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Prevalence of Atopic Dermatitis Symptoms among Students in Kurdistan: a North-west Province of Iran

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Abstract

Background

Atopic dermatitis (AD), often called eczema or atopic eczema is a very common skin disease; AD looks different in infants, children, and adults. The aim of this study was to determine the prevalence of the disease in Kurdistan province.

Materials and Methods

Cross-sectional study using written questionnaires ISAAC where 4,000 students in two age groups 7-6 and 14 -13 years in the province were using multi-stage sampling was carried out so that the first two floors rural and urban communities in every city and in every school pupil samples were selected based on 8-digit code.

Results

The prevalence of itchy rashes in the past 6 months, itchy rashes in the past 12 months and rashes at flexural areas were 7.5%, 8.9%, and 10.3%, respectively; the prevalence was higher in 13-14 years old than 6-7 years old and was higher in boys than in girls(Odds Ratio (OR)=1.44, Confidence interval (CI)= 1.49-2, P <0.001).

Conclusion

The prevalence of itchy rashes in the past 12 month was 8.9% and it was more prevalent in boys than the girls were and in age group 13-14 years old was higher than in 6-7 years old.

***Key Words*:** Atopic, Dermatitis, Iran, Students.

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1- INTRODUCTION

Eczema or atopic dermatitis is one of the most common skin diseases in the world(1), particularly in neonates and children (2) and its symptoms are itching and eczema. Although this disorder is not fatal, it can lead to skin damages, secondary infections, sleep disorders in children and parents(3), reduced quality of life (4), high costs(5), loss of confidence, and reduced functional capacity that can interfere athletic activities and social relationships(6). The economic burden of eczema is similar to that of asthma (7)and in its severe and moderate forms it imposes a level of stress to families that is more than the stress caused by caring for a child with type I diabetes mellitus(8). Studies have shown that the stress caused by this disease can lead to increased levels of eosinophils, subpopulation lymphocytes, and natural killer cells (4).

Several studies state that genetic and environmental factors involved in the pathogenesis of atopic dermatitis(9). AD is an important public health problem(10), and there has been a significant increase in the prevalence of disease in industrialized countries during the past three decades (11) which has affected 1% to 5% of the general population, 2% to 10% of adults, and 5% to 30% of children(11-13).

Higher prevalence of AD in urban areas is attributed to better health condition that reduces the level of exposure to infections in early childhood and increase the sensitivity to allergic diseases (11, 14). Increased exposures to various infections and endogenous allergens, reduced level of breastfeeding, and more awareness about atopic dermatitis have led to the increased prevalence of the disease(15). In terms of etiology of the disease, the progress of AD is under the influence of both genetic factors (16) and also environmental factors such as diet, climate, infections, atmosphere pollutions, ozone, nitrogen monoxide, Particulate. Matter less than 10 (PM10), and songorine (SO, 10 and 30 μm) (13, 17). The prevalence of AD is reported to be 17.2% in American children(18), 15.6% in European Children(19), 24% in Japanese children aged 5-6 years old (20), 19.1% in Korea, and 20% in other countries(21). Investigations on more than half a million children in the world in the first phase of the ISAAC study showed that the disease is a prevalent disease, and the range of its prevalence varies from less than 2% to 20%(22). It is notable that the disease has had a rising trend in recent decades (23-25); probably, air pollution, increased education levels, and increased social levels may increase the risk of AD. Previous studies have shown that individuals with AD are more likely to develop asthma; furthermore, there is a better prognosis of asthma in patients without a history of AD (26).

Kurdistan province has an area of 28,203 km^2 and is located in western part of Iran at 34 degrees 44 minutes and 36 degrees 30 minutes of north latitude and 45 degrees 31 minutes and 48 degrees 16 minutes of east longitude of the Greenwich meridian. With regard to climatic and geographical conditions, the province has the features of a middle cool climate and its height difference is about 3,290 meters (27) (Figure.1). The knowledge about the prevalence of the disease can be used to prioritize health care issues and utilized as a guide for identifying possible environmental factors which can cause dermatitis, and finally it can be helpful for public health planning.

2- MATERIALS AND METHODS

2-1: Methods

This cross-sectional study was conducted during September 2013 to June 2014. Using the written questionnaire of the first phase of the ISAAC, this study was conducted on 4,000 students at the

two age groups of 6-7 and 13-14 years old in Kurdistan province-Iran. In this survey the response rate was about 97% and 3,890 people participated in the study. The prevalence of symptoms was calculated via dividing positive responses by the total number of questions answered. Sensitivity and specificity of the questions 2 and 3 (rashes in the past 12 months and rashes in flexural areas) were, respectively, 84% and 93% in the United Kingdom study (28)and 74% and 98% in Romania study(29).

Validity and reliability of the Persian version of the questionnaire have been measured in previous studies (30). The repeatability of the questions was high and Kappa value was equal to 0.86 (28). This study was the result of a research project which was approved by the Research deputy of Kurdistan University of Medical Sciences and approved by the Ethics Committee (ID: MUK.REC.1392.61).

2-2: Subject

The study subjects included 1,768 students aged 6-7 years old and 2,122 students aged 13-14 years old, which were respectively selected from students at the first grade and eighth grade, respectively.

To generalize the results, the sample size was determined in proportion with the number of students in each city by sex and age. Sampling was carried out via a multi-stage method. The samples were selected using the table of random numbers and based on the 8-digit codes of students they had received at the time of registration.

After coordination with the provincial education department and communicated to the schools under study, researchers presented letters referred to schools according to ISAAC protocol, after obtain informed consent, in the age group 6-7 years parents completed old the questionnaires while in the age group 13-14 years old the students themselves completed them. Based on ISSAC protocol, after distributing the questionnaires, each question was explained by a trained interviewer.

Fig.1: Kurdistan province

2-3: Statistical analysis

The data collected based on ISSAC standards were entered into SPSS-16 statistical software in two separate sheets by two persons. Descriptive analysis was performed. P values less than 0.05 were significant. To investigate the relationship between symptoms of dermatitis, gender, and educational level, the analysis was carried out using the Chi- square test, and its odds ratio (OR) and confidence interval of 95% were calculated. Based on ISSAC protocol, the analysis of the two age groups of 6-7 and 13-14 years were performed separately.

3- RESULTS

The results showed that the prevalence of itchy rashes in the past 6 months, itchy rashes in the past 12 months, and rashes at flexural areas were 7.5%, 8.9%, and 10.3%, respectively and they were more prevalent in boys than in girls. In this study, the prevalence of eczema in both

age groups was higher in boys and this difference was statistically significant (OR=1.44, CI: 1.49-2, P <0.001). In addition, the prevalence of symptoms in age group 13-14 years old was higher (Table.1). Of all, 5.9% of boys and 6.5% of girls had a severe form of the disease, which was statistically significant (P <0.003) (Table.2). The Odd ratio of asthma in patients with eczema was 1.068, CI: .742-1.539 and in patients with rhinitis it was 0.9, CI: .77-1.269. The prevalence rate was particularly diverse in different districts of the province (Figure.2).

Table 1: Prevalence of symptoms of atopic dermatitis, by age group and gender

Variables		N (%)	OR	CI	P
Male		1809(46.6)			
Female		2069(53.4)			
Elementary school (6-7 years old)		1788(45.5)			
Junior high school (13-14 years old)		2122(54.6)			
Recurrent itchy rashes for at least 6 months		11.96%	1.363	1.122-1.655	.002
(6-7 years old)	Male	9.70%	1.557	1.162-2.084	.003
	Female	5.60%			
(13-14 years old)	Male	8.40%	1.317	.937-1.581	.145
	Female	6.50%			
Itchy rashes during 12 past months		8.90%	1.293	1.035-1.615	0.027
(6-7 years old)	Male	10.58%	1.455	1.046-2.025	.026
	Female	7.50%			
(13-14 years old)	Male	9.40%	1.176	.869-1.*591*	.318
	Female	8.86%			
Itchy rashes on flexural areas		6.6%	1.32	1.024-1.72	.033
(6-7 years old)	Male	7.79%	1.325	.913-1.92	.148
	Female	6%			
(13-14 years old)	Male	7.33%	1.335	.94-1.89	.112
	Female	5.92%			
History of eczema		37.6%	1.44	1.49-2	.000
(6-7 years old)	Male	37.2%	1.85	1.15-1.8	.001
	Female	29%			
(13-14 years old)	Male	49.5%	1.72	1.51-2.26	.000
	Female	34.6%			

Table 2: Prevalence of sleep disorders due to itchy rashes, by age groups and gender

Variables		Never during the past 12 months N (%)	Less than one night a week	One or several nights a week	P value
Sleep disorders due to itchy rashes		102(58.4)	621(35.4)	109(6.2)	
(6-7 years old)	Male	178(52.7)	142(42)	18(5.3)	.052
	Female	271(60.4)	151(33.6)	28(6.2)	
(13-14 years old)	Male	285(56)	192(37.7)	*32(6.3)*	.035
	Female	289(63.4)	136(29.8)	31(6.8)	
Total	Male	463(54.7)	334(39.4)	847(5.9)	.003
	Female	560(61.8)	287(31.7)	59(6.5)	

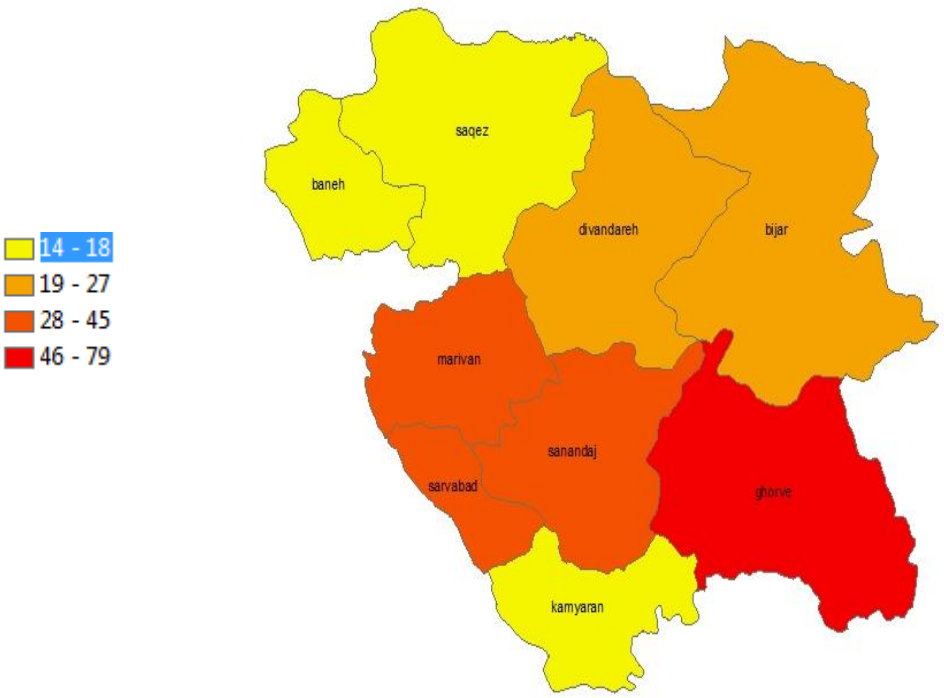

Fig.2: Distribution of the prevalence of eczema in districts of Kurdistan province

4- DISCUSSION

Of all people, 8.9% of the subject in this study reported itchy rashes in the past 12 month, it was more prevalent among the age group 13-14 years old, and there was a significant difference between the two sexes. In addition, the prevalence of symptoms in age group 13-14 years old was higher than in age group 6-7 years old. Mean prevalence of symptoms of eczema is 7.6% (from 0.1 to 19.9) in the world and its prevalence among children aged 13-14 years old is 2.6% (22, 31), however, in another study it is reported as 13.7% (from 1.6% to 39.7%)(32). According to the results of international ISAAC study, the prevalence of symptoms of atopic eczema was higher in girls in both age groups; moreover, with increasing the prevalence of atopic eczema, was this ratio raised more. The prevalence of symptoms in the age group 6-7 years old was more than the age group 13-14 years old(33). The prevalence of the disease is reported to be 7.55% in Croatia(34) , 15% in Yazd(35), 18.3% in Shiraz (in Center of Iran)(36), 14% in Birjand (in Eastern part of Iran)(37), and 15.6% in Bushehr (in Southern part of Iran)(38); similar to our results, in Bushier the disease was more prevalent in the age group 13-14 years old which may be due to the higher levels of fast food consumption and other nutritional factors in this age group(39).

The prevalence of AD in children 7-12 years old in Kerman (in Southeast of Iran) in girls and boys was, respectively, 8.33% and 9.09% (P> 0/05) (40).

The prevalence of disease has been reported 3.9% in Ahvaz (41) and 2.1% in Shahrekord(42). The highest levels of prevalence in the world are reported in urban areas in Africa, Australia, Northern and Western Europe (more than 15%) and the lowest levels are reported in China, Eastern Europe, and Central Asia (less than 5%) (43, 44). In a study in Brazil, of all the subjects, 8.2% had atopic dermatitis, 11.5% had eczema symptoms in the past 12 months, and 5% were

suffering from severe eczema (45) and the results are almost consistent with the results of the present study.

The distribution of the prevalence of atopic dermatitis in the province shows varieties in the prevalence rates in the province (Figure. 2) which is almost in line with the climate conditions in different districts of the province. Kurdistan is under the influence of two important hot and cold air flows which create different climates. The highest amount of rainfall is observed in the Western part of the province (in Bane and Marivan) with 800 mm per year, and the lowest rainfall is observed in the eastern part of the province (in Ghorveh and Bijar) with 400 mm per year. The rainfall in the central part of the province (in Saghez and Sanandaj) is about 500 mm per year. In Northern parts of Brazil, there was an association between the incidence of eczema in children and higher temperatures. In Nigerian children, heat, extra sweating, and humidity were among the predisposing factor for AD (46) and similar findings are also noted in other clinical trials (47). The prevalence of eczema symptoms is also associated with latitude and mean temperature; as a result climate plays an important role in the prevalence of the disease(48).

A study in Spain has reported air pollution as one of the factors influencing the increase of AD in adults (49). Allergic diseases are increasing throughout the world and such an increase is associated with climate conditions, nutritional changes that move toward westernization, and environmental factors resulting from industrial pollution (50). In European countries the prevalence of symptoms of eczema in both groups is positively associated with the increase in height and negatively associated with the increases in annual mean temperature. Symptoms of eczema in the age group 6-7 years old are negatively associated with relative indoor temperature. Indeed, height and temperature are indirectly correlated with changes in behaviors and exposures to sunlight. Moreover, the impact of relative indoor humidity is also suggested by some other studies. Several studies have shown that climate and pollutions are the most important environmental factors affecting the disease(51, 52).

Higher prevalence rates in urban areas and among higher socioeconomic classes suggest that antigenic pollutions and lack of exposure to infectious agents and other antigenic triggers in early childhood are effective in the development of AD (28, 53). Being affected by the severe form of dermatitis in boys aged 6-7 years was 5.3% while in girls it was 6.2%; moreover, in the age group 13-14 years old they were 6.3% and 6.8%, respectively, and the difference between the sexes was significant ($P < 0.003$).

The prevalence of sever atopic eczema symptoms ranged from 0% to 3.2% in the age group 6-7 years and from 0% to 5.1% in the age group 13-14 years old (33). The prevalence of the severe form of the disease is reported 5% in Brazil (45) and 1.5% in Taiwan(54).

Of all, 3.9% of patients reported a history of asthma and 9.37% had a history of hay fever. The Odd ratio of asthma in patients with dermatitis was 1.068, CI: .742-1.539 and in patients with rhinitis it was 0.9, CI: .77-1.269. The risk of asthma attributable to atopic dermatitis is estimated to be around 30% (55). In Bazazi's study in Gorgan (in North part of Iran), both the history of rhinitis in the past 12 months and eczema were associated with asthma ($P<0.05$)(32). In a study that was conducted in Bushier, there was no association between environmental factors and atopic dermatitis; however, there was an association between allergic rhinitis and asthma(38). In a study in Kerman, 3.79% of participants reported a history of asthma and rhinitis. Among allergic diseases, the

two diseases of atopic dermatitis and asthma are associated with each other; however, dermatitis does not necessarily lead to the development of asthma.

Eczema during infancy is one of the most important risk factors for asthma and rhinitis. In addition, rhinitis and atopic dermatitis are more reported in patients with asthma. In a study on patients with atopic dermatitis after eight years 43% are affected with asthma and 45% with allergic rhinitis (29). Atopic march is the natural course of atopic symptoms that is characterized by the sequence of typical clinical symptoms of atopic diseases. Clinical symptoms of AD are the predictors of the onset of asthma and rhinitis. AD is recognized as the entry point for allergic diseases(26).

Limitations: The possibility of recall bias and lack of additional tests to diagnose the disease and calculate the exact values are among the limitations of this study.

5- CONCLUSION

The results of this study show that in the mountainous districts that has a cold climate and high humidity are and they are also more high prevalence of atopic dermatitis. The lack of parent's attention to keep track of dermatitis in early childhood can predispose to more severe cases in older adolescents. Growing tendency in Western nutrition is another cause of the increased prevalence of the disease in children and adolescents.

Recommendations: This study was merely aimed to determine the prevalence and distribution of atopic dermatitis in Kurdistan, a North-west Province of Iran. Hence it is recommended to conduct further studies on risk factors of the disease and use the results for better implementation of effective interventions.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENT

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