

## ARTICLE ORIGINAL/ORIGINAL ARTICLE

# PREVALENCE OF ALLERGIC DISEASES IN CHILDREN IN BEIRUT : COMPARISON TO WORLDWIDE DATA

Fouad M. RAMADAN<sup>1</sup>, May N. KHOURY<sup>2</sup>, Theresa A. HAJJAR<sup>3</sup>, Salman M. MROUEH<sup>4</sup>

Ramadan FM, Khoury MN, Hajjar TA, Mroueh SM. Prevalence of allergic diseases in children in Beirut : Comparison to worldwide data. *Leb Med J* 1999 ; 47 (4) : 216-221.

**ABSTRACT** • *Objective* : To report on the prevalence of allergic rhinitis and atopic eczema in school children in Beirut, Lebanon, and compare the prevalence rates of allergic diseases in Beirut to the rest of the world.

*Subjects and Methods* : A random sample of school children aged 13-14 years completed the ISAAC written and video questionnaires. Data was entered using a special program prepared by ISAAC and analyzed using SPSS version 6.0.

*Results* : The prevalence rates of allergic rhinitis and rhinoconjunctivitis were 25.5% and 15.9% respectively. Atopic eczema was more common among males, with a total prevalence rate of 11%.

*Conclusion* : The prevalence rates of allergic diseases in childhood was along the 50th percentile worldwide. The prevalence rates of uncontrolled asthma was very high while that of allergic rhinitis was low as compared to the rest of the world.

Ramadan FM, Khoury MN, Hajjar TA, Mroueh SM. Prévalence des maladies allergiques chez les enfants à Beyrouth : comparaison avec les données mondiales. *J Méd Lib* 1999 ; 47 (4) : 216-221.

**RESUME** • *Objectif* : Etudier la prévalence de la rhinite allergique et de l'eczéma atopique chez les enfants d'âge scolaire à Beyrouth, Liban, et comparer l'incidence des maladies allergiques par rapport aux autres pays.

*Sujets et méthodes* : Un échantillon randomisé d'enfants âgés de 13 à 14 ans a rempli un questionnaire ISAAC : écrit et vidéo. Les renseignements ont été analysés suivant un programme spécial préparé par ISAAC, utilisant SPSS version 6.0.

*Résultats* : Les incidences de la rhinite allergique et de la rhinoconjunctivite étaient respectivement de 25,5% et 15,9%. L'excéma atopique était plus fréquent chez les garçons avec une incidence totale de 11%.

*Conclusion* : L'incidence des maladies allergiques dans le monde est de 50% chez les enfants d'âge scolaire. L'incidence de l'asthme incontrôlé était très élevée alors que celle de la rhinite allergique était basse comparée aux incidences mondiales.

## INTRODUCTION

The prevalence of asthma has increased in the West over the recent decades [1]. This has occurred in association with a rise in the prevalence of other allergic diseases i.e. eczema and hay fever [2-5]. This higher diagnostic rate reflects an increase in the prevalence of atopy [2], there is also an increase in the prevalence of atopic eczema that suggests environmental factors have an important role in the expression of the disease process [6].

As the prevalence of asthma had increased, so did asthma morbidity and mortality [7]. Environmental factors have been incriminated for the increased airway re-

sponsiveness in atopic children which has resulted in the above changes [8]. There is a worldwide variation in the prevalence of asthma, allergic rhinitis and allergic rhinoconjunctivitis, together with an urban-rural variation [9-11].

The European Community Health Survey (ECRHS) was designed to estimate variations in asthma and asthma like symptoms [14], and to answer specific questions about the distribution of asthma in the European Community. The International Study of Asthma and Allergies in Childhood (ISAAC) [15] was initiated to maximize the value of epidemiological research into asthma and allergic diseases. Specific aims were to determine the prevalence and severity of asthma, allergic rhinitis and eczema in children living in different countries, make comparisons within and between countries, obtain baseline measures for assessment of future trends in the severity of allergic diseases and provide a framework for further research into genetic, lifestyle, environmental and medical factors affecting these disease entities. The first phase of the ISAAC study [16] looked at 463801 children 13-14 years of age, from 155 centers in 56 countries. Beirut, Lebanon, was included as a center along with a number of Middle Eastern cities.

1. Department of Internal Medicine, American University of Beirut-Medical Center (AUBMC).

2. School of Nursing, AUB Faculty of Medicine (AUBFM).

3. Department of Family Medicine (AUBMC)

4. Department of Pediatrics (AUBMC).

Correspondence : F. Ramadan, MD. Department of Internal Medicine. P.O.Box : 22C. American University of Beirut - Medical Center. Beirut, Lebanon.

Tel. : +961 1 342914/602395 ; +961 3 702070.

Fax : +961 1 744464.

This paper reports on the prevalence of allergic diseases in Beirut as determined using the ISAAC protocol. It represents the first attempt to study the epidemiology of these diseases in Lebanon, using a worldwide established instrument.

## SUBJECTS AND METHODS

School children aged 13-14 years were selected for the study following the ISAAC protocol. The sample was recruited from 32 schools in Beirut, Lebanon. There were 10 private, 8 semi-private i.e. subsidized and 14 governmental schools. School grades with the highest proportion of children aged 13-14 years were selected. All children, 2994, in such classes were surveyed, out of which there were 2059 students 13-14 years of age. Of these there were 542 students (26.3%) in private schools, 602 students (29.2%) in semi-private schools and 915 (44%) students in governmental schools. All schools that were asked to take part in the study agreed to participate. The study took place during teaching hours, hence all the students in the class did participate.

Each student was asked to complete the ISAAC written questionnaire, which is designed to assess the existence and severity of symptoms, related to asthma, allergic rhinitis and eczema. That questionnaire was translated to Arabic by a certified translator, then back-translated to English by another translator, following the ISAAC protocol.

This was followed by the International ISAAC video questionnaire which related to asthma alone. It consisted of five scenes showing young persons of different ethnic backgrounds, displaying wheezing at rest, post exercise, nocturnal wheeze, nocturnal cough and an episode of severe asthma. After each sequence, participants were asked to write down their answers to questions presented in the video. The purpose of the video questionnaire was to avoid problems related to comprehension or translation and elicit information without using language dependent terminology, hence comparing the prevalence of asthma in different parts of the world. The international version of the ISAAC protocol has been validated in Hong Kong [16].

The study was conducted by two pulmonary physicians and a registered nurse between June and November 1995.

## DATA PROCESSING ANALYSIS

Data was entered using a special program prepared by the ISAAC center and was analyzed using SPSS package for Windows version 6.0. (SPSS Inc., Chicago, USA).

Frequencies on demographic as well as symptomatic variables were obtained and Chi square test was conducted to examine the relationship between wheezing, asthma, sex and type of school.

## RESULTS

The symptoms of asthma are clearly revealed in table I which includes responses to the written and video questionnaire adapted from the ISAAC study.

709 students (34.4%) had nasal symptoms (sneezing, runny or blocked nostrils) in the absence of an upper respiratory tract infection. 534 students (25.5%) experienced symptoms during the last 12 months. 327 students (15.9%) had rhinoconjunctivitis, the symptoms that relate closely to hay fever. Rhinitis had a little impact on activities of 181 students (8.8%), moderate impact on 43 students (2.1%) and 12 students (0.6%) had their activities severely affected by rhinitis. 411 students (20.0%) reported having hay fever.

Rash was reported by 233 students (11%) and was more prevalent among males (52.8%) than females (47.1%). Out of the total of students who had rash, 67.7% reported having rash sometimes during the past 12 months and were considered to have atopic eczema. Moreover, 56.1% had sleep disturbance during the past year as a result of the rash.

## DISCUSSION

This paper is designed to report the incidence of allergic rhinitis and eczema in Beirut, Lebanon, and compare the incidence of allergic diseases in Beirut to the rest of the world. The 12 months prevalence of wheezing remains to be the cornerstone of epidemiological assessment of asthma on a large scale basis. Beirut falls midway between areas of high and those of low prevalence rates, as evident in the ISAAC study (Figures 1 & 2). It was also evident that Beirut ranks high in the

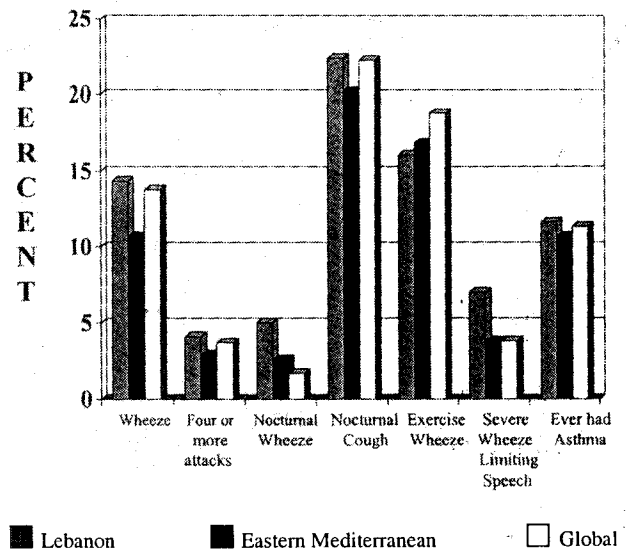


FIGURE 1. Twelve months prevalence of asthma and asthma-related symptoms in Lebanon compared to the Eastern Mediterranean region and the global prevalence : Findings from Written Questionnaire.

**TABLE I**  
**WRITTEN QUESTIONNAIRE**

Question	Number of Students (N = 2059)	%	Question	Number of Students (N = 2059)	%
<b>1. Type of school</b>			<b>12. Sneezing or runny nose ever without flu</b>		
Private	542	26.3	Yes	709	34.4
Semi-private	602	29.2	No	1329	64.5
Governmental	915	44.4	Unspecified	21	1.0
<b>2. Age groups</b>			<b>13. Sneezing or runny nose in the past year</b>		
13 yrs	1285	62.4	Inapplicable	1329	64.5
14 yrs	774	37.6	Yes	534	25.9
<b>3. Sex</b>			No	164	8.0
Males	1178	57.2	Unspecified	32	1.6
Females	881	42.8	<b>14. Itchy watery eyes with nose problem in the past year</b>		
<b>4. Wheezing/whistling in the chest</b>			Inapplicable	1493	72.5
Yes	475	23.1	Yes	327	15.9
No	1555	75.5	No	210	10.2
Unspecified	29	1.4	Unspecified	29	1.4
<b>5. Wheezing/whistling in the chest in the past year</b>			<b>15. Nose problem interfering with daily activities in the past year</b>		
Inapplicable	1555	75.5	Inapplicable	1493	72.5
Yes	286	13.9	Not at all	281	13.6
No	182	8.8	A little	181	8.8
Unspecified	36	1.7	Moderate	43	2.1
<b>6. Attacks of wheezing in the past year</b>			A lot	12	0.6
Inapplicable	1737	84.4	Unspecified	49	2.4
None	34	1.7	<b>16. Hay fever ever</b>		
1-3 attacks	184	8.9	Yes	411	20.0
4-12 attacks	41	2.0	No	1559	77.7
> 12 attacks	27	1.3	Unspecified	49	2.4
Unspecified	36	1.7	<b>17. Rash ever</b>		
<b>7. Sleep disturbance due to wheezing in the past year</b>			Yes	223	10.8
Inapplicable	1737	84.4	No	1810	87.9
Never	101	4.9	Unspecified	26	1.3
< 1 night/week	92	4.5	<b>18. Rash in the past year</b>		
≥ 1 night/week	85	4.1	Inapplicable	1810	87.9
Unspecified	44	2.1	Yes	151	7.3
<b>8. Speech limited due to severe wheezing in the past year</b>			No	66	3.2
Inapplicable	1737	84.4	Unspecified	32	1.6
Yes	112	5.4	<b>19. Rash clear in the past year</b>		
No	167	8.1	Inapplicable	1876	91.1
Unspecified	43	2.1	Yes	94	4.6
<b>9. Asthma ever</b>			No	55	2.7
Yes	244	11.9	Unspecified	34	1.7
No	1775	86.2	<b>20. Sleep disturbance due to rash</b>		
Unspecified	40	1.9	Inapplicable	1876	91.1
<b>10. Wheezing during or after exercise in the past year</b>			Never	65	3.2
Yes	323	15.7	< 1 night/week	43	2.1
No	1634	79.4	≥ 1 night/week	36	1.7
Unspecified	102	5.0	Unspecified	39	1.9
<b>11. Cough not due to cold or chest infection in the past year</b>			<b>21. Eczema ever</b>		
Yes	444	21.6	Yes	241	11.7
No	1538	74.4	No	1767	85.8
Unspecified	77	3.7	Unspecified	51	2.5

**TABLE I**  
**VIDEO QUESTIONNAIRE**

Question	Number of Students (N = 2059)	%	Question	Number of Students (N = 2059)	%
<b>22. Breathing with wistling while at rest</b>			<b>Ever woken up with wheezing during the past month</b>		
Yes	196	9.5	Inapplicable	1830	88.9
No	1884	89.6	Yes	51	2.5
Unspecified	19	0.9	No	21	1.0
<b>Breathing with whistling while at rest during the past year</b>			Unspecified	157	7.6
Inapplicable	1844	89.6	<b>25. Have you been woken at night</b>		
Yes	131	6.4	Yes	316	15.3
No	39	1.9	No	1699	82.5
Unspecified	45	2.2	Unspecified	44	2.1
<b>Breathing with whistling while at rest during the past month</b>			<b>Have you been woken at night during the past year</b>		
Inapplicable	1883	91.5	Inapplicable	1699	82.5
Yes	69	3.4	Yes	209	10.2
No	32	1.6	No	49	2.4
Unspecified	75	3.6	Unspecified	102	5.0
<b>23. Breathing with whistling after exercise</b>			<b>Have you been woken at night during the past month</b>		
Yes	416	20.2	Inapplicable	1748	84.9
No	1607	78.0	Yes	97	4.7
Unspecified	36	1.7	No	57	2.8
<b>Breathing with whistling after exercise during the past year</b>			Unspecified	157	7.6
Inapplicable	1607	78.0	<b>26. Breathing like this ever</b>		
Yes	274	13.3	Yes	150	7.3
No	47	2.3	No	1859	90.3
Unspecified	131	6.4	Unspecified	50	2.4
<b>Breathing with whistling after exercise during the past month</b>			<b>Breathing like this during the past year</b>		
Inapplicable	1654	80.3	Inapplicable	1859	90.3
Yes	158	7.7	Yes	101	4.9
No	60	2.9	No	27	1.3
Unspecified	187	9.1	Unspecified	72	3.5
<b>24. Ever woken up with wheezing</b>			<b>Breathing like this during the past month</b>		
Yes	156	7.6	Inapplicable	1886	91.6
No	1780	86.4	Yes	67	3.3
Unspecified	123	6.0	No	20	1.0
<b>Ever woken up with wheezing during the past year</b>			Unspecified	86	4.2
Inapplicable	1780	86.4			
Yes	101	4.9			
No	50	2.4			
Unspecified	128	6.2			

questions that address the severity and control of asthma i.e. wheezing severe enough to limit speech, nocturnal symptoms and the video scene of acute severe asthma. This reflects many contributing factors in our population, namely : the over reliance on short acting oral and inhaled bronchodilators, the fear and under use of inhaled steroids, the under diagnosis and lack of follow-up of asthmatic patients and the abundance of passive smoke, all of which result in poor control of asthmatic patients in Beirut.

The ISAAC study revealed that the prevalence of allergic rhinoconjunctivitis across the world was less well defined than that of asthma [16]. High prevalence rates were reported from scattered centers across the globe that did not present high prevalence of asthma. Low prevalence rates were reported in parts of Eastern Europe and Central Asia that have low prevalence of asthma [17]. The mean (range) of prevalence of allergic rhinoconjunctivitis symptoms was 13.9% (1.8%-39.7%) [17]. Comparing our results to 155 centers across the world [18],

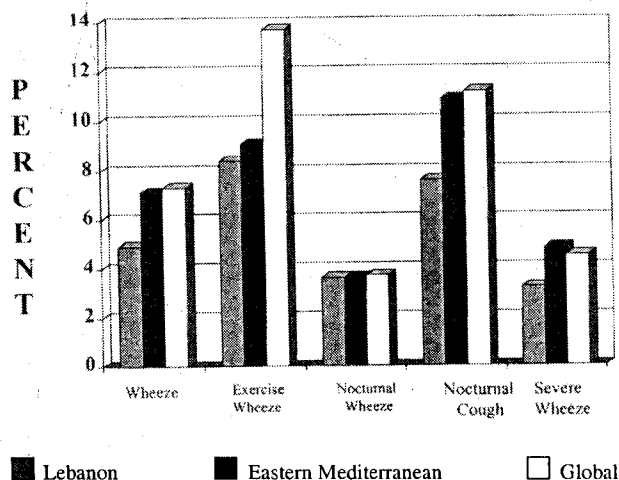


FIGURE 2. Twelve months prevalence of asthma and asthma-related symptoms in Lebanon compared to the Eastern Mediterranean region and the global prevalence : Findings from Video Questionnaire.

the prevalence rates of rhinitis ever and rhinitis in the past year were between the 25th and 50th percentiles. That of rhinoconjunctivitis and hay fever fall between the 50th and 75th percentiles.

The prevalence of severe rhinitis interfering with daily activities was on the 25th percentile. Hence, the control of severe symptoms of rhinoconjunctivitis was better than that of asthma in our study population. This could well be a result of wide availability of (over the counter) antihistamines in Lebanon.

Atopic eczema is an inflammatory skin disorder manifested as an itchy rash that occurs mainly in the flexural areas. The ISAAC study [18] reported highest prevalence rates of atopic eczema in centers that do not have high rates of asthma i.e. Africa and Scandinavia. Low prevalence rates were reported from centers that also have low rates of asthma and allergic rhinoconjunctivitis. William et al [20] reported in the ISAAC study that the prevalence of atopic eczema worldwide ranged between 3 and 17%, that of severe atopic eczema between 0 and 4.3%. Our data shows that the prevalence rates for both atopic eczema and severe atopic eczema fall around the 50% percentile of the world prevalence rates. The higher female to male ratios [19-20] was also noted in our population.

Response rates in the ISAAC study were generally high with 96% (149/155) centers achieving a response rate of 80% or higher. We had a 100% response rate, as all the students in the classes we studied were compliant.

#### CONCLUSION

The availability of standardized and written questionnaires through the ISAAC study has facilitated meaningful comparison of the prevalence of atopic diseases in Beirut, Lebanon, to the rest of the world. It was noted that lifestyle in western countries could be related to

higher prevalence of asthma than developing countries. This could be the result of air pollution, early exposure to certain indoor allergens or nutritional habits. Here we find that Beirut, lying geographically and culturally between the east and west, has rates of asthma symptoms also being midway between those of the east and west. One main exception is related to symptoms of uncontrolled severe asthma, which is surprisingly high. This could well be the result of the over-reliance on bronchodilators and the under usage of inhaled steroids. The prevalence of allergic rhinitis in Beirut was comparable to the rest of the world, with a relatively low prevalence rate of severe symptoms. That of atopic eczema was also comparable worldwide falling on the 50th percentile. The phase II of the ISAAC study is now underway. It involves study of asthmatic students with the contribution of specialists.

#### ACKNOWLEDGMENT

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### نسبة الامراض الاليرجائية (الحساسية) عند اطفال بيروت مقارنة مع معطيات عالمية

**موجز : الغاية -** تقدير نسبة التهاب الانف الاليرجائي والنملة (اكزيما) بالتحاس المباشر في مدرسة اطفال ببيروت - لبنان ومقارنة نسبة امراض الحساسية في بيروت مع ما هو معروف في العالم .

**الموضوع والطرق -** انموذج عشوائي اطفال لمدارس اعمارهم ١٣ - ١٤ عاماً ISAAC متمم للدراسة العالمية للربو والحساسية في الطفولة ولاستبيانات فيديو . ادخلت المعطيات بالاستناد الى برنامج خاص هيأته دراسة عالمية ISAAC وحلته برامج العقل الالكتروني لدراسة الاحصائيات (SPSS 6.0).

**النتائج -** كانت نسبة التهاب الانف الاليرجائي ٢٥,٥٪ ونسبة التهاب الانف والمنظمة العينية ١٥,٩٪ واما الاكزيما بالتحاس المباشر فقد كانت أكثر شيوعاً عند الذكور ونسبتها ١١٪ .

**الخلاصة -** كانت نسبة الامراض الاليرجائية في الطفولة واحد من خمسين ٪ على النطاق العالمي وكانت نسبة الربو غير المراقب عالية جداً بينما نسبة التهاب الانف الاليرجائي كانت متدنية مقارنة مع ما هو معروف في العالم .