ISSN: 03875547
Volume 44, Issue 05, October, 2021

Clinical Profile of Children with Atopic Dermatitis in Basrah, Iraq

Aya A. Al-Rubaye[1], Asaad Q. Al-Yassen[2]

MBChB, Department of Family and Community Medicine, College of Medicine, University of Basrah, Iraq[1]

MBChB, MSc, Prof. of Dermato-Epidemiology and Community Medicine, Department of Family and Community Medicine, College of Medicine, University of Basrah, Iraq[2]

Keywords:
Atopic Dermatitis, Eczema, Hanifin-Rajka criteria, Basrah, Iraq.

ABSTRACT

Atopic dermatitis is one of the commonest chronic inflammatory skin diseases. There are variable diagnostic criteria that have been developed to make the diagnosis accurate and thus, appropriate management would be established. Hanifin and Rajka diagnostic criteria was one of the most commonly used diagnostic tools. In this study, the researchers aimed to explore the clinical profile and the distribution of these criteria among children with atopic dermatitis in comparison with a control group. The study was conducted in the outpatient clinic of a Alfayhaa Teaching hospital in Basrah, Iraq during the period from December, 2020 to March, 2021. The study found that maternal education, positive family history of atopy and being an overweight or obese child were associated with atopic dermatitis. The study also revealed that xerosis, early age of onset, facial erythema or pallor, previous hand or foot dermatitis, and elevated serum Immunoglobulin E level were the most common minor diagnostic criteria. Further studies to compare Hanifin and Rajka diagnostic criteria with other sets of criteria is recommended.

1. INTRODUCTION

Atopic dermatitis (AD) is a chronic, relapsing pruritic inflammatory skin disease characterized by exacerbations and remissions. It is considered as one of the most prevalent skin diseases. It is frequently associated with a personal or a family history of atopy [1]. The Global Burden of Disease Project has shown that, dermatological diseases are the fourth leading-cause of nonfatal illness burden worldwide, of them dermatitis is the most important one [2]. The diagnosis of AD is basically clinical diagnosis, by history and examination of the lesion in respect to the distribution, morphological characteristics and associated clinical features [3]. There are numerous diagnostic tools for AD. Itching is the main feature in all diagnostic criteria, including Hanifin and Rajka diagnostic criteria (HRC) [4]. The Hanifin and Rajka diagnostic criteria have a sensitivity of 96.0% and specificity of 93.8%. The diagnosis is made when an individual have 3 out of four major criteria and three out of 22 minor criteria [5].

The aim of this study was to study the frequency and distribution of HRC among patients with AD.

2. Material and Method

A case-control study was carried out during the period extending from the first of December, 2020 to the first of March, 2021 at Alfayhaa Teaching Hospital in Basrah, Iraq. Cases were collected from the dermatology outpatient clinic. The enrolled children were under the age of 16 years and had fulfilled the HRC. A randomly selected control group matched for the age and sex was recruited from the pediatric outpatient clinic of the same hospital. Children with a history of allergic diseases as asthma or allergic rhinitis were excluded from the control group. Parents of both study groups gave consent to participate. A special questionnaire form was developed for the purpose of the study. It was filled for each recruited child through direct interview with one parent of the children. The questionnaire covered the following aspects: age, gender, place of residence, educational level of both parents, and family history of atopy. Furthermore, the cases had answered questions regarding the age of onset of disease, the aggravating factors, and whether they had received previous treatment or undergone any previous laboratory investigations. The clinical examination was performed by one of the researchers. It involved measuring the height and the weight of the subjects, then calculating the body mass index (BMI). Among children aged less than 2 years, the length on lying down was measured while among those who are 2 years or older, the height of standing was measured. For the cases, the distribution of the lesion was documented. Hanifin and Rajka diagnostic criteria were looked at in details. Among cases, the frequency of each major and minor criterion of HRC was recorded which were obtained through history and examination. Likewise, the frequency of non-specific minor criteria that were found positive among the control group were also documented. Examination for subcapsular cataract and keratoconus was not performed since it requires ophthalmologist examination [6]. Additionally, skin prick test was not performed due to difficulties in follow up.

Both of the study groups were tested for serum total Immunoglobulin E (IgE) using ALFA (Allergy Lateral Flow Assay) total IgE kits. According to receiver operating characteristic curve, the total IgE level above the cut-off point for age was defined as “high” while a lower level was considered as “normal” [7].

2.1 Statistical Analysis

The data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Numeric variables were presented as mean and standard deviation. Categorical data were formulated as frequencies and percentages (%). Both chi-square test and independent t–test were used to test the significance of the association. A p-value of less than 0.05 was considered statistically significant.

2.2 Ethical approval

Authority granted from the Ministry of Higher Education, University of Basrah, College of Medicine and the Ministry of Health and Environment, Basrah Health Directorate. Informed consent form was obtained from the parents of all the patients recruited in this study. Confidentiality is preserved.

3. Results

Seventy-six children under 16 years of age who fulfilled the HRC were involved. Eighty children were chosen as a control group. The mean age of the cases was 8.3 ± 2.4 years, and the mean age of the control group was 8.2 ± 2.3 years (P-value > 0.05).

Fifty-one (67.1%) of the cases were living in the city center compared to 49(61.3%) of the control group. The duration of education of the parents was classified into three categories as follows: less the 6 years, (6-12) years and more than 12 years. Among cases, fathers with education of more than 12 years were 12 (15.8%) while among the control group, 19(23.7%) of the fathers had an education of more than 12 years (P-value > 0.05). Mothers with more than 12 years of education among cases and controls were 5(6.6%)

and 12(15.0%), respectively. There was a significant difference in the educational level of the mothers among the two study groups. (P<0.05).

A positive family history of atopy in the first-degree relatives of the participants was found 69(90.8%) among the cases and 29(36.3%) among the controls. There was a significant difference in the family history of atopy between the cases and the control groups. Although the majority of both cases and control groups had normal BMI, but the percentages of obese or overweight participants was higher among cases. There was a significant difference between the two study groups with respect to the BMI (P<0.05). (Table 1)

Table 1: The sociodemographic and clinical characteristics of both study groups.

Variables		**Cases No.(%)**	**Controls No.(%)**	**P-value**
Gender	Male	44(57.9)	44(55.0)	0.72
	Female	32(42.1)	36(45.0)	
Place of residence	City center	51(67.1)	49(61.3)	0.45
	Periphery	25(32.9)	31(38.7)	
Fathers' education (in years)	<6	24(31.6)	13(16.3)	0.065
	6-12	40(52.6)	48(60.0)	
	>6	12(15.8)	19(23.7)	
Mothers' Education (In years)	<6	34(44.7)	22(27.5)	**0.042**
	6-12	37(48.7)	46(57.5)	
	>6	5(6.6)	12(15.0)	
Family history of atopy	Positive	69(90.8)	29(36.3)	**0.001**
	Negative	7(9.2)	51(63.7)	
BMI	Normal	63(82.9)	76(95.0)	**0.015**
	Overweight/obese	13(17.1)	4(5.0)	

The parents of most of the patients (70%) were able to identify at least one aggravating factor. Physical irritation of wool 23(30.2%), sweating 22(28.9%), and certain types of food 17(22.3%) as eggs, chicken, eggplant and tomato were the most frequently reported aggravating factors. In addition to the over-use of soap and detergents 13(17.1%) and nearby smoking 3(3.9%).

None of the patients was previously investigated for AD. The treatment varied from topical moisturizers in 3(3.9%), topical corticosteroids with or without moisturizers in 39(51.3%), topical calcineurin inhibitors in 1(1.3%) patient. Systemic antihistamines were prescribed to relief pruritis and improve sleep in 4(5.3%) patients. The frequency of patients that have never received any previous treatment for AD was 29(38.2%). The clinical presentation and distribution of lesions were variable. Although most of the patients had typical sites of distribution for age, however, there were some atypical sites of the eczematous lesions. Table 2 reveals the distribution of atopic eczematous lesions among patients. Cheeks and flexural surfaces were the commonest sites of involvement.

Table 2: The distribution of sites of lesion among cases

Site of lesions	**Number**	**Percentage**
Cheeks	25	32.9
Flexural surfaces	17	22.3
Back and abdomen	13	17.1
Hands	7	9.2

Thighs or arms	6	7.9
Behind the neck	4	5.2
Perioral	2	2.6
Other sites (feet, legs, shoulder)	9	11.8

Itching and a positive family history among the first-degree relatives of cases were the most common major criteria in the patients' group as demonstrated in (Table 3).

Table 3: The frequency of major Hanifin and Rajka criteria among cases

Major Hanifin and Rajka Criteria	**Present**		**Absent**	
	No.	Percent	No.	Percent
Pruritus	73	96.1	3	3.9
Typical morphology and distribution	70	92.1	6	7.9
Chronic or chronically relapsing dermatitis	72	94.7	4	5.3
Personal or family history of atopy	73	96.1	3	3.9

Table 4 shows the frequency of the shared non-specific minor diagnostic criteria between the cases and the controls. All these criteria were significantly higher in the cases compared to the controls.

Table 4: The frequency of the shared minor Hanifin and Rajka criteria among the two study groups.

Minor Hanifin and Rajka Criteria	**Cases No.(%)**	**Controls No.(%)**	**P-value**
Xerosis (dry skin)	73(96.1)	9(11.3)	<0.05
Facial erythema/pallor	48(63.2)	13(16.3)	<0.05
Elevated serum IgE level	31(40.8)	13(16.3)	<0.05
Pityriasis Alba	29(38.2)	10(12.5)	<0.05
Food allergy/Intolerance	26(34.2)	1(1.3)	<0.05
Cheilitis	55(72.4)	2(2.5)	<0.05
Recurrent conjunctivitis	14(18.4)	2(2.5)	<0.05

Table 5 shows the frequency of the other minor Hanifin and Rajka criteria among the cases. These criteria were positive in the patients and were not seen among the control group.

Table 5: The frequency of the other minor Hanifin and Rajka criteria among the cases.

Minor Hanifin and Rajka Criteria	**No.**	**%**
Early age of onset (below 2 years)	63	82.9
Previous hand or foot dermatitis	35	46.1
Itching after sweating	32	42.1
co-existing asthma or allergic rhinitis	28	36.8
Intolerance to wool and soap	27	35.5
Intolerance to wool and lipid solvents	23	30.2
Itching after sweating	22	28.9
Orbital darkening	16	21.1
Recurrent skin infections	15	19.7
Dennie–Morgan fold	11	14.4
Keratosis pillars	10	13.2
White dermographism	4	5.3
History of recurrent skin infection	4	5.3

Ichthyosis, Palmar hyper-linearity, keratosis pilaris.	3	3.9
Course influenced by emotional or environmental factors	2	2.6
Anterior neck folds	1	1.3
Nipple eczema	0	0.0

4. Discussion

Atopic dermatitis is a heterogenous skin disease with a variable clinical presentation and severity. There is no specific biomarker or laboratory test to diagnose AD. Thus, various clinical diagnostic tools have been developed in the past decades to make the diagnosis of AD clearer. Hanifin and Rajka criteria were one of the most widely used diagnostic sets. A case-control study in Baghdad, 2015 found that male and female cases constituted percentages of 55% and 45%, respectively. Controls had 53.9% and 46.1% male and female participants, respectively. This resembles to some extent the gender distribution of the current study [8]. A study in the USA found a significant association between prevalence of AD and living in densely populated urban regions [9]. In contrast, a previous study of AD in Basrah revealed no association between cases and controls with respect to residency [10]. The later study agrees with the present study which is probably due to the overall similarity in environmental exposures among families living in city centers and periphery. A study in Korea revealed that higher educational level of both parents was associated with lower odds of AD [11]. Moreover, data from Central America found that a higher maternal education was associated with a decreased prevalence of AD [12]. The current study showed a that a lower maternal education was associated with AD development. This might be explained by the tendency of mothers with higher education to adapt AD preventive habits toward their offspring as wearing cotton clothes, use of non-irritant soap, application of emollients, ensuring less exposure to smoking and more aware of the benefits of breastfeeding.

Two previous Iraqi studies in Tikrit and Baghdad, showed positive family history was found in 84% and 70.6 %, respectively [13], [14]. It also agrees with a study in Saudi Arabia found more than 56% of patients had a positive family history of atopy [15]. The current study showed a significant association between a positive family history of atopy among first-degree relative (father, mother or siblings) and development of AD. The relationship between obesity and AD had been discussed in several studies, however, there was inconsistency with respect to age groups, study design, diagnostic criteria, severity assessment and obesity definition. Thus, controversial results about such association were found. From one hand, two studies in Italy and Germany found no association between AD and obesity among children and adolescents [16], [17]. On the other hand, studies in Korea, Norway and Taiwan found a positive correlation between AD and high BMI [18- 20]. Likewise, the present study found that being overweight or obese was associated with AD. The current explanation of such association is that obesity itself is a state of systemic inflammation, which in turn enhances the development of AD. A study in Iran in 2014 found that climatic changes, sweating, food, air allergens and clothing were the most frequent aggravates. This was similar to some extent to the present study, which found that wool clothing, sweating, food, and detergents use were the most frequently reported triggers [21]. The present study revealed that none of the patients had been investigated with laboratory tests. This agrees with the fact that the diagnosis of AD is clinical and there is no specific laboratory biomarker for the diagnosis [22], [23].

Patients with AD had received different types of treatments, of which topical moisturizers with or without topical corticosteroids of various potencies were the most predominant types. This agrees with the current guidelines since they are considered as first-line therapies [23]. The use of topical calcineurin inhibitors (Tacrolimus) was limited to a single case of AD. However, we recommend more emphasis on the maintenance of remission through the use of emollients as a preventive strategy.

The present study found that cheeks lesions were the commonest sites of involvement, followed by flexural areas, whereas hands lesions were seen in 8.7% of the patients. In 2017, a cross-sectional study in Baghdad found that face involvement was the most frequent site followed by hand eczema [14]. Since hand lesions are commonly seen in adults with atopy, [1] the relatively high frequency of hand lesions in the later study can be attributed to the inclusion of adult patients in their sample. Another study in India, 2012 found that facial lesions were the commonest site of involvement in infants and children with AD [24]. A case-control study conducted in Tunisia in 2018 found that pruritus was the most frequent major finding in 97%, followed by chronic-relapsing course 87.1% while personal or family history of atopy was positive in 67.3% [25]. However, in the current study, although pruritus was also the commonest major feature (97.1%), but a personal or family history of atopy had the highest frequency in companion with the pruritus. Early age of onset and xerosis were the commonest minor criteria among the cases. A cross-sectional study in India found that Dennie-Morgan folds, followed by early-onset AD and xerosis were the commonest minor features [26]. Additionally, the later Tunisian study also revealed that xerosis was the most frequent minor criterion (97%) followed by Dennie-Morgan infraorbital folds (76.2%) [25]. Moreover, study in Turkey in 2019 about the diagnostic criteria of AD in children found that xerosis was the minor criterion of the highest sensitivity. This is consistent with the present study in which xerosis was found in 86.5% of patients. Contrary to the present study, both studies found that facial erythema or pallor was uncommon and of lesser clinical importance [25], [27]. However, an Iraqi study in 2017 supports the findings of the current study as xerosis, facial erythema or pallor and hand or foot dermatitis were the most common minor clinical criteria [14]. These variations in minor criteria predominance can be attributed the different genetic background, allergen exposure and age distributions of the mentioned studies. Ultimately, although the minor criteria are non-specific to AD, but they have a clinical significance in supporting the diagnosis of AD.

A study in Iraq on 2018 found that high total IgE levels were seen in 64.3% while in the current study high total IgE was seen in 40.8% of the patients [28]. The higher percentage in the total IgE in the mentioned study is probably due to inclusion of adult population as the total IgE sensitization increases with advanced age [29].

5. Conclusions

This study revealed that lower maternal education was associated with AD. Thus, emphasis on improving the education of the mothers and adopting the preventive measures and healthy habits. Additionally, maintaining a healthy weight for children may help to reduce AD development.

The current study also found that the frequency of minor HRC were significantly higher in patients with AD. Therefore, it is crucial for the dermatologist to be aware of the common clinical characteristics to diagnose the disease and manage it properly. The drawbacks of HRC that they were somehow complex and time-consuming. We recommend further studies to compare HRC with other diagnostic tools.

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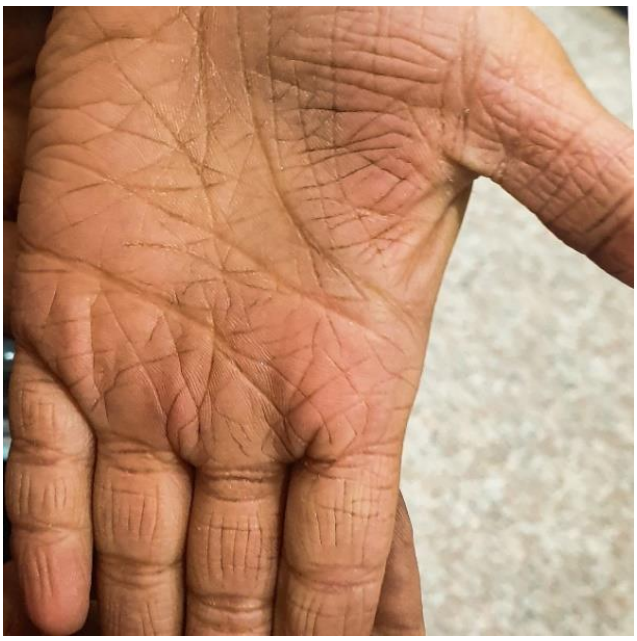

Picture 1: Hyper-linear palm, a minor criterion of AD.

Picture 2: Shows keratosis pilaris, a minor criterion of AD.