

Prevalence and Severity of Allergic Diseases among Egyptian Pediatric in Different Egyptian Areas

Melad Abdu Alhmed Al Dhduh¹, Nagwa Ali Mohamed Sabri² and Eman Mahmoud Fouda³

¹Bachelor of Pharmaceutical Sciences, El-Mergab University, Alkhoms, Libya

²Head of Clinical Pharmacy Department, Faculty of pharmacy, Ain Shams university, Cairo, Egypt

³Department of Pediatric, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Abstract

Background: Allergic diseases have become one of the top three conditions demanding major effort toward prevention and control in the 21st century, according to the World Health Organization. Recently, the prevalence of asthma and allergic disease has increased annually throughout the world. It is not only affect the quality of life for children, but also creating a serious burden on all of society and family life.

Objective: To investigate the prevalence and severity of allergic disease and the associated risk factors among school children at Al Maasara and Al Maadi region in the south of Cairo.

Methods: A cross – sectional study, the International Study of Asthma and Allergic in Childhood (ISAAC) conducted in a random sample of the students of preparatory school at Al Maadi and Al Maasara region in the south of Cairo between February and April 2014. A total of 308 students aged 11-14 years were interviewed for this study .The questionnaire was adapted from ISAAC phase one project and those questions were slightly modified and translated into Arabic.

Results: The total number of the sample was 510, only 308 of them have participated in this study, while the rest of number of sample was excluded because they were not in target age or refused participation. The prevalence of asthma and other allergic diseases like allergic rhinitis and atopic eczema were 46.1%, 34.5% and 20.4% respectively .The severity of asthma including recurrent wheezes, exercise-induced asthma, and nocturnal cough were approximately 26.9%, 19.2%, and 29.9% respectively. Passive smoking, family history and parent's education are significantly difference among children with asthma symptoms compared to others without asthma. 46.4% of children reported a visit to hospital and around 13.6% to 21.1% reported at least two or three day's absence from school due to asthma.

Conclusion: The prevalence of asthma in the general population of the Al Maasara and Al Maadi areas is high .

Introduction

Asthma and other allergic diseases of common diseases, which is still incomprehensible to a large extent, despite the abundance of researches. Allergic diseases are demanding a major effort toward prevention and control in the 21st century. In recent years, increased the spread of this disease annually worldwide, according to the World Health Organization [1], seriously affecting the quality of life of children, and creating a serious burden on both families and society. Allergic disease can be fatal if not controlled [2], and more challenge both public health organizations and healthcare providers will be always expected [3] .

Around 300 million people suffered from asthma and 255,000 died of asthma in 2005, according to World Health Organization (WHO) [4] . Up to 25% of world's population suffers from allergic disease including asthma, allergic rhinitis, eczema and drug reactions [5].

Epidemiology of asthma and allergies in childhood is of considerable interest and importance because of increasing both economic impact on the health service and the fact regarding the growing challenge to control and manage chronic allergic diseases in whatever country, including African and Asian countries [6].

Approximately 7% of the population of the United States are affecting by asthma and causes nearly 4,210 deaths per year [6-8]. In 2005, asthma affected more than 22 million people, including 6 million children, and accounted for nearly 500,000 hospitalizations that same year [9]. In 2010, asthma accounted for more than one-quarter of admitted emergency department visits in the U.S. among children aged 1-9 years, and it was a frequent diagnosis among children aged 10-17 years [10]. From 2000 to 2010, the rate of pediatric hospital stays for asthma dropped from 165 to 130 per 100,000 population, respectively, whereas

Publication History:

Received: January 29, 2015

Accepted: March 12, 2015

Published: March 14, 2015

Keywords:

Asthma, Allergy, Prevalence, Severity, Al Maasara and Al Maadi

the rate for adults remained about 119 per 100,000 population [11].

Asthma is the most prevalent diseases in the United States compared to other countries of the world, as it varies greatly between ethnic population [12]. Prevalence of asthma is highest in Puerto Ricans, African Americans, Filipinos, Irish Americans, and Native Hawaiians, and lowest in Mexicans and Koreans [13]. In 2010, more than three times higher among African American children entered to the hospital due to asthma, and twice the highest for African Americans adults compared with white and Asian and Pacific [11]. In addition, rate of asthma prevalence differ among populations of the same ethnicity who are born and live in different places [14]. Mexican populations who born in the U.S for example ,have a higher asthma rates than compared to non U.S born Mexican populations that they are living in the U.S [15].

Asthma affects an estimated 5% of the United Kingdom's population [16] . In England, for example, nearly 261,400 people were newly diagnosed with asthma in 2005, 5.7 million people had an asthma diagnosis and were prescribed 32.6 million asthma-related

Corresponding Author: Melad Abdu Alhmed Al Dhduh, Bachelor of pharmaceutical sciences, El-Mergab University, Alkhoms, Libya; E-mail: melad_aldhduh@yahoo.com

Citation: Al Dhduh MAA, Mohamed Sabri NA, Fouda EM (2015) Prevalence and Severity of Allergic Diseases among Egyptian Pediatric in Different Egyptian Areas. Int J Pharm Sci Res 2: 107. doi: <http://dx.doi.org/10.15344/2394-1502/2015/107>

Copyright: © 2015 Al Dhduh et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

prescriptions [17].

The International Study of Asthma and Allergies in Childhood (ISAAC) has established a standardized methodology to maximize the value of epidemiological research into asthma and allergic disease and facilitating international collaboration. ISAAC has become the largest worldwide collaborative research projects ever undertaken, involving more than 100 countries and nearly 2 million children and its aimed to develop environmental measures and disease monitoring in order to form the basis for future interventions to reduce the burden of allergic and non-allergic diseases, especially in children in developing countries [18].

Methods

It was a cross-sectional study, the International Study of Asthma and Allergic in Childhood (ISAAC) conducted in a random sample of the students of preparatory school at Al Maadi and Al Maasara region in the south of Cairo between February and April 2014.

Study sample

A sample study consisted of the students attending to the preparatory schools. A total of 308 students aged 11-14 years were interviewed for this study. The questionnaire was adapted from ISAAC phase one (International Study of Asthma and other Allergic in Childhood) project [19] and certain questions were modified and translated into Arabic.

Data collection

Interviews were conducted by fifteen local interviews (ten for Al Maasara and five for Al Maadi). The interviewers were students who had been trained about respiratory symptoms attack, allergic disease and interview technique. Questions in the interview were generally closed and it is not required to interpretation. The interview lasted from ten to fifteen minutes.

A pilot study was done at Pediatric out-patient clinic Ain Shams University Hospital on a twenty five children in order to estimate potential response and to ensure acceptability of questionnaires and the language proposed. Items that could be poorly understood were modified and slightly modification in the study tool was done.

The ISAAC project pattern written questionnaire would be used for fulfilling items:

Socio-demographic data including

Patient's age, sex, education level, income level, average size of the patient's family. Schools and hospitals: infrastructure of medical advice, first aid tools.

Environment exposure including

Gastrointestinal or skin exposure to food allergens; respiratory exposure to indoor and outdoor allergens; presence of environmental pollutants such as tobacco smoke, factories pollution; and exposure to microbial compounds.

Symptoms of allergic disease including

Frequency and severity of the symptoms, time and seasons at which the symptoms begin, other problems associated with the patient's symptoms, effect of these symptoms on patient's education and quality of life.

Management of allergic disease including

Pharmacological and non-pharmaco-logical measures, frequency of using an inhaler, effectiveness and adverse events of the used drugs.

Statistical analysis

The collecting data was coded, tabulated and statistically analyzed using SPSS13.0 software program (statistical package for social science). Both descriptive and comparative analyses were done. Different statistical tests were performed for quantitative and qualitative variable the level of significance was taken at p value < 0.05.

In this study comparative analysis was done to examine the relation between:

- Gender difference (males and females) in relation to asthma.
- Distribution of asthma in relation to socio-demographic class.
- Risk factors (exposure to smoking, family history of atopy presence of nearby air pollution, and exposure to family pits or far animals), severity indices of diseases and hospitalization due to asthma.
- Distribution of other atopic diseases (allergic rhinitis and atopic dermatitis) in relation to asthma.

Descriptive statistics were done for numerical data by range, mean and standard deviations while it done for categorical data by number and percentage.

Comparative studies were done for numerical data using student's t-test and studies were done for categorical data using Chi-square test for comparison between variables.

Result

Prevalence

Of the 510 respondents, 67 were excluded because they were not aged 11 to 14 years and 135 refused to participate in study. As a result, the number of valid questionnaires for the following analysis was 308 (Figure 1).

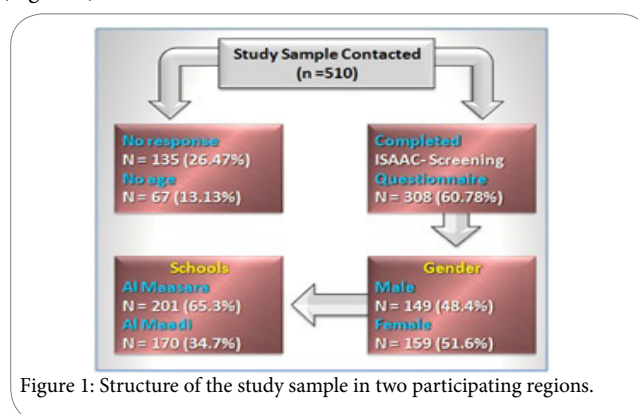


Figure 1: Structure of the study sample in two participating regions.

Table 1 provides the prevalence of symptoms of asthma, allergic rhinitis, and atopic eczema. The prevalence of "asthma symptoms" were 46.1%. Females tended to have a higher reported prevalence than Males as regards to Al Maasara and Al Maadi schools. For the current status the prevalence of "recurrent wheezes", "exercise-induced asthma", and "nocturnal cough" were approximately 26.9%, 19.2%, and 29.9%, respectively. In spite of nocturnal cough was more common among students in both schools, compared to recurrent wheezes and exercise-induced asthma, the difference is not statistically significant.

Symptoms	Al Maasara N = 201	Al Maadi N = 107	Total N = 308	P value
Gender as regards asthma				
- Male	55(55.5%)	14(32.5%)	69(48.59%)	0.012
- Female	44(44.4%)	29(67.4%)	73(51.4%)	
Asthma symptom	99(49.3%)	43(40.2%)	142(46.1%)	0.161
-Wheezes	58(56%)	25(23.4%)	83(26.9%)	0.257
-Nocturnal cough	56(27.9%)	36(33.6)	92(29.9)	0.878
-Chest tightening	49(47.3%)	26(24.3%)	75(24.4%)	1.00
-Exercise induced asthma	36(17.9%)	23(21.5%)	59(19.2%)	0.878
Allergic rhinitis				
-Nasal allergy	23(11.44%)	15(14%)	38(12.33%)	0.376
Atopic eczema				
-Skin allergy	27(13.43%)	10(9.34%)	37(12%)	0.920
-Food allergy	50(24.88%)	24(22.43%)	74(24.03%)	0.90

Table 1 : Prevalence of Symptoms of Asthma, Rhinitis, and Eczema From Written Questionnaires of the ISAAC Project in 11- to 14-Year-Old Children in Al Maasara and Al Maadi in 2014.
ISAAC: International Study of Asthma and Allergies in Children

The prevalence of asthma according to “father and mother’s educated and non educated” were 87.1%, 12.9% respectively for father (P = 0.045) and 79.6%, 20.4% respectively for mother (P= 0.036). The education of both parent were significant difference compared to non-educated parent.

The prevalence of “passive smoking” regarding to school locations were 46.8% in Al Maasara and 46.4% in Al Maadi region. There is no significant difference. Whereas , the prevalence of “passive smoking” among students as regards presence or absence of asthma symptoms were 52.8% and 46.8% respectively. The students with asthma symptoms were statistically significant difference (P=0.320).

The prevalence of “family history” among students as regards presence or absence of asthma symptoms were 47.9% and 52.1% respectively. The students with asthma symptoms were statistically significant difference (P<0.001).

The prevalence of “skin allergy” and “food allergy” among students as regards presence or absence of asthma symptoms were 20.4% and 4.8% respectively for skin allergy and 37.3% and 13.3% respectively for food allergy. There is no significant difference of both. According to “environmental exposure”, higher percentage of students with asthma symptoms lives nearby factories, nearby coffee shops and higher percent of them living with or exposed to animals (26.1%, 65.5% and 62.7% respectively).

Severity

The prevalence of the severity of symptoms of recurrent wheezing, rhinitis, and eczema are given in Table 2. The prevalence is the number of patients who reported having that specific symptom. Approximately 26.9% of recurrent wheezes (n =83) experienced severe wheezing, 34.5% of the students who reported rhinitis (n = 49), and 20.4% of the students with skin allergy (n=29).

Regarding to the different symptoms of the 3 allergic diseases under analysis, Al Maasara and Al Maadi did not demonstrate any significant differences in severity.

Factor	Asthma symptoms		Chi square	
	Present	Absent	X ²	P value
Gender				
-Male	69(48.6%)	80(48.2%)	0.002	0.964
-Female	73(51.4%)	86(51.8%)		
Mother’s education				
-Educated	78(79.6%)	113(90.4%)	4.379	0.036
-Non educated	20(20.4%)	12(9.6%)		
Father’s education				
-Educated	81(87.1%)	111(95.7%)	4.015	0.045
-Non educated	12(12.9%)	5(4.3%)		
Family history	68(47.9%)	33(19.9%)	25.984	<0.001
Allergy				
-Skin allergy	53(37.3%)	22(13.3%)	0.004	0.953
-Food allergy	49(34.5%)	13(7.8%)	3.913	0.048
-Nasal allergy	29(20.4%)	8(4.8%)	1.427	0.232
Environmental exposure				
-Nearby factories	37(26.1%)	20(12%)	9.958	0.002
-Nearby coffee shops	93(65.5%)	83(50%)	7.501	0.006
-Nearby trucks	137(96.5%)	154(92.8%)	2.018	0.155
-Pet exposure	89(62.7%)	68(41%)	14.437	<0.001
-Passive smoking	75(52.8%)	67(47.2%)	0.989	0.320

Table 2: Factors regarding to the severity of asthma, rhinitis, and eczema symptoms from written questionnaires of the ISAAC project in 11- to 14-Year-Old children reporting symptoms in Al Maasara and Al Maadi in 2014.

Many questions collected information on the severity of asthma symptoms on subjects (Table 3). Around 46.1% of subjects overall reported being disabled by their asthma all or most of the time. In addition, a similar proportion of respondents (46.4%) reported visit

to a hospital due to asthma, a few number of them (3.3%) reported at least one visit to an intensive care unit admission. Moreover, around 13.6% to 21.1% reported at least two or three day's absence from school due to asthma.

During the interview, subjects were asked whether they had ever received a medications for asthma, around 15.7% of respondents reported use nebulizer at home, whereas 28.6% of them were used inhaler medications (12.4% on demand and 16.2% regular).

	N (%)
Severity of asthma attack	170(55.2%)
-Missed school day due to asthma symptoms.	65(21.1%)
-No absence	31(10.1%)
• <5days	42(13.6%)
• 5-10 days	56(18.2%)
• >10 days	26(46.4%)
-Acute asthma symptoms at school	56(3.3%)
-Hospitalization due to asthma symptoms	
-ICU admission	
Medications used	29(15.7%)
-Nebulizer at home	80(43.2%)
-Antibiotic	112(60.5%)
-Cough remedies	53(28.6)
-Inhalers	23(12.4%)
• On demand	30(16.2%)
• Regular	

Table 3: Distribution of students as regards severity of asthma attack and medications used.

Link of asthma symptoms and other allergic disease

Of all the factors, the diagnosis or existing symptoms of respiratory allergies like allergic rhinitis had a significant relationship with asthma symptoms. However, skin allergy or eczema did not reveal a significant relationship with asthma symptoms.

Discussion

Generally, prevalence of asthma in the general population of the Al Maasara and Al Maadi region participating in this study was estimated to 46.1%, with no pertinent difference apparent between two regions in our study.

ISAAC phase 1 questionnaires used to evaluate the prevalence and severity of asthma and other allergic disorders. The consistency of the survey methods was believed to make the results more comparable. In this study, we collected 308 valid questionnaires and Prevalence rates for pediatric asthma in the two regions (Al Maasara and Al Maadi), ranged from 49.3% to 40.2%. In general, prevalence rates for asthma in children were quite similar across the two regions, probably reflecting similarity exposure to environmental and lifestyle risk factors.

ISAAC and ECRHS [20, 21], we observed a higher prevalence of asthma in females subjects than males. However, this difference was not consistent between regions, being a bit high in Al Maadi but not observable in Al Maasara. To the best of our knowledge, no study has yet described, the prevalence of pediatric asthma among school children in two regions. However, many studies tried to estimate the prevalence of asthma among children in other governorates. The prevalence of asthma among 2645 school children aged 11-15 years old in Cairo and the found that prevalence of wheezes during last year was 14.7% [22].

Most subjects reported that their asthma had a significant impact on their lives. More than 40% of subjects reported asthma related defect all or most of the time, nearly 4% had visited an emergency department due to asthma and about 40% to 45% had been hospitalized or required time off school. These findings suggest that asthma is poorly controlled in two regions. However, like recent reports of the variable trends in hospital admission rates for asthma in different countries around the world, there are still some studies revealing the opposite results and showing the severity of asthma and respiratory symptoms still increasing in some populations and areas[23-25]. It is also possible that some environmental factors can affect the prevalence of severe asthma symptoms in different areas. Several epidemiology studies have shown that exposure to environmental tobacco smoking (ETS) is associated with poor respiratory health in children, adversely affect lung function and may increase the risk of development of bronchial asthma. This was agreement with [26, 27]. They found that there was association between exposure to ETS and prevalence of asthma children.

Conclusion

In conclusion, it was clear that the prevalence of asthma and other atopic disease among Egyptian school children is high, prevalence of asthma, allergic rhinitis, and atopic dermatitis among school children in Al Maasara and Al Maadi region were 46.1%, 12.33% and 12.01%, respectively. Air pollution, living in urban areas, exposure to ETS, animal outside or inside the house, family history of allergy, are significant risk factors for asthma. Early exposure to allergens in susceptible individuals in first years of their lives have a significantly higher probability of developing asthma and atopic phenotype (Eczema, Rhinitis) during childhood [28].

Skin allergy, family history, passive smoking and nasal allergy seems to be risk for asthma in both schools.

Competing Interests

The authors declare that they have no competing interests.

Author Contributions

All the authors substantially contributed to the study conception and design as well as the acquisition and interpretation of the data and drafting the manuscript.

References

- Masoli M, Fabian D, Holt S, Beasley R; Global Initiative for Asthma (GINA) Program (2004) The global burden of asthma: executive summary of the GINA Dissemination Committee report. *Allergy* 59: 469-478.
- Sullivan SD, Liljas B, Buxton M, Lamm CJ, O'Byrne P, et al. (2001) Design and analytic considerations in determining the cost-effectiveness of early intervention in asthma from a multinational clinical trial. *Control Clin Trials* 22: 420-437.
- Akinbami LJ, Moorman JE, Garbe PL, Sondik EJ (2009) Status of childhood asthma in the United States, 1980-2007. *Pediatrics* 123 Suppl 3: S131-145.
- Schneider L, Tilles S, Lio P, Boguniewicz M, Beck L, et al. (2013) Atopic dermatitis: a practice parameter update 2012. *J Allergy Clin Immunol* 131: 295-299.
- Matasar MJ, Neugut AI (2003) Epidemiology of anaphylaxis in the United States. *Curr Allergy Asthma Rep* 3: 30-35.
- Fanta CH (2009) Asthma. *N Engl J Med* 360: 1002-1014.
- Lazarus SC (2010) Clinical practice. Emergency treatment of asthma. *N Engl J Med* 363: 755-764.

8. Getahun D, Demissie K, Rhoads GG (2005) Recent trends in asthma hospitalization and mortality in the United States. *J Asthma* 42: 373-378.
9. www.cdc.gov/nchs/about/major/nhis/reports_2005.htm
10. Wier LM, Yu H, Owens PL, Washington R (2013) Overview of Children in the Emergency Department, 2010: Statistical Brief #157.
11. Barrett ML, Wier LM, Washington R (2014) Trends in Pediatric and Adult Hospital Stays for Asthma, 2000–2010: Statistical Brief #169.
12. Gold DR, Wright R (2005) Population disparities in asthma. *Annu Rev Public Health* 26: 89-113.
13. Davis AM, Kreutzer R, Lipsett M, King G, Shaikh N (2006) Asthma prevalence in Hispanic and Asian American ethnic subgroups: results from the California Healthy Kids Survey. *Pediatrics* 118: e363-370.
14. Gold DR, Acevedo-Garcia D (2005) Immigration to the United States and acculturation as risk factors for asthma and allergy. *J Allergy Clin Immunol* 116: 38-41.
15. Eldeirawi KM, Persky VW (2006) Associations of acculturation and country of birth with asthma and wheezing in Mexican American youths. *J Asthma* 43: 279-286.
16. Anderson HR, Gupta R, Strachan DP, Limb ES (2007) 50 years of asthma: UK trends from 1955 to 2004. *Thorax* 62: 85-90.
17. Simpson CR, Sheikh A (2010) Trends in the epidemiology of asthma in England: a national study of 333,294 patients. *J R Soc Med* 103: 98-106.
18. Aberg N (1989) Asthma and allergic rhinitis in Swedish conscripts. *Clin Exp Allergy* 19: 59-63.
19. Asher MI, Keil U, Anderson HR, Beasley R, Crane J, et al. (1995) International Study of Asthma and Allergies in Childhood (ISAAC): rationale and methods. *Eur Respir J* 8: 483-491.
20. de Marco R, Locatelli F, Sunyer J, Burney P (2000) Differences in incidence of reported asthma related to age in men and women. A retrospective analysis of the data of the European Respiratory Health Survey. *Am J Respir Crit Care Med* 162: 68-74.
21. (1998) Worldwide variations in the prevalence of asthma symptoms: the International Study of Asthma and Allergies in Childhood (ISAAC). *Eur Respir J* 12: 315-335.
22. Georgy V, Fahim HI, El-Gaafary M, Walters S (2006) Prevalence and socioeconomic associations of asthma and allergic rhinitis in northern [corrected] Africa. *Eur Respir J* 28: 756-762.
23. Chapman KR, Ernst P, Grenville A, Dewland P, Zimmerman S (2001) Control of asthma in Canada: failure to achieve guideline targets. *Can Respir J* 8 Suppl A: 35A-40A.
24. Khadadah M, Mahboub B, Al-Busaidi NH, Sliman N, Soriano JB, et al. (2009) Asthma insights and reality in the Gulf and the near East. *Int J Tuberc Lung Dis* 13: 1015-1022.
25. Adachi M, Ohta K, Morikawa A, Nishima S (2006) [Asthma Insights & Reality in Japan 2005]. *Alerugi* 55: 1340-1343.
26. Thomson NC (2007) The role of environmental tobacco smoke in the origins and progression of asthma. *Curr Allergy Asthma Rep* 7: 303-309.
27. Gold DR (2000) Environmental tobacco smoke, indoor allergens, and childhood asthma. *Environ Health Perspect* 108 Suppl 4: 643-651.
28. Jaakkola JJ, Hwang BF, Jaakkola N (2005) Home dampness and molds, parental atopy, and asthma in childhood: a six-year population-based cohort study. *Environ Health Perspect* 113: 357-361.