Original Research Article

A Retrospective study on the Epidemiologic patterns of Atopic Dermatitis

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Received: 26-06-2021 / Revised: 28-07-2021 / Accepted: 26-08-2021

Abstract

Introduction: A rising trend in Atopic Dermatitis (AD) has been observed in India in last four decades. Changes in environmental pollutants, breast feeding pattern, increased awareness, and urbanization are some of the reasons cited for this change. This study has been undertaken here to assess the various clinical patterns of AD in this region by studying the clinical and immunological profile of AD and tried to correlate with severity of atopic dermatitis among the subjects. **Methods**: This was a Retrospective study of 200 diagnosed cases of Atopic Dermatitis attending OPDs / Emergencies / Admission in Wards. Information on each patient selected were carefully obtained by an in depth study of the patients' case notes (folder), which contain the house officer's detailed clerking at patient's presentation to clinic, casualty or referral before admission to the wards. **Results:** Family history was present in 42% of subjects. 173 (86.5%) had history of relapse. 182 (91%) patients had onset before 5 years of age. Mean age at onset was about 8.3 months. . Infantile AD had statistically significant higher SCORAD Index score. One hundred and thirty (98%) patients presented with complain of itching /pruritus. 64.5% (129) patients had high AEC. Patients with high AEC had statistically significant higher SCORAD Index score. 67.5% (135) patients had increased total serum immunoglobulin E (TsIgE). On ANOVA analysis of the TsIgE, severe AD had statistically significant high AEC. High TsIgE had statistically significant higher SCORAD Index score. **Conclusions:** The prevalence of AD is considered to be increasing, This study identified that both AEC and TsIgE increased significantly. This study throws light upon epidemiological data and various clinical patterns of atopic dermatitis. The load / Magnitude of atopic dermatitis remains low in this region compared to developed countries and disease manifestation is mild in Indian patients, hence vigilant eyes, elaborated detailed history and examination are required for accurate diagnosis and efficient management of AD in Indian setting. However to confirm our findings, larger population study in future is needed.

Keywords: Atopic Dermatitis, Retrospective, Lichenification, Atopy

Introduction

Atopic dermatitis (AD) is a chronic or chronically relapsing eczematous skin disease that is also called as atopic eczema and characterized by itching, dry, inflamed, and easily irritated skin accompanied by cutaneous functional dysfunction. There is no laboratory "gold standard" for the diagnosis of AD. It pose a significant burden on health-care resources and patients' quality of life. The current prevalence of Atopic dermatitis in most high income and some low-income countries is approximately 10-30% in children and 2-10% in adults, representing 2-3 fold increase over the past several decades. The diagnosis of AD is based on a constellation of signs and symptoms.[1],[2]

A rising trend in AD has also been observed in India in last four decades. A study from Bihar reported an incidence of 0.38% of the total number of outpatient attendees. Relatively recent hospital-based studies have also determined a low prevalence both in the Northern and Eastern parts of the country, the reported prevalence among dermatology outpatient department attendees being 0.42% and 0.55%, respectively.

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AD was the commonest dermatosis in children registered to a pediatric dermatology clinic where it constituted 28.46% of all registered patients. In contrast, only 0.01% (3 out of 2100) children in a South Indian study had AD. This relative rarity has been attributed to different dietary habits and climate.[3]

During the last decades various lists of diagnostic criteria for AD have been proposed. Hanifin and Rajka for the first time proposed a systematic approach toward the standardization of the diagnosis of AD by incorporating four major/basic and 23 minor features.4,5 AD arises as a result of complex interplay between various genetic, immunologic, and environmental factors. Atopic dermatitis has a strong familial basis. Twin studies have shown that monozygotic twins have about 86% risk to develop AD if the twin partner has the disease, whereas there is only 21% disease risk in dizygotic twins.[2] The genetic predisposition of atopy causes a systemic expansion of Th2 cell activity, leading to increased secretion of Interleukin (IL) IL-5, IL-4, IL-13, and IL-3 which causes eosinophilia, increased immunoglobulin E (IgE), and increased growth and development of mast cell.[3] The prevalence of AD has been increasing over the past 30 years. Changes in environmental pollutants, breast feeding pattern, increased awareness, and urbanization are some of the reasons cited for this change.[4] There are many published research on natural history, epidemiology, etiopathogenesis, clinical patterns, and management of AD in Indian Literature, but no published research on clinico-immunologic profi le and their correlation with severity of AD in Indian children. This study has been undertaken here to assess the various clinical patterns of AD in this region by studying the clinical and immunological profile of AD and tried to correlate with severity of atopic dermatitis among the subjects

Methodology

This Retrospective Analytical study involved Prior Consent from Hospital Authorities / Medical Superintendents of the Local Randomly selected Secondary & Tertiary care hospitals having Full Facility Dermatology / Skin Department along with our Hospital to see the records of the patients from Medical Records Department (MRD) with the disclosure that we will use the data for study purpose only. The study was conducted within ethical standards. Medical record numbers were used to generate the data for analysis. The study was conducted within ethical standards & doesn't involved any direct Intervention to any mentioned subjects nor any physical Examination was performed. Randomization was done using computer tables in selecting data. All Patients data had details of standard clinical examinations, routine biochemical and haematological investigations. The study duration was 8 months. This was a Retrospective study of 200 diagnosed cases of Atopic Dermatitis attending OPDs / Emergencies / Admission in Wards . Information on each patient selected were carefully obtained by an in depth study of the patients' case notes (folder), which contain the house officer's detailed clerking at patient's presentation to clinic, casualty or referral before admission to the wards .

Data was collected by using a pre- designed structured proforma. Items related to past history of Presenting Cutaneous lesions & inputs from a detailed clinical / dermatological examination were included. This Performa included data on present age, age of onset, area of residence, personal and family history of atopy, seasonal variation, religion of the patient, mile stone development, socio-economic status of the parents, history of relapse, absolute eosinophil counts (AEC), and serum total IgE level.

Hemoglobin, total leukocytes count (TLC), differential leukocyte count (DLC), and absolute eosinophils count (AEC) was performed by automated hematology analyzer. AEC was also rechecked manually after staining with Leishman's stain. An AEC more than 300 was considered as increased eosinophils count. Total serum immunoglobulin E antibody titre (TsIgE) was performed by Chemiluminescence Immunoassay CLIA) method in IU/ml. An absolute eosinophil count (AEC) more than 300 was considered as high and more than reference normal range of TsIgE for different age group (0-1 year, 0.6-117 IU/ml; 1-5 year, 0.3-313 IU/ml; 5-10 year, 0.6-555 IU/ml; and 10-15 year, 1.4-481 IU/ml) was considered as high TsIgE.

Inclusion Criteria was Clinically diagnosed cases of Atopic dermatitis according to Hanifin and Rajka's criteria.

Exclusion Criteria included Patients with Contact dermatitis, Stasis eczema, Lichen Simplex Chronicus, Infective eczema , Drug induced rashes etc.

Statistical Analysis

The collected data was depicted in tabular form and interpreted statistically and analyzed. The collected data was statistically analyzed by using the standard tests to ascertain the clinical relevance of the present study.. $P < 0.05$ was considered statistically significant. Statistical analysis was done using SPSS version 21.0.

Continuous data were expressed as mean ± standard deviation (SD) .

Appropriate statistical tests of significance like Chi square were applied wherever necessary. Quality assurance measures were taken appropriately.

Results

Out of a total of 200 pediatric case sheets studied , age of subjects was between aged 6 month to 15 years. Of 200 patients, 87 (43.5%) were boys and 113 (56.5%) were girls, with a male to female ratio of 1.3 . 124 (62 %) patients belonged to rural area whereas 76 (38%) to urban area.

Socioeconomically, 44 % were from high socio-economic group, 36 % were from the middle strata, and 20% from the lower socio-economic strata. Family history was present in 42% of subjects . 173 (86.5%) had history of relapse. 182 (91%) patients had onset before 5 years of age. The distribution of the patients according to age of onset is shown in Table 1.

Table 1:Age of onset

Age (in year)	Number of patients (*N*=200)	Percentage (%)
0-1	58	29
1-2	73	36.5
2-3	39	19.5
3-4	12	06
4-5	08	04
5-15	10	05

Of 200 patients, 58 were infants (up to 1 year of age). Mean age (SD) at onset was about 8.3 ± 2.34 months. . Infantile AD had statistically significant higher SCORAD Index score in all three grade of severity of the disease as shown in Table 2.

Table 2: SCORing atopic dermatitis index score (mean±SD) among infantile atopic dermatitis and childhood AD

SCORAD index mean±SD

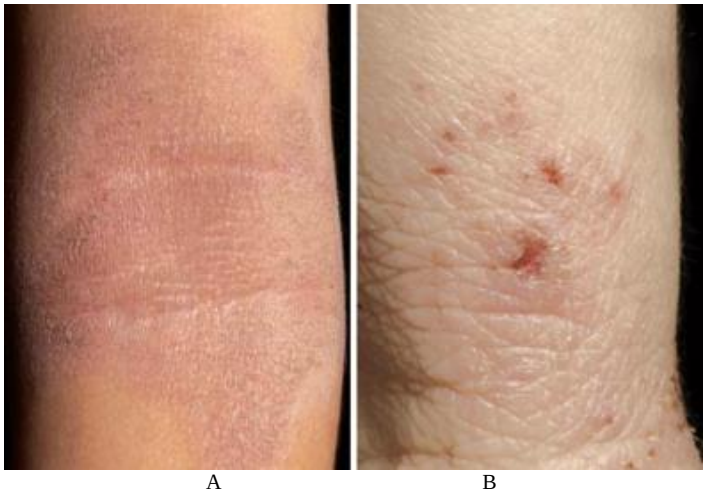
Severity Of AD	Infantile AD (<1 year)	Childhood AD (1-15 year)	P value
Mild	18.8±5.29	12.3±5.1	0.007
Moderate	39.3±9.30	32.3±6.5	0.04
Severe	87.48±12.14	65.9±12.9	0.001

Statistical significance by two sample independent *t*-test and $P<0.05$ is statistically significant, SCORAD: SCORing atopic dermatitis, AD: Atopic dermatitis

Childhood AD had statistically significant lower SCORAD Index score in all three grade of severity of the disease. One hundred and thirty (98%) patients presented with complain of itching or pruritus as shown in Table No. 3

Table 3: Common clinical presentation of atopic dermatitis . See Fig 1 A & B , 2 a,b,c

Clinical feature	No. of patients (*N*=200)	Percentage (%)
Pruritus / itching	192	96
Chronic relapsing eczema	115	57.5
Family history of atopy	101	50.5
Excoriation of skin	95	47.5
Dryness of the skin	86	43
Flexural lichenification	77	38.5
Ichthyosis	56	28
Recurrent conjunctivitis	16	08



A B

Fig 1:(A & B) Flexural involvement in the childhood phases of AE. Note accentuation of skin markings (lichenification and excoriations (right)

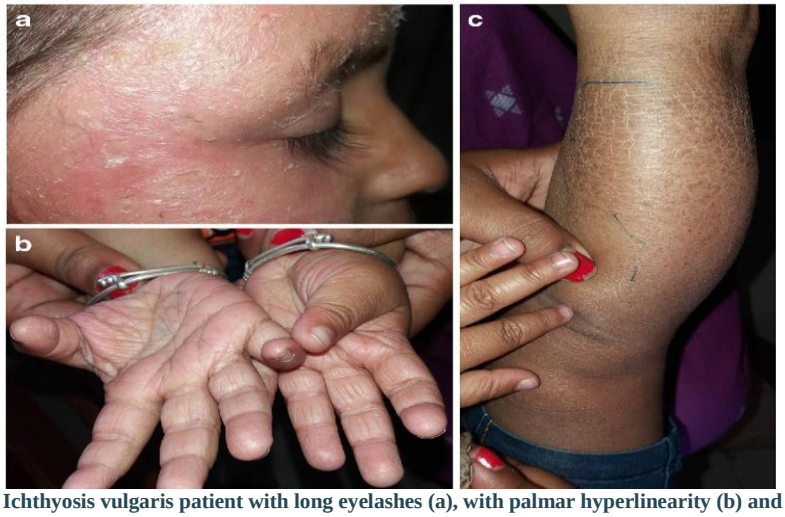


Fig 2: Ichthyosis vulgaris patient with long eyelashes (a), with palmar hyperlinearity (b) and ichthyosis over legs (c)

64.5% (129) patients had high AEC with mean SD of 1025.6 491.8 (range 325-2510). On ANOVA analysis of the AEC in different severity, severe AD had statistically significant high AEC (*P* 0.0001). Even within same group, patients with high AEC had statistically significant higher SCORAD Index score. 67.5% (135) patients had increased total serum immunoglobulin E (TsIgE) with mean SD value of 1165.35 IU/ml 681.75 IU/ml (range: 125-2680 IU/ml). On ANOVA analysis of the TsIgE, in different severity, severe AD had statistically significant high AEC (*P* 0.0001). Even within-group patients with high TsIgE had statistically significant higher SCORAD Index score.

Discussion

Atopic dermatitis (AD) is a chronic or chronically relapsing eczematous skin disease that is also called as atopic eczema and characterized by itching, dry, inflamed, and easily irritated skin

accompanied by cutaneous functional dysfunction. The term eczema and dermatitis are often used synonymously.[1],[2]

Atopic dermatitis has three phases. (1) Infantile phase (up to 2 years of age) primarily involved face, scalp, neck, and extensor surface of extremities with erythematous oozing papulo-vesiculous lesions. (2) In childhood phase (between 2 year and 10 years of age), the lesions are sub-acute, more scattered, and often localized in the flexor folds of the neck, elbows, wrist, and knees. (3) In adolescent and adult phase (more than 10 years of age), the lesions are primarily dry, lichenified, and hyperpigmented plaques were seen in flexor areas.[3],[4]The prevalence of AD had been increasing over the past four decades in developed country and also in India.[4,6] A four-decade-old study from Bihar reported an incidence of 0.38% of the total number of out-patient attendees.[7] On contrary to this study, North Indian hospital-based study reported 28.46%[8] and 29.9%[9] of total pediatric dermatology patients.. Prevalence in eastern & central regions also had increased over last four decades.[7] The reason for this increase is not known but probably increased environmental pollution, exposure to agricultural chemicals, decline breast feeding, earlier weaning, urbanization, increased awareness , better case detection technique, and improved quality of life are the factors that can explain increasing trend in occurrence of AD. In previous studies carried out, there are contrast view regarding gender ratio, although most have reported a male predominance, with male to female ratio 2.13:1 for infants and 1.09:1 for children,[8] 2.25:1 for infants and 1.6:1 for children.[9] On the contrary, our study found that girls outnumbered boys, with a female to male ratio of 1.3:1. . Our study result was comparable with study carried out by Rajka *et al*. who found female predominance with a female to male ratio of 1.5:1.[10] Todd *et al*.[11] and Poysh *et al*.[12] found higher prevalence in urban areas than rural areas. In contrast to these findings, our study found higher prevalence in rural based cases. This finding can be explained in view that some hospital including ours caters to predominantly rural population. William found that prevalence of AD increases with improvement in socio-economic condition.[4] Similar finding was reported by Spergel *et al*. who found that the prevalence of AD had increased two to three folds during past three decades in industrialized countries due to improvement of socio-economic condition and improved life style.[13] In contrast to our study,36 % patients came from middle class, 20 % from lower socio-economic class, and 44% from upper socio-economic class. An Indian study carried out by Sarkar and Kanwar, in which they found that majority belonged to middle class families (53.8% for up to 1 year and 57.57% onwards) whereas minority of patients was from low strata 15.55% for up to 1 year and 23.23% above 1 year.[8] In this study, mean age (±SD) at onset was 8.3 ± 2.34 months in infantile AD and 4.83 ± 3.02 years in childhood AD, these were comparable with other Indian studies which recorded 4.2 months for infantile AD and4.5 years for childhood AD,[8] 4.5 months for infantile AD and 4 years for childhood AD.[9] In the present study, 29 % of children developed disease by the age of 1 year and 91 % by the age of 5 years . In a study, Rajka found that 60% of subjects were having the onset of the disease in the first year of life and 85% by 5 years of age.[14] In a North Indian study they found 55.2% developed disease by 1 year of age and only 5.6% developed the disease after 6 years of age.[9] In our study, late presentation can be explained that in rural areas milder disease often ignored especially during infancy in low socio-economic strata.

In the present study infantile AD had statistically significant higher SCORAD Index score in mild, moderate, and severe AD . Sarkar and Kanwar in a study from north India also reported that infantile AD was relatively more severe than childhood AD.[9]In this study most common (96%) clinical presentation was itching. Face was affected in 76% patients in infantile AD and 56% patients in childhood AD. Our findings werecomparable with findings of Dhar and Kanwar.[8] In our study disease severity was assessed by SCORAD which was almost comparablewith other Indian study by Dhar *et al*.[16]

64.5% (129) patients had high AEC. On ANOVA analysis of the AEC in different severity, severe AD had statistically significant high AEC. Even within same group, patients with high AEC had statistically significant higher SCORAD Index score. 67.5% (135) patients had increased total serum immunoglobulin E (TsIgE) On ANOVA analysis of the TsIgE, in different severity, severe AD had statistically significant high AEC . Even within-group patients with high TsIgE had statistically significant higher SCORAD Index score.

Increased AEC and TsIgE level directly correlated with severity of the disease. Akadis et al. also found that systemic expansion of Th2 cell activity leading to release of IL-5, IL-4, IL 13, and IL-3 caused eosinophilia.[3] In a study, Leiferman has found that exact role of eosinophils and IgE antibodies in the pathogenesisof AD is not clear, but individual with AD has elevated eosinophils and IgE antibody level.[17] Wollenberg also has demonstrated that majority of cases are associated with a sensitization to environmental allergens and increased total IgE and eosinophilia, but about 30% of all cases lack increased total IgE.[18]

Conclusion

The prevalence of AD is considered to be increasing, it still remains low in comparison to developed countries. This study identified that both AEC and TsIgE increased significantlyThis study throws light upon epidemiological data and various clinical patterns of atopic dermatitis in this part of India. The load / Magnitude of atopic dermatitis remains low in this region compared to developed countries and disease manifestation is mild in Indian patients, hence vigilant eyes, elaborated detailed history and examination are required for accurate diagnosis and efficient management of AD in Indian setting. However to confirm our findings, larger population study in future is needed.

Acknowledgement

We would like to thank all the participants of this study. Our Faculties SRs / JRs , HoD and Dean for their Support.

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Conflict of Interest: Nil
Source of support: Nil