low education, lack of medical knowledge of the participants, and the difference between Vietnamese translated written questionnaires and original copy. These implications agree with those of some authors in countries not using English as mother tongue[7]. However, these factors do not affect much on the increase of wheezing prevalence because last year wheezing prevalence were very high in both group (17% and 29,1% in age group of 6 – 7 and 13 – 14 respectively).

ISAAC proposed the video questionnaires to get over the limit of written questionnaire in culture and language differences, translating English WQ to other language for using in the study. In this study, we conducted 1081 cases for video questionnaires and we found that the prevalence of wheezing during

the past 12 months in the past was 3.6% (compared with that from WQ: 23.3%). P=0.001. So, wheezing during the past 12 months from VQ were lower than that from QW. These results were similar to those of other authors in some countries such as Korea, Japan, and Thailand. On the other hand, there were good agreements in the results of wheezing from WQ and VQ in countries using English as mother tongue.

The difference between prevalence of wheezing last year and diagnosed asthma were not so much in some studies in Singapore, England, and Australia[1], [3], [5]. However, the prevalence of wheezing last year in our study were 23.3%, compared with 4.8% of diagnosed asthma. There must be remarkable number of underdiagnosed asthma cases, so these patients were not treated and prevented properly. This is very dangerous because children with underdiagnosed asthma could get in severe or life threatening attacks leading to death, although asthma can be treated and prevented. Therefore, it is very difficult to bring high quality of life to the patients who suffer from the disease with high mortality and more and more prevalent. We realized these problems through the fact that the prevalence of wheezing during last year are up to 11.3% but prevalence of diagnosed asthma was only 4.8%. Too many cases of asthma have been omitted!. These finding are similar to implication of GINA (Global Initiative of Asthma): "asthma, underdiagnosis and under-treatment"[8].

There was closed relation between asthma and other allergic diseases such as rhinoconjunctivitis, and eczema. The prevalence of rhinitis last year was very high: 53.1%, in which the prevalence of rhinoconjunctivitis were 17.5%. Eyes itching and rhinitis are specific symptoms of allergic rhinitis. These high prevalences were equal to those of some countries such as: England, Australia, and Newzeland[1]. In spite of high prevalence of rhinitis, ¾ of cases answered that the disease had no or little affection on their daily activities. On the other hand, prevalence of eczema was too low: 5.4%.

#### **Conclusion:**

This is the first international cooperating study based on ISAAC protocol to assess the prevalence and severity of asthma and allergies in childhood in HoChiMinh city. It is also the first time in Viet Nam we have drawn up a general picture about the diseases, contributing to drawing a picture of the diseases on over the world. This study paves the way for a multicenter survey in the whole country of Viet Nam, and provides the basis to establish national health care programs and other studies about the tendency of prevalence increasing by time, and identifying risk factors, etiology of asthma and allergies in childhood. We found that asthma and allergies have high prevalence and severity which were equal to those in some developed countries such as England and Australia, and higher than those in some pacific countries. However, these diseases have not been paid attention to properly, many cases were underdiagnosed and the disease becomes the burden for the patients, their families, and society. Therefore, a national program for diagnosis and management of asthma and allergies is needed to offer patients better quality of life.

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