

Assessment of clinical profile of children aged 9–16 years with atopic dermatitis

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ABSTRACT

Background: Atopic dermatitis (AD) or atopic eczema is a chronic, relapsing, remitting, non-contagious, and highly pruritic skin disorder. **Objective:** The present study was conducted to determine the clinical profile of AD among children aged 9–16 years. **Materials and Methods:** A prospective hospital-based study was carried among children aged 9–16 years for a period of 2 years from July 2017 to June 2019. The children were examined and looked for signs of AD. A detailed history followed by physical and dermatological examination was carried out for the students diagnosed with AD. **Results:** Among 1124 students, the prevalence of AD was 1.9%. The majority of them were male (66.6%), aged between 9 and 11 years (76.1%), and hailed from the urban background (57.2%). The most commonly reported aggravating factor was sweating (52.5%). The mean age of onset and duration of illness were 1.14 ± 0.35 years and 0.63 ± 0.38 years, respectively. The majority of the respondents fell under the category of chronic AD (80.9%). The predominant site of involvement was flexor surface (66.6%) and almost all of the children were having a mild form of AD (95.2%). The association between males and type of AD was statistically significant ($p=0.03$). **Conclusion:** In our study, the prevalence of AD was 1.9%. We found that AD of chronic type, mild form, and on flexor surface was more common among the children of our study and the association between males and type of AD was statistically significant.

Key words: Atopic dermatitis, Children, Eczema, Skin disease

Atopic dermatitis (AD) or atopic eczema is a chronic, relapsing, remitting, non-contagious, and highly pruritic skin disorder. There has been a two- to three-fold increase in the prevalence of AD in the past 30 years [1]. The proposed reasons responsible for this increased prevalence are the constantly occurring changes in environmental pollutants, breastfeeding patterns, and urbanization [2]. It is widely prevalent in developed countries affecting approximately 15–23% of the pediatric population [3,4]. Although it can affect any age group, an age-dependent distribution is seen with respect to the disease as it is mostly seen under 2 years of age [5]. The disease is characterized by itching/pruritus, dry, inflamed, and easily irritated skin. The most common triggers for AD include heat, sweating, anxiety, frustration, food allergy, and infections. It is frequently associated with elevated immunoglobulin E (IgE) levels in serum.

The etiology behind AD is still poorly understood, and various theories have been proposed to understand the pathophysiology behind the disease. The two most common theories are the skin barrier and immunological hypotheses. Disruption of the epithelial skin barrier and associated immune dysregulation in the skin occurring in the genetically predisposed host, results in the occurrence of AD [6]. The disease arises as a result of interaction between various factors such as genetic, immunologic, and environmental factors. Among these, the contribution of genetic factors toward the disease is approximately 80%. Twin

concordance studies demonstrated that AD has a strong familial basis [7]. There is no gold standard for the diagnosis of AD. The most widely used diagnostic criteria are the Hanifin and Rajka criteria [8] and subsequent modifications, including the UK Working Party's Diagnostic Criteria for AD [9]. The aim of the management of AD is to improve the quality of life and prevent infectious complications among patients.

There are many published researches on natural history, epidemiology, etiopathogenesis, clinical patterns, and management of AD in the literature, but there is a paucity of literature regarding the clinical profile of AD. Hence, the present study was conducted to determine the clinical profile of AD among children aged 9–16 years.

MATERIALS AND METHODS

A hospital-based prospective study was conducted for a period of 2 years from July 2017 to June 2019. The study protocol was approved by the Institutional Ethical Committee. The inclusion criteria consisted of the children aged 9–16 years coming to the dermatology outpatient department (OPD) with signs and symptoms of AD or diagnosed with AD. Patients of AD with any other congenital skin disorder, drug rashes, mentally challenged children, and whose parents were not willing for participation were excluded from the study.

After taking informed written consent from the parents, the children were examined and looked for the signs of AD. The diagnosis of AD was made on the basis of Hanifin and Rajka criteria [8]. According to the criteria, the major criteria consists of pruritus, typical morphology and distribution, flexural lichenification in adults, facial and extensor eruptions in infants and children, chronic or chronically relapsing dermatitis, and personal or family history of atopy. The minor features were xerosis, elevated serum IgE, cheilitis, etc. The presence of at least three major and three minor criteria was taken into consideration. A self-administered questionnaire was distributed. A detailed history was taken, including the present age, age at onset, sex, residence, background, duration of illness, personal and family history of atopy, seasonal variation, and degree of pruritus, history of oozing, seasonal variation, aggravating factors, and history of allergy and other associated diseases.

A thorough physical and dermatological examination was carried out for the children diagnosed with AD. It included the examination of the mucous membranes and the skin appendages. The clinical features of AD students were recorded as having itching/pruritus, excoriation and dryness of the skin, ichthyosis, chronic relapsing eczema, flexural lichenification, and recurrent conjunctivitis. AD was classified as acute, subacute, and chronic, according to the stage of the disease.

Acute AD includes erythema, edema, vesiculation, and oozing, subacute AD denotes patches with minimal oozing, crusting, and scaling, and chronic AD includes dry and rough lichenified plaques with or without scaling. AD was also classified according to the predominant site of involvement (flexor, extensor, face, and mixed) and severity of AD (mild, moderate, and severe). The severity and the extent of the disorder were assessed using the scoring for AD (SCORAD) index. The index consists of six items (erythema, edema/papules, effect of scratching, oozing/crust formation, lichenification, and dryness) and two subjective symptoms (itch and sleeplessness) [10].

Data analysis was performed using the SPSS version 23.0 and the Chi-square statistical test was used to assess the gender-wise difference for the type and severity of AD exhibited by the students. $p < 0.05$ was considered statistically significant.

RESULTS

Out of a total of 1124 children aged 9–16 years seen in our hospital from July 2017 to June 2019, 21 children had AD; hence, the prevalence of AD was 1.9%. Among the aggravating factors for AD, sweating was the most commonly reported by 11 (52.5%) children. Other common aggravating factors such as stress and dust were reported by none of the children (Table 1).

The mean age of onset and duration of illness as responded by children were 1.14 ± 0.35 years and 0.63 ± 0.38 years, respectively. The common clinical presentation of AD is given in Table 2. The predominant site of involvement was flexor surface in 14 children. Almost all of the participants were categorized as mild AD ($n=20$, 95.2%). None of the participants responded as having severe AD.

Table 1: Demographic profile and detailed history of children with atopic dermatitis

Demographic features	Number of children (%)
Age	
9–11 years	16 (76.1)
12–16 years	5 (23.9)
Sex	
Males	14 (66.6)
Females	7 (33.4)
Residence	
Rural	9 (42.8)
Urban	12 (57.2)
History of	
Winter exacerbation	8 (38)
Asthma	1 (4.8)
Atopy	2 (9.5)
Allergic rhinitis	10 (47.7)
Family history of	
Atopic dermatitis	10 (47.7)
Asthma	1 (4.8)
Aggravating factors	
Sweating	11 (52.5)
Seasonal	8 (38)
Wool	0
Stress	0
Dust	0
Food	2 (9.5)

The association between males and the type of AD was statistically significant ($p=0.03$), as shown in Table 3.

DISCUSSION

AD is associated with elevated levels of serum IgE. It is usually considered as an age-related entity as it is common in childhood, but a recent meta-analysis conducted by Abuabara *et al.* found that the prevalence of AD is similar in childhood and adolescence/early adulthood [11]. An overall prevalence rate of 1.9% was found in the present study. This was found to be higher as compared to various published studies conducted by Sehgal *et al.* (0.98%) [12], Dotterud *et al.* (0.7%) [13], and Williams *et al.* (0.26%) [14]. A low prevalence of 0.42% and 0.55% was found in studies conducted by Dhar and Kanwar [15] and Dhar *et al.* (2002) [16] in the northern and eastern part of the country, respectively. A prevalence rate of only 0.01% was found in a South Indian study conducted by Karthikeyan *et al.* [17]. In a 12-month study of the prevalence of symptoms of asthma, allergic rhino-conjunctivitis, and atopic eczema in the International Study of Asthma and Allergies in Childhood (ISSAC, Phase 1), the prevalence of atopic eczema in 56 countries had been found to vary between 3 and 20.5% [18]. A higher prevalence rate of 4.6% and 7.21% was found by Upendra *et al.* [19] and Kumar *et al.* [20].

Table 2: Common clinical presentation of atopic dermatitis

Features	Clinical presentation	Number (%)
Clinical features	Pruritus/itching	17 (81)
	Excoriation of the skin	13 (62)
	Dryness of the skin	12 (57.1)
	Ichthyosis	2 (9.5)
	Chronic relapsing eczema	2 (9.5)
	Flexural lichenification	0 (0)
	Recurrent conjunctivitis	0 (0)
Type of atopic dermatitis	Acute	1 (4.8)
	Subacute	3 (14.3)
	Chronic	17 (80.9)
Predominant site involved	Flexor	14 (66.6)
	Extensor	5 (23.8)
	Face	1 (4.8)
	Mixed	1 (4.8)
	Severity	Mild
	Moderate	1 (4.8)
	Severe	0 (0)

Table 3: Gender-wise distribution for the type and severity of atopic dermatitis

Parameter	Male (n=14)	Female (n=7)	Chi-square (χ^2)	p value
Type of atopic dermatitis				
Acute (n=1)	1	-	6.23	*0.03
Subacute (n=3)	3	-		
Chronic (n=17)	10	7		
Severity				
Mild (n=20)	13	7	2.86	0.09
Moderate (n=1)	1	-		
Severe (n=0)	-	-		

The prevalence of AD was more in males (66.6%) as compared to females (33.4%) and the difference was statistically significant (p=0.03) in our study. The findings of our study were in accordance with the previous studies conducted by Sehgal *et al.* (83.1% were male) [12], Dhar and Kanwar (M: F – 2.13:1) [15], Sarkar *et al.* (1.6:1) [21], Kaujalgi *et al.* (1.5:1) [22], and Onunu *et al.* (1.2:1) [23]. On the contrary, Upendra *et al.* [19], Kumar *et al.* [20], and Rajka [24] found a female predominance in their studies.

Urbanization and improved quality of life were proposed as one of those factors that are responsible for the increased prevalence of AD. We found that almost half (57.2%) of the children hailed from the urban area. Sehgal *et al.* also found that 70% of the participants were from urban areas [12]. Similar results were observed by Dhar and Kanwar [15], Sarkar *et al.* [21], Todd G *et al.* [25], and Poysh *et al.* [26]. However, Kumar *et al.* found a higher prevalence in the rural areas, with a rural-to-urban ratio of 1.64:1 [20].

We found that most of the students had a personal and family history of atopy, allergic rhinitis, winter exacerbation, and asthma. These results were in accordance with the studies by

Sehgal *et al.* [12], Dhar and Kanwar [15], Dhar *et al.* [16], Sarkar *et al.* [20], and Onunu *et al.* [23]. According to Hanifin and Rajka, personal history of atopy was found in 50% of patients with AD [8], while it was positive in 55% of patients in the study by Roth and Kierland [27]. Similar results were observed by Rystedt *et al.* [28], Ellis *et al.* [29], Halbert *et al.* [30], and Al-Naqeeb *et al.* [31].

The mean age of onset of AD was 1.14±0.35 years in the present study which is comparable with the previous studies Dhar and Kanwar (1998) [15] and Dhar *et al.* [16]. Upendra *et al.* found a mean age of onset of about 2 years with more than 70% children developing symptoms before the first 5 years of age [19]. Rajka found that 60% of subjects were having the onset of the disease in the 1st year of life and 85% by 5 years of age [24].

Itching/pruritus was a major presenting symptom in the current study, which is in agreement with the findings of Sehgal *et al.* [12], Kumar *et al.* [20], Sarkar *et al.* [21], and Roth *et al.* [27].

In the present study, the flexures (66.6%) were more commonly involved as compared to extensors (23.8%) and face (4.8%). The findings were similar to the study by Sehgal *et al.* [12] and Dhar *et al.* [16], whereas Kumar *et al.* found that the face was more affected than the other parts [20]. A study conducted by Dhar and Kanwar also found conflicting results with our study. They found that 79% in the infantile AD group had facial involvement while in the childhood group, the corresponding figures were 74.5% [15].

The most common type of AD found in our study was chronic AD (80.9%) which is similar to the findings of Upendra *et al.* study [19]. In contrast, Sarkar *et al.* found that acute type of eczema predominated in patients with infantile AD (65.4%) while chronic lichenified eczema predominated in childhood AD (44.4%) [21]. Kanwar *et al.* found that 52.7% of infantile patients had acute eczema while 47.4% of childhood patients had a chronic type of eczema [15]. Dhar *et al.* found acute eczema as the most prevalent [16].

The most common aggravating factor found in our study was sweating (52.5%) followed by seasonal alteration (38%) which is in line with the findings of Upendra *et al.* study [19]. Dhar and Kanwar found that 67.14% of infants had aggravation during winters and the corresponding figures in the childhood AD patients were 58% [15]. On the contrary, in the study by Dhar *et al.*, 40% of patients had aggravation during summers and only 15% had winter exacerbation [16]. Sarkar *et al.* concluded that the majority of the patients had aggravation of their eczema in the winters [21]. Onunu *et al.* found high temperature and humidity to be the most common aggravating factors [23].

The disease severity score was found to be mild in almost all of the students (95.2%) which are line with the findings of the study by Dhar and Kanwar study [15] and Al-Naqeeb *et al.* [31]. In contrast, Kumar *et al.* found more patients in a moderate AD group (44.7%) as compared to mild AD (42.4%) [20].

The study had several limitations. Our study is hospital based rather than population based which could not exactly determine the prevalence of AD in the community. We have conducted the study in the dermatology OPD of only one hospital, thereby

limiting its generalizability. Furthermore, the serum IgE test to confirm the correlation between the extent of the disease and their serum level was not conducted.

CONCLUSION

AD of chronic type, mild form, and on the flexor surface was more common among the children of our study and the association between males and type of AD was statistically significant. Since this is a hospital-based study, the true point prevalence of the community cannot be detected. Hence, to confirm the findings, larger population studies are warranted.

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