

RISK FACTORS OF CHILDREN'S ASTHMA (6-12 YEARS OLD) IN KHORRAMABAD, IRAN: A CASE CONTROL STUDY

Ali Amiri, Nishteman Ghaderi, Zia Obeidavi*, Saber Khorramabadi, Javad Torkashvand, Elham Sheikhi, Behrouz Beiranvand

Department of Internal Medicine, Lorestan University of Medical Sciences, Khorramabad, IRAN

ABSTRACT

The aim of this study is to investigate the risk factors involved in the morbidity of asthma in Khorramabad city and its suburban areas. In the present case-control research, all the patients who had referred to the Shahid Rahimi Hospital and a pulmonary disease sub-specialist's office in Khorramabad in 2015 and had been diagnosed with asthma by a pulmonary disease sub-specialist and based on the criteria of Global Initiative for Asthma (GINA) were enrolled in the study. The census taking sampling method was used and all patients with immunodeficiency, congenital diseases, chronic allergic pulmonary diseases or sinusitis were excluded. The control group that matched the experimental group in terms of age, sex and the place of residence were selected from among those referring to the ophthalmological and dermatological clinics of the Shahid Rahimi Hospital. The data collection instrument used in this study was a questionnaire that included items related to the demographic information of the patients, and also questions regarding the patient's economic and social situation as well as the patient's clinical symptoms from birth until the present. All parents of the selected children signed written consents regarding their participation in the study. The data were analyzed using SPSS software. The mean age of the patients was 8.5 ± 2.1 and 60.3 percent of the patients were male. The average age of the mothers of asthmatic children was higher than the mothers of healthy children and this difference was statistically significant (P -value= 0.009). The mean duration of breastfeeding in healthy children was higher than the asthmatic children and this difference was Statistically significant (P -value= 0.001). There was observed a statistically significant relationship between a background of asthma or allergy among first-degree relatives and the development of asthma in the patients themselves (P -value < 0.05). The children of highly educated parents were less likely to develop allergic diseases and asthma, which could be attributed to the knowledge of the parents about various diseases. Given the risk factors, it can be concluded that acquired factors can play an important role in the occurrence of this disease in children.

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*Corresponding author: Email: ziaobd@gmail.com; Tel.: +98-6633203004

INTRODUCTION

Global Strategy for Asthma Management and Prevention Guidelines define asthma as “a chronic inflammatory disorder of the airways associated with increased airway hyper-responsiveness, recurrent episodes of wheezing, breathlessness, chest tightness, and coughing” [1]. Asthma, which typically begins in childhood and is the most common chronic disease of childhood, has reached epidemic proportions [2-4]. In the International Study of Asthma and Allergies in Childhood (ISAAC), the highest asthma prevalence was observed in westernized English-speaking countries (e.g., the United Kingdom, Australia, and New Zealand), with much lower prevalence rates in Eastern Europe, India, China, other countries in Asia, and Africa [5]. This observation has led to the belief that the rapid increases in asthma prevalence are more likely to be attributable to environmental than genetic factors. The rising prevalence in the United States and worldwide seems to be correlated with modern industrialization, suggesting that changes in the ambient environment may contribute to this increase in morbidity and mortality [6].

The responsible causes of initiating asthma are specific factors referred as allergens, which are present in the patients' surroundings originating from outdoor and indoor environment. Hence, allergens are divided into two categories; the outdoor allergens such as pollen grains, fungal spores, dust particles and non-specific irritants, and the indoor allergens such as House Dust Mites (HDMs), animal allergens, fungal allergens, insects, and rodent allergens, etc. [7].

In addition to sensitizing factors mentioned above, there are other non-sensitizing or irritating factors such as air pollution (primarily chemicals), cigarette and tobacco smokes, etc. present in both outdoor and indoor environment.

These irritating factors also play a role in the exacerbation of the allergic symptoms or may cause asthma and breathing problems temporarily [5, 8].

Considering the diversity of asthma risk factors in different regions of the world, much work remains to be done in defining the environmental factors that may cause asthma and that may trigger asthma exacerbations in individuals with the disease. Because of this issue, this study tries to investigate the risk factors involved in the morbidity of asthma in Khorramabad (a mountainous region in Lorestan province, southwest of Iran); so that, by identifying these factors and educating parents, the occurrence of this disease can be prevented as much as possible.

MATERIALS AND METHODS

In the present case-control research, all the patients who had referred to the Shahid Rahimi Hospital and a pulmonary disease sub-specialist's office in Khorramabad (a mountainous region located over 1000 meters above sea level in Lorestan province, southwest of Iran [Figure-1]) in 2015 and had been diagnosed with asthma by a pulmonary disease sub-specialist and based on the criteria of Global Initiative for Asthma (GINA) were enrolled in the study. GINA is the standard criteria used to diagnose asthma based on clinical symptoms and patient history and its items include: continuous wheezing in the chest more than once a month, wheezing and coughing after physical activity, the presence of coughs especially nighttime coughs without viral infection, wheezing that is independent of the effect of the season, continuation or worsening of symptoms after 3 to 6 years of age when encountering furry animals, chemical compounds, air fresheners and detergents, intense physical activity, viral infections of the respiratory tract, exposure to cigarette smoke, and exposure to emotional situations, remission of symptoms by medicines used for the treatment of asthma, and persistent colds, or the continuation of disease for more than 10 days. In the present research, only patients residing in Khorramabad and its suburban areas were studied. The census taking sampling method was used and all patients with immunodeficiency, congenital diseases, chronic allergic pulmonary diseases or sinusitis were excluded. Finally, 150 patients diagnosed with asthma were selected as the volume of the sample. The control group that matched the experimental group in terms of age, sex and place of residence were selected from among those referring to the ophthalmological and dermatological clinics of the Shahid Rahimi Hospital, provided that they had no backgrounds of chronic physical and mental illnesses.

The data collection instrument used in this study was a questionnaire that included items related to the demographic information of the patients, and also questions regarding the patient's economic and social situation as well as the patient's clinical symptoms from birth until the present. Based on reference books, factors listed in the questionnaire were the most important factors affecting asthma. The same data were collected from the members of the control group. All the diagnostic studies for the diagnosis of the disease were carried out by a pulmonary disease sub-specialist. All parents of the selected children signed written consents

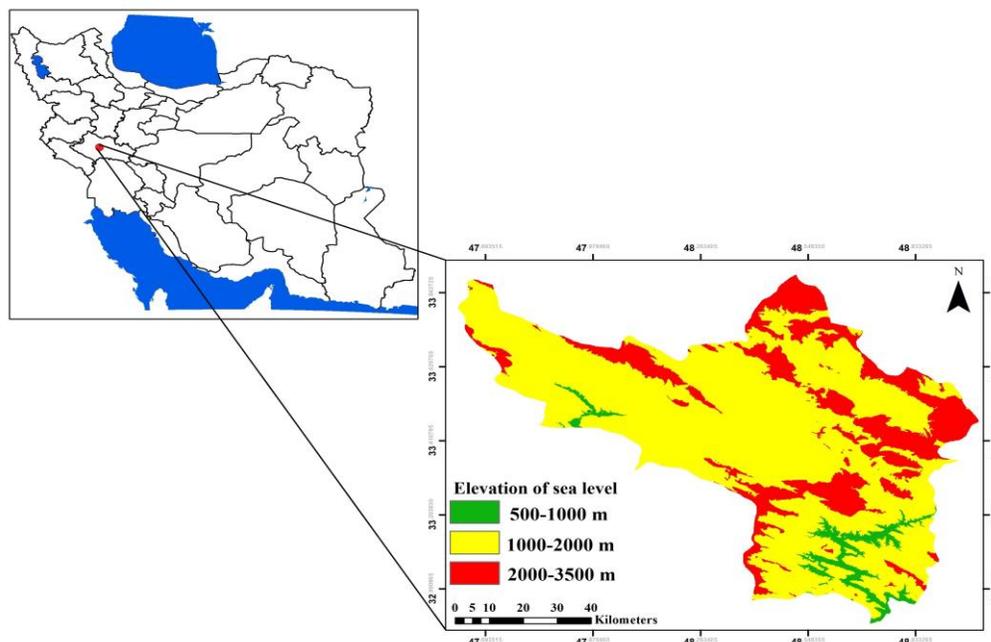


Fig. 1. Digital Elevation Mode (DEM) of Khorramabad city and its suburban areas

regarding their participation in the study. The data were analyzed using SPSS software. Descriptive statistical methods, the Chi-square test, and the Fisher's exact test, were used. In order to determine the intensity of the risk factors and the development of asthma, the odds ratio estimate was used with a confidence interval of 95%.

RESULTS

In the present research, 150 patients suffering from asthma and 150 children in the control group were studied. The mean age of the patients was 8.5 ± 2.1 and the mean age of the control group members was 8.1 ± 4.2 . The youngest patient was 4 years old and the oldest was 14 years old. 60.3% of the children were male and 39.7% were female, while the same figures in the control group were 61.9% and 38.1% respectively. The sex ration (male over female) of the patients suffering from asthma was 1.5 over 1. The average age of the mothers of asthmatic children (26 ± 5 years old) was higher than the mothers of healthy children and this difference was statistically significant (P -value= 0.009). The frequency distribution of the demographic characteristics of the patients and the control group is presented in [Table-1] in detail.

Table: 1. Frequency distribution of the demographics of the patients and the control group

Type of variable		Patients N (%)	Control group N (%)	P value
Sex	Male	94 (62.7)	88 (58.7)	
	Female	56 (37.3)	62 (41.3)	
Father's educational attainment	Illiterate	6 (4)	7 (4.7)	0.001
	Junior high school or less	55 (36.7)	8 (5.3)	
	High school or High school diploma	27 (18)	49 (32.6)	
	University	62 (41.3)	86 (57.3)	
Mother's educational attainment	Illiterate	19 (12.7)	3 (2)	0.001
	Junior high school or less	41 (27.3)	26 (17.3)	
	High school or High school diploma	49 (32.7)	52 (34.7)	
	University	41 (27.3)	69 (46)	
Father's Occupation	Office employee	63 (42)	68 (45.3)	0.161
	Self-employed	86 (57.3)	79 (52.7)	
	Unemployed	1 (0.7)	3 (2)	
Mother's Occupation	Office employee	15 (10)	10 (6.7)	0.231
	Self-employed	3 (2)	5 (3.3)	
	Housewife	132 (88)	135 (90)	
Place of residence	Urban areas	132 (88)	150 (100)	
	Rural areas	18 (12)	0 (0)	

The mean duration of breastfeeding in healthy children was higher than the asthmatic children and this difference was Statistically significant (P -value= 0.001). In the case group, 42% of mothers had vaginal delivery, the same figure in the control group was 46.7%, this difference was not statistically significant (P -value= 0.243). On the other hand, the average number of family members of asthmatic children (4.7 ± 2.1) was higher than the average number of family members of healthy children (3.9 ± 0.6) and this difference was statistically significant (P -value= 0.023).

One of the main objectives of this study was to investigate the relationship between asthma and having a familial background of asthma or allergy among first-degree relatives and to determine the intensity of this relationship. In this regard, 62 patients (41.3%) had a familial background of asthma among their first-degree relatives. The same figure in the control group was 34 cases (22.7%) and based on the chi squared test, this difference was statistically significant (P -value=0.004). The intensity of the relationship was determined using the odds ratio, which was calculated to be 3.96 (CI=0.48-7.61). Additionally, 71 patients (47.3%) had a familial background of allergy among their first-degree relatives. The same figure in the control group was 40 cases (26.7%) and based on the chi squared test, this difference was statistically significant (P -value=0.001). The intensity of the relationship was determined using the odds ratio, which was calculated to be 4.5 (CI=2.21-8.16).

In present study, tobacco consumption was higher among the parents of asthmatic children, but the difference was not statistically significant (P -value=0.093).

DISCUSSION

Since asthma is one of the most important health problems, identifying its risk factors is very important for diagnostic and preventive purposes [9]. In the present research, 150 asthmatic children who had referred to the Shahid Rahimi hospital of Khorramabad during one year were studied. Given the fact that the afore-mentioned hospital is the only center providing pulmonary disease sub-specialty services, this study can provide valuable information regarding the risk factors of asthma in a mountainous region.

Several factors are involved in the incidence of asthma among children, in some cases, several factors together lead to the exacerbation of this disease. As mentioned in the introduction, nowadays extensive environmental and genetic studies have investigated factors contributing to the exacerbation of asthma [5, 7, 8].

The parents play a very important role in the management of asthma in their children [9]. In this study, the educational attainment level of the parents of non-asthmatic children was significantly higher (especially the educational attainment level of the fathers). So considering the studies conducted in this regard [10, 11], it can be said that purposeful training for parents can have a very important role in preventing asthma.

The mother's age at the time of the pregnancy is one of the important factors in the birth of a healthy child. The mother's high age during pregnancy can be dangerous for the child (high age of the mother during pregnancy creates a series of psychological reactions and stresses which also affects the severity of the disease). In this study, the average age of the mothers of asthmatic children was significantly higher than the mothers of the control group [12]. In the present study, smoking was not recognized as a significant risk factor, but the number of smoking parents in the asthmatic group was higher. Haghbin et al conducted a study on this subject and found out that smoking together with underlying genetic factors play an important role in the pathogenesis of asthma in children [13], also in another study conducted by Gioviner et al smoking by the parents was recognized as a very important factor in the exacerbation of this disease [9].

Since in this study the number of city-dwellers were more than that of the inhabitants of rural areas, statistically the frequency of occurrence of asthma among urban-dwelling children was higher. Because this study was conducted in Khorramabad and its surrounding villages, 12% of the patients belonged to rural areas. In a study conducted by Zuo et al in Beijing, the percentage of children suffering from asthma in rural areas was less than in urban areas [14].

In the present study, the number of parents with a history of allergy (especially in fathers) was significantly higher in the asthmatic group. In studies conducted by Kim et al, a parental history of allergic diseases was recognized as the most important risk factor in the occurrence of asthma which confirms the results of the present study [15]. In terms of quality of life, frequency of asthma among children who live in crowded families was higher than children who live in smaller families. The results of a study conducted by Arash et al confirm the results obtained from the present study [16, 17].

The results of the present study show that there is no relationship between asthma and type of childbirth. A study conducted by Mohammadzadeh et al shows the same results [18]. In another study too, the type of childbirth was not related to the occurrence of asthma [19].

CONCLUSION

According to the findings of this study it can be said that educated parents protect their children better against allergy and asthma and this is due to their knowledge about the disease. Also, it can be said that acquired factors play an important role in the occurrence of asthma in children. So educating mothers during pregnancy and raising their awareness by brochures and other medias can be useful.

Because of some limitations, this research only studied the environmental factors contributing to asthma. We suggest an evaluation of both environmental and genetic factors in larger studies for further clarification. Since the best time to prevent asthma and other allergies is before birth, it is recommended that pregnant mothers, who have a history of asthma or allergies in their family, should avoid environmental pollution. Additionally, breastfeeding is strongly recommended during infancy, especially among families who are genetically predisposed to asthma.

CONFLICT OF INTEREST

The authors declare no conflict of interests.

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ABOUT AUTHORS

Dr. Ali Amiri: MD, Assistant Professor and Head of Department of internal medicine, Shahid Rahimi Hospital of Lorestan University of Medical sciences, Khorramabad, Iran

Dr. Nishteman Ghaderi: MD, Resident of Internal Medicine, Shahid Rahimi Hospital of Lorestan University of Medical sciences, Khorramabad, Iran

Mr. Zia Obeidavi: Medical Students, Student research Committee, Shohada-Ashayer Hospital of Lorestan University of Medical sciences, Khorramabad, Iran

Saber Khorramabadi: Medical Student, Student Research Committee, Lorestan University of Medical Sciences, Khorramabad, Iran

Javad Torkashvand: Medical Student, Student Research Committee, Lorestan University of Medical Sciences, Khorramabad, Iran

Mrs. Elham Sheikhi: Researcher, Department of clinical research, Shohada-Ashayer Hospital of Lorestan University of Medical sciences, Khorramabad, Iran

Mr. Behroz Beiranvand: MSc of Biostatistics, Lorestan University of Medical Sciences, Khorramabad, Iran