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## A Clinical Profile Observational Study in a Tertiary Care Hospital of Children with Atopic Dermatitis

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### ABSTRACT

Atopic dermatitis, which is simply referred to as eczema, is a common persistent skin condition that impacts children and infants across the globe, accounting for 10-30% of them. Extreme itching, skin swelling, infections, and additional itching characterize it. There has been a rise in the incidence of the disease in the last 30 years primarily due to the effluent environment, breastfeeding, increased prevalence and awareness of the disease, and urbanization. The present study aimed to describe the clinical aspects of children diagnosed with atopic dermatitis, fulfilling the Hanifin and Rajka clinical and visiting outpatient pediatrics and derma. Also, the study had a specific objective of identifying the possible factors that could worsen atopic dermatitis among the participants in the study. This trial covered 59 kids with atopic dermatitis; they filled questionnaires concerning their age, sex, complaints, things that worsen their condition, age of disease onset, and related symptoms. The other explored history included dietary one, breastfeeding history and the family or individual atopic history. A clinical assessment was carried out comprising localization and type of lesions and other features. It was revealed that females experience more atopic dermatitis than males and most of the children are affected from an early age. Food intolerance was the most common reason reported, with milk as the most frequent substance, followed by wool and lipid solvents. Half of the patients showed aggravation during the cold season. Dermatitic lesions involved the face and flexural areas more compared with the limbs. We found that 30 percent of the patients took complementary therapies, while 30 percent were malnourished. This work examined 59 children with atopic dermatitis ranging from 2 months to 12 years. It found that females were more affected than males, with an M: F ratio of 0.84:1. The most common manifestation experienced by the patients was purpurtus which was worse at night in about one-third of the population. Recurrence during the particular season was noticeable in half of the patients. Facial rash and flexural areas of extremities were found to be more affected by dermatitic lesions.

### INTRODUCTION

Eczema, also referred to as atopic dermatitis, is among the most frequent persistent, relapsing skin diseases in infancy and childhood. It is manifested in inflammation and pruritus and also physiological skin dysfunction (Bieber, 2022). Such a condition is frequent in those individuals who had asthma, or allergic rhinitis in the family, or had it themselves at some point; it is typical for early childhood (Frazier & Bhardwaj, 2020). Estimates for children indicate that the incidence of atopic dermatitis is between 10% and 20% in the United States, Japan, Australia and other developed nations (Faye *et al.*, 2024). Estimations to this effect suggest that the current status of this disease poses considerable threat to global public health (Hadi *et al.*, 2021). According to data, modern children are affected by atopic dermatitis more than three times than in the 1960s (Becerril-Ángeles *et al.*, 2023). As to why the incidence has started rising, we are yet to fully understand. The prevalence of the said diseases above, however, varies greatly across nations with similar ethnic groups, suggesting that there is strong influence of the environment in the manifestation of diseases (Bylund *et al.*, 2020). The exact relationship between atopic

dermatitis and atopy is not well understood; however, the following affiliations are possible. It is important to note that as many as 60% of the children with the clinical phenotype, although identified as atopic, show no signs of IgE-driven sensitization to food allergens (Mocanu *et al.*, 2021). Also, there is no specific test for atopic dermatitis diagnosis, as well as no specific physical sign that would separate this disease from other similar conditions (Frazier & Bhardwaj, 2020).

### Aims and Objective

In this study, the goal was to describe initial clinical characteristics of the children, who suffer from atopic dermatitis. It was done directly by enrolling people affected by the condition, based on the Hanifin and Rajka defining criteria, from the pediatric and dermatology outpatient departments. Moreover, the literature expanded its examination, aiming to identify factors that occasion flare in atopic dermatitis in the specified subpopulation. This study also seeks to incorporate an assessment of the symptomatology and likely precipitating factors in atopic dermatitis among children to offer substantive information on its management.

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## LITERATURE REVIEW

### Epidemiology and Impact on Pediatric Populations

Eczema cannot be restricted by age and therefore can start from the early infancy, which is distinguished by 75% of the cases with the first signs and symptoms by six months old. There is genetic susceptibility to develop atopic dermatitis (Barbarot *et al.*, 2022). From the epidemiologic data it is seen that atopy risk is higher if either or both the parents are suffering from the disorder. It is noted that atopic dermatitis develops at the first three months of life in infants from atopic mothers in more than a quarter of cases (Ezzedine *et al.*, 2020). Over 50 per cent of the children who develop an allergy exhibition from an atopic parent are affected by the time they are two years old (Dierick *et al.*, 2020). If both parents possess the disease, then, the rate is higher. Most of the genetic factors are fixed in atopic dermatitis (Bylund *et al.*, 2020). Twin studies showed that if one of the identical twins, i.e. the monozygotic twin, develops atopic dermatitis it is extremely likely that the other twin also will develop the disease, in 86% of cases; on the other hand, if one of the fraternal twins, i.e. the dizygotic twin gets the disease the other twin will develop the disease only in 21% of cases (Hartman, 2024).

Moreover, infections of the skin due to bacteria, viruses, or fungi (for example; *Staphylococcus aureus*, Herpes simplex, *Molluscum contagiosum*, etc.) are among those who are detected more in patients with atopic dermatitis (Alexander *et al.*, 2020). There is a strong correlation between food allergy and atopic dermatitis including the first occurrence of the skin condition (Dierick *et al.*, 2020). These are some of the primary food allergies that are frequently observed; eggs, milk and any dairy products, fish, peanuts, soybeans, wheat and tree nuts (Domínguez *et al.*, 2020). As can be seen, even if the disease becomes worse when the patient is exposed to allergens, irritants or infections, thus looking clinically like the symptoms manifested during the intake of foods that are causing an adverse reaction, the case is tricky to diagnose (Papapostolou *et al.*, 2022).

### Clinical Manifestations and Severity

Atopic dermatitis is an episodic eczema type skin disease and thereby has been found to have complaints that come in cycles of increase and decrease (Wollenberg *et al.*, 2023). They seem to be highly related to the age and stage of the disease, and the worst presented in childhood and get better in adolescence and adulthood (Chovatiya, 2023). Signs are that it is dry, becomes red skinned and the skin frequently develops a tendency of itching. The itching may be very severe, to the extent that the patient can hardly carry out his or her daily activities (Mocanu *et al.*, 2021). Common rashes appear in the regions such as elbows, behind the knees, wrists, cheeks, and neck of an affected person. The texture of the rash depends with the stage: acute lesions are associated with pus and crusting while the chronic ones are associated with thick

lichenification (Hui-Beckman *et al.*, 2023). Other signs which are also manifested with this skin condition are hyper linearity of palms, skin ulcerations, infections, and sleeplessness due to itching (Siegels *et al.*, 2021). The degree of a burn condition possible and probable adverse effect balances the extent of the burned area, the depth of the burn layer, and the effect on the individual's quality of life and their functioning capabilities and abilities, including activities of daily living and response to treatments (Dreno *et al.*, 2021). Skin manifestations are negligible with a few patches; skin disease is severe and has a tendency to become localized into thick skin, causes bleeding, painful and often requires other system affecting treatments (Bocheva *et al.*, 2021). The highlight of the points regarding the management of skin condition is that no matter how severe it is, environmental control and gentle handling are of paramount importance (Sekita *et al.*, 2023).

### Importance of Understanding the Clinical Profile of Atopic Dermatitis in Children

It is noteworthy for clinical diagnosis in children with AD that lesions are mainly distributed in flexural areas of limbs and curves, age of onset is before six years and disease progression (Napolitano *et al.*, 2022). Documenting the average time and outcome of the disease in children help creating the best approach for handling the disease and the execution of an efficient plan. Different studies focus on atopic dermatitis focuses on the clinical characteristics of the disease in children, and therefore may contain information on the identified factors and relationships: family history, environment, and co-morbidities (Siegels *et al.*, 2021). The symptoms, signs and severity of atopic dermatitis also differs from one child to another; this implies that the variation in the clinical appearance of AD is relatively large (Al-Adawiyah *et al.*, 2021). This understanding helps health care providers to map out unique care strategies for each child given that children's ailments can vary from the next. The follow-up of clinical status of children with atopic dermatitis provides an understanding of its severity and changes in the course of the disease, and to compare the results of therapeutic interventions and determine the prognosis (Frazier & Bhardwaj, 2020).

Therefore, the following information is very valuable for better understanding of the quality of patients' lives, for making clinical and further research decisions on the case of pediatric atopic dermatitis (Maksimovic *et al.*, 2020). A sufficient knowledge of the clinical, demographic, and health-related characteristics of children with atopic dermatitis may enhance healthcare workers' communication and teaching capabilities of the disease and the expectations for its treatment among families (Zhao *et al.*, 2023). It can also contribute to identifying specific educational materials and assistance programs for children with atopic dermatitis and their parents (Yoo *et al.*, 2022).

**MATERIALS AND METHODS**

**Study Area and Population**

The following study included patients who were present at Little Flower Hospital & Research Centre, Angamaly, located in the Ernakulam district of state Kerala in India. The duration of this study was for a year, starting from November 2015 to October 2016. The study population consisted of infants and children under 12 years, attending the Pediatrics and Dermatology OPD. All the patients were diagnosing with atopic dermatitis as per the Hanifin and Rajka clinical criteria.

**Study Design**

Serving as a cross-sectional research, the study looked at several aspects of patient information. The patient completed a detailed medical questionnaire that included the patient’s age, sex, initial complaints, including itching, factors that worsened or predisposed the patient to the specific disease, patient’s age at the first occurrence of the disease, and symptoms associated with the disease, including cheilitis and recurrent conjunctivitis. We sought to examine the dietary history of the patient in terms of foods that worsened the complaints and breastfeeding. Such observations were made in atopic families or on a personal level. Distribution and morphology of the lesions were observed during physical examination by general survey and palpation. The extra dimensions of the Hanifin and Rajka criteria were equally worth mentioning. Pearson’s chi-square test was utilized to analyze the final data.

**Ethical Considerations**

The permission to conduct the study was sought and later on, the informed written consent was obtained from the Institutional human ethics committee of the study setting. This improved the chances of attaining certain ethical principles by the research and the reduced likelihood of any harm coming to the participants. The parents or the close relatives or whoever takes up the responsibility of a parent for the families of the study participants agreed to participate in the study by willingly putting their signatures on the consent forms after explaining to them the details of the role and responsibilities, benefits, and risks of participating in the study and the right to withdraw their children from the study at any time of their choice. The control of participant was applied in the study as only participants who had given their voluntary written consent to participate in the research. The name of the specific participant of the study and the data that was collected and analyzed in the present research was kept anonymous or pseudonymous at all stages. This made sure that the name of the participant is concealed and there is no trace or chances that somebody might recognize any of the participants.

**Inclusion and Exclusion Criteria**

**Inclusion Criteria**

**Age**

Patients of required age limit, between 0-12 years of age.

**Diagnosis**

Documentation of atopic dermatitis according to the Hanifin and Rajka

**Severity**

Patients with atopic dermatitis of required age group and any gender corresponding to the objectives of the study and details of their disease such as mild, moderate or severe form of atopic dermatitis.

**Willingness to Participate**

Children who were available and willing to participate in the study and parents or primary caregivers who were willing to sign informed consent for the child’s involvement in the research.

**Exclusion Criteria**

**Underlying Medical Conditions**

Participants with chronic diseases, especially those that may affect the assessment of the results obtained during the study (such as scabies, insect bite reaction, intellectual disability, etc.)

**Current Treatment**

Patients with atopic dermatitis receiving treatments that may affect the obtained clinical picture at the moment (e. g., participating in other trials).

**Inability to Follow-Up**

Patients who included children or families that would not be able to continue follow-up procedures with the study (frequently migratory, no access to the hospital).

**Statistical Analysis**

The results of the descriptive statistics in terms of percentage, mean and standard deviation were used on the variables in the study. Regarding Inferential statistics, Pearson’s Chi – square test was used to determine the statistical difference between the association of major and minor clinical features of atopic dermatitis in the study population with, males and females, personal/family history atopy, age at onset less than one year, inadequate breast feeding history, malnutrition, food allergy history, seasonal exacerbation history. Significance level of  $p < 0.05$  was used in the study.

Based on the pilot study, we used the power analysis that works with 5% level of significance ( $p$  value) and 90% test power and using the software Sigma-plot 11, we determined the following sample size for each group. This proposed research presents the findings of the analysis in the following Table 1.

**Table 1:** Statistical analysis of sample size

Type of test	Minimum Sample	Maximum Sample
Chi-square test	19	51
So required Sample Size	51	

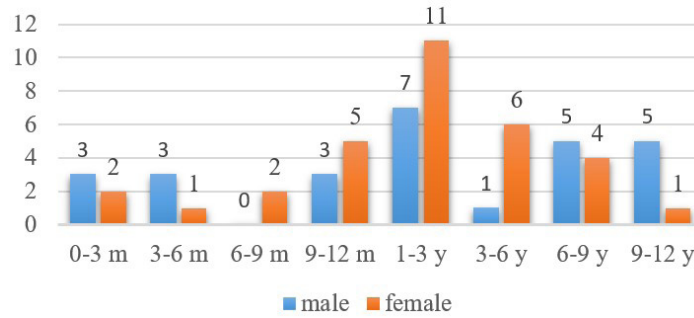
**RESULTS AND DISCUSSION**

**Results**

**Distribution of Patients on the Basis of Age Group**

The study samples involved 59 young patients with all patrons under the age of 12. The age variation came to cater for many aspects of childhood development as the youngest child was but 2 months and the oldest just below the adolescence age of 12 years. Yet, the average

age that the group had was 3.5 years, this shows that the respondents were skewed slightly to the younger children as may be expected. Out of 59 patients, 37 were below three years thus indicating the major impacts of this disease on the little children. It can be assumed that this sample might need more accommodation concerning the treatment of cases and data gathering techniques than elders may need in the same study.



**Figure 1:** Shows the number and distribution of male and female patients included in the study, according to the age group

The following study consisted of 27 male and 32 female patients, with a M:F ratio of 1.18:1 in the study group. The value in percentage of the patients and the final mean value of their age in months is mentioned in Table 2 and Table 3, respectively.

**Table 2:** Number of patients

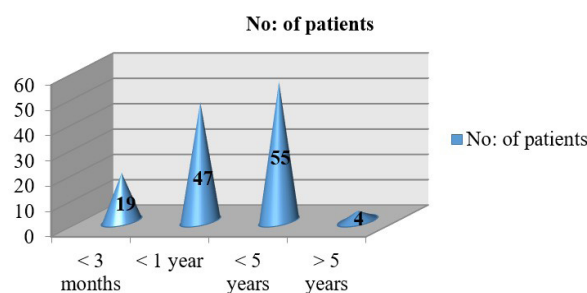
Sex	Frequency	Percent
Male	27	45.8
Female	32	54.2
Total	59	100.0

**Table 3:** Mean value of age in months

	Age in months
Mean	40.22

**Age at the Time of Diagnosis**

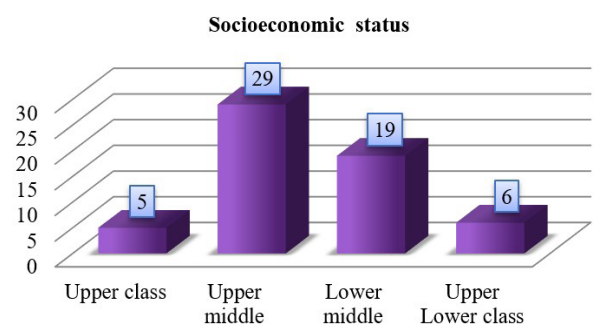
Among the 59 children with atopic dermatitis, 19 children (32.2%) developed the condition within three months after birth and 47 (79.6%) within infancy. Finally, 4 (6.7%) patients of them had the disease onset after 5 years of when they were born, while 8 (13.5%) patients had the onset of disease between the first and the fifth birthday. In regard to the age of onset, the disease developed in 55 (93.2%) of the children when they were 5 years old or less, as per shown in Figure 2. In other words, the mean age of onset for the patients was one year and four months.



**Figure 2:** Age of onset of disease

**Socioeconomic Status (SES) and Atopic Dermatitis**

Socioeconomic status can also be seen among the study population. The largest portion of children was characterized as belonging to the upper middle class, 29 (or 49.15%); next were the children from the lower middle class, 19 (or 32.20%); and the last category indicated 6 (or 10.16%) as being from the upper lower class. Only 5 of the participants (8.4%) were classified as belonging to the upper socioeconomic class and none as lower according to the modified Kuppaswamy scale. This difference in the distribution of the variables in the population based on SES may need to be taken into account when interpreting this study's results because factors such as access to adequate healthcare and exposure to environmental stimuli are known to have different distributions across SES (Podder *et al.*, 2022).



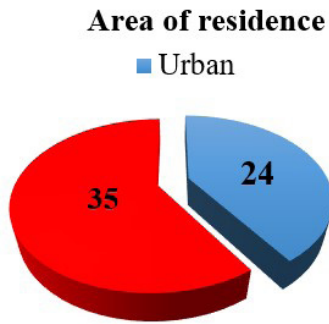
**Figure 3:** Distribution of patients according to SES.

**Geographic Distribution**

**Residence of Patients**

The following study narrates the participants involved with regard to their residence. Two categories are represented: which includes the urban and rural groups. Thus, urban areas represent a much more significant share in the study, involving about 35 participants (62.7%). On the other hand, the 'Rural' area category constitutes only a small proportion of the participants that were around 24 in number (37.3%). Such a case implies that there are

more participants from the urban areas of the country than from the rural areas.

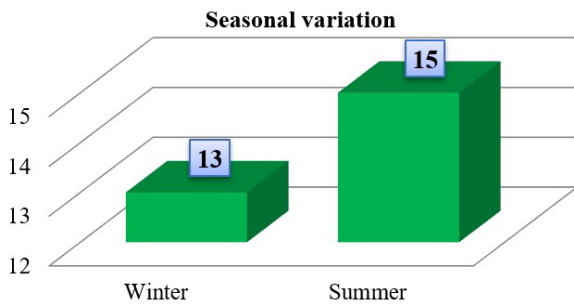


**Figure 4:** Distribution of patients according to area of residence

Moreover, 11 of the patients had to relocate due to personal reasons. This movement either had flare-ups or the onset of the disease. Two of them experienced exacerbations on moving to cities, while four of them had the beginning of their illness on moving from a town into a more rural area.

**Climatic Interventions on Patients**

Atopic dermatitis can be worsened by climate change because it gets affected by temperature increases, pollution and production of pollen and allergens, humidity, and increased levels of UV radiation (Wang *et al.*, 2024). In the present study, exacerbation of the condition occurred in 13 children (22.03%) during winter and in 15 children (25.42%) during summer, especially after sweating.



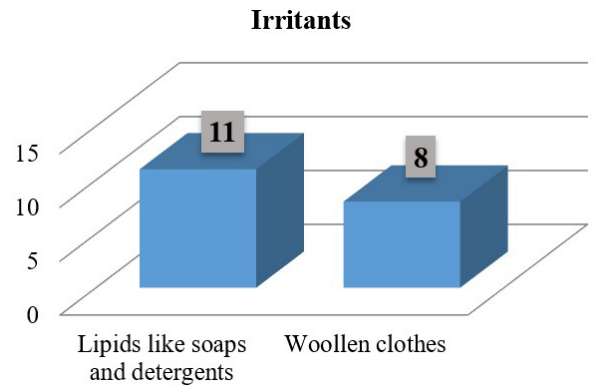
**Figure 5:** Seasonal variation of number of patients

**Table 4:** Number of patients classified according to the presence of existing atopy or allergic disorder

Atopy/Allergic disorders	AR	BA	EVW	AD	Total	Percentage	AR - Allergic rhinitis BA – Bronchial Asthma EVW- Episodic viral wheeze AD- atopic dermatitis
Maternal	17	7			24	40.67	
Paternal	9	12			21	35.59	
Sibling	1	5		4	10	16.94	
Personal	11	8	7		26	44.06	

Furthermore, Xerosis was the most frequent cutaneous morphology; 58 (98.3%) of the patients described their skin as being very much dry, at some time or all the time. Desquamation of the skin in the form of hyper pigmented diamond shaped scales was identified in 24 (40.67%) of

Moreover, for patients suffering from atopic dermatitis, choosing the right clothing material is really crucial for managing symptoms, its effects and improving comfort for the patients (Jaros *et al.*, 2020). In this study, there were 8 (13.55%) children who complained of itching on contact with wool and 11 (18.64%) children gave history of exacerbation of the disease with the use of lipid solvents like soaps and detergents as shown in Figure 6.



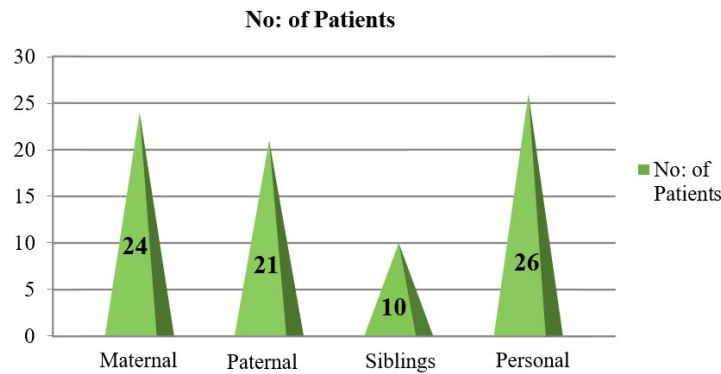
**Figure 6:** Effect of irritants (i.e. wool or lipid solvents)

**Examination Findings**

**History of Atopy or Allergic Disorders**

In the shortlisted 59 children having atopic dermatitis, 44 (74.5%) patients had family / personal history of atopy or other allergic diseases and 26 (44.06%) patients had personal history of atopy or other allergic diseases. Although both parents transmitted Atopy in the family history, it was more dominant in mothers with 40 percent. Inheritance through the mother was found to be more common at 67% as opposed to the paternal inheritance at 35.59%. Concerning the parents' health status, 10 children (16.94%) had a history of atopy/allergic disorders previously reported in their parents. Details of previous allergic disorders in the siblings were taken from 10 (16.94%) patients. In regard to the atopic manifestation, allergic rhinitis was most frequent, then bronchial asthma (Akhmedova & Akhmedova, 2021). For personal history of atopy in patients with the disease, 7 (11.86%) among the patients had episodic viral wheeze. Table 4 and Figure 7 shows a detailed and comprehensive analysis of these number mentioned above.

children with atopic dermatitis. Palmar hyper linearity was present in 24 (40.70%) of the children investigated in the present study with atopic dermatitis. However, hyper linearity of palms was present in 24 patients and among these, 20 have ichthyosis as an additional attribute.



**Figure 7:** Family history of Atopy or Allergic disorders

This feature characterized by tiny follicular papules was noted predominantly over outer arms in (13.6%) of our patients. Ichthyosis was seen in two patients with positive family history; hyperlinearity of palms and keratosis pilaris were seen in one patient.

**Minor Examined Features**

Apart from major physical features related to the patients suffering from AD, there were few minor features as well that corresponds to provide further analysis about the severity of the conditions. Few of these features are mentioned below as well represented as a demographic graph in Figure 8.

**Nipple Eczema**

Nipple eczema was noted in 3 patients (5.01 %) among our 59 patients. This finding was more common in the older children,

**Cheilitis**

There were 10 (16.9%) children with atopic dermatitis, who presented with dryness and fissuring of lower lip.

**Nonspecific Hand/ Foot Dermatitis**

There were 8 (13.6%) patients had eczematous lesions over hands and feet.

**Dennie Morgan Fold**

This finding characterized by folding of lower eyelid was noted in 34 (57.60%) children. There was associated lower eyelid dermatitis among 4 (11.76%) of them.

**Facial Pallor / Erythema**

Sixteen (27.1 %) out of 59 children had facial pallor. In most of them it was confined to the perinasal area, with a few showing involvement of periorbital area also.

**Orbital Darkening**

This feature was characterized by hyperpigmentation below the lower eyelid was present in 18 (30.50%) patients

with atopic dermatitis.

**Pityriasis Alba**

There were 15 (25.4%) children with pityriasis alba of which 10 had the lesions over the face only and the remaining 5 children showed extensive lesions over the trunk also.

**Anterior Neck Folds**

This finding characterized by horizontal creases on the anterior aspect of the neck was present in 4 (6.77%) children with atopic dermatitis.

**Perifollicular Accentuation**

Nine (15.3%) children with atopic dermatitis showed perifollicular accentuation characterized by pebbled appearance which was noted over the thighs, upper arms and back of trunk.

**White Dermographism**

Stroking of involved and uninvolved skin of patients with a blunt object produced a white line in 7 (11.9%) children. In addition to the above mentioned features described by Hanifin and Rajka, other findings noted were:

**Scalp Scaling**

Out of 59 patients with atopic dermatitis, 13 (22%) had diffuse scaling of the scalp.

**Eyelid Dermatitis**

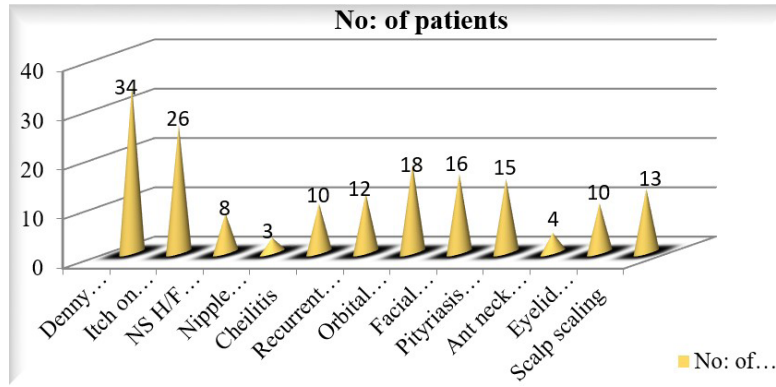
Scaling and redness of the eyelid was noted in 10 (16.9%) of children with atopic dermatitis.

**Itch When Sweating**

There were 26 (44.06%) children who complained of itch when sweating, which was more in the axilla and groins.

**Recurrent Conjunctivitis**

There were 12 (20.33%) children who complained of recurrent conjunctivitis.



**Figure 8:** Minor features corresponding the severity of AD in different patients

**Skin Lesions and Their Distribution**

Particularly, the study identified that the AD targeted face and the flexural surfaces in the limbs, or course, refers to the inner parts of the joints as such as elbows and knees. Interestingly, the distribution of involvement showed some variation:

**Facial Involvement**

Still, only 9 patients (15.3%) had atopic dermatitis exclusively on the facial skin; it was evident in total. This raises the aspect of esteem as a patient may be at risk of losing confidence and social interactions.

**Combined Involvement**

The most common site of involvement was faces and

flexures (17 patients or almost 28.8%). This implies that the condition may be wider than what has been estimated by the director of the research.

**Extensor Involvement**

In only 5 (8.5%) patients the AD became involved only in the extensor aspect (the area in direct opposition to the bend, e. g., the outer region of the arms and the forearm). This pattern is more unusual for AD.

**Isolated Flexural Involvement**

Only the flexural surfaces were affected in another 9 patients (15.3 %). This underlines the significance of assessing these regions in the process of the disease's identification.

**Table 5:** Sites of different skin extremities and number of patients affected

Site	Number	Percent
Generalized eczema	8	13.5
Eczema in face alone	9	15.3
Eczema in flexures alone	9	15.3
Eczema in extensors alone	5	8.5
Eczema in face and extensors	9	15.3
Eczema in face and flexures	17	28.8
Eczema in face, flexures and extensors	2	3.4
Total	59	100.0

**Secondary Cutaneous Infections**

In addition to atopic dermatitis, some children also presented with secondary skin infections or infestations which can also be observed via demographic status in Figure 9:

**Impetiginisation (13.55%)**

Among all the secondary diseases, this bacterial superinfection was the most common in the study reappearing in more than 8 children. Impetiginisation aggravates the symptoms of eczema and the use of antibiotics is needed for the treatment.

**Tinea Versicolor (6.77%)**

There are 4 children who have such a fungal infection

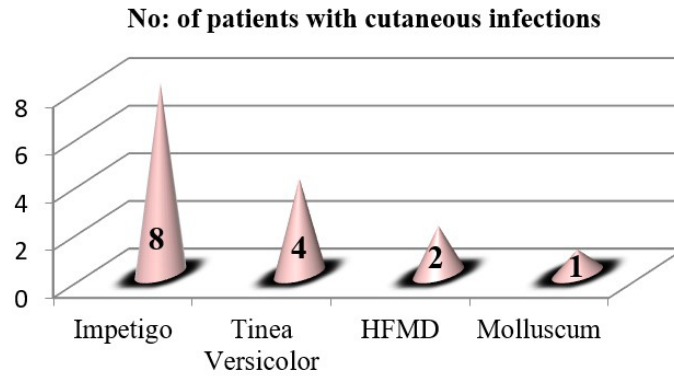
that is characterized white and tannish colored patches. Though it doesn't belong to the category of eczema, it is similar to it and may be confused with the latter sometimes.

**Hand, Foot, and Mouth Disease (3.38%)**

This viral infection presents with a fever and a rashes accompanied by blistering of the hands, feet and the oral cavity and two children were diagnosed with this.

**Molluscum Contagiosum (1.69%)**

Only one patient had this viral infection, and there were small, painless, bumpy lesions on the skin.



**Figure 9:** Patients affected by secondary skin infections

**Identifying Food Triggers**

Eczema or the atopic dermatitis is indeed very irritable, making the skin on the affected area feel itchy. The specific cause is still unexplained, nevertheless, there are certain foods that are believed to worsen the condition in patients (Papapostolou *et al.*, 2022). Consequently, our study showed that 41(69.49%) children had worsening

of the disease manifestations with particular foods. The food products that had more frequent associations with allergies were milk in 12 irregular cases (28.57%) and followed by egg in 9 cases (21.4%). Other foods that are included were meat, wheat, biscuits, ragi, fishes, sea foods, nuts chocolates, and orange as per shown in Table 6.

**Table 6:** Food allergens affecting number of patients

Food Allergens	No: of patients	Percent
Wheat	4	9.5
Milk	12	28.57
Meat	5	11.9
Ragi	3	7.1
Egg	9	21.4
Biscuits	3	7.1
Orange	1	2.38
Nuts	1	2.38
Chocolate	1	2.38
Seafood	1	2.38
Fish	1	2.38
Total	41	69.49

Moreover, on the aspect of adequate breast feeding, it was revealed that all except 8 children (13. 55%) were adequately breast fed. As for the inadequately breast fed children, all 8 of them had onset of disease before 1 year of age. In the following study, among 59 children with atopic dermatitis, 12 children were evaluated to be malnourished based on their weight for age status as per the WHO 2006 and IAP 2015 centile charts.

**Treatment Induced to The Patients**

Out of the 59 children with atopic dermatitis, 13 (22.03%) of them were receiving management through moisturizers alone. Among the twenty of them, majority (75%) were on topical corticosteroids which was often used with moisturizers. Of these 59, five (8.47%) of them were on topical calcineurin inhibitors combined with moisturizers and topical corticosteroids. Among

them 21 (35.59%) were used resorted to other system of medicines. Out of which, 18 patients (30.50%) were taking Ayurvedic treatment and 3 patients (5. 08%) were taking homoeopathic treatment.

**Statistical Analysis**

The correlation between the clinical aspects of the major and minor enrollees themselves together with gender, personal/family history of atopy, age on the onset of the disease below 1 year, inadequate breast feeding, malnutrition, history of food allergy and history of seasonal worsening of symptoms were investigated. Pearson joint Chi square test was also used in the analysis and p value was greater than 0.05 ( $p > 0.05$ ), which indicates that there has no statistical relationship between the major and minor clinical entities among the children in the study group.

## Discussion

In this investigation, a prospective analysis of 59 cases of children with AD during one year from November 2015 to October 2016 was carried out. Ours' was primarily a historical and clinical examination centered study. Many authors globally have also as well investigated clinical manifestations of atopic dermatitis. Such studies have often drawn different conclusions which might be due to ethnic variation or differences in definitions, materials or methods used.

The following study included children with AD within the age-group of 2 months to 12 years. Children with atopic dermatitis participating in the study ranged from the age of 2 months to 12 years of age with the average age of 3.5 years. Srinivas in his study also involved children those who belonged to the same age group thus the mean age of the AD patient was 2.7 years (Srinivas *et al.*, 2023). In a similar fashion, findings in the study by Parthasarathy, established that the mean and median age were 4.6 and 3.9 years respectively (Parthasarathy *et al.*, 2020). Hence, the age distribution of our patients is thus well in parallel with the other studies done in India.

Similarly, the following study identified cutaneous infections in 25.42% of children with AD having Impetiginisation in 8 of the patients, Tinea versicolor in 5, HFMD in 2 and Molluscum contagiosum in only 1 patient. That is why the level of infections is relatively low – due to better hygiene measures in Kerala and the use of antibiotics in time (Aggithaya *et al.*, 2021). The study also revealed that in the subjects with AD, 57.60% of the children had Dennis Morgan (DM) fold present, indicating a status due to persistent vasoconstriction, thus the lower percentage may be due to less severe manifestation of the disease in the children and the higher rate identified in some Indian studies due to ethnic difference and darker skin color (Nath *et al.*, 2020).

Moreover, in our study, orbital darkening was present in only 30.50% of cases, whereas different studies show different numbers. Probably, the reason for this difference may be the persistence of nasal congestion for a longer time period in atopic adults. Increased exposure to pollution in cities like Bangalore or Delhi might increase its incidence (Ailawadi *et al.*, 2024). In the present study, 44.1%) of the patients with atopic dermatitis experienced itch when sweating, and exacerbation during summer. Probably, the humid climate of Kerala may be responsible for the increased incidence. Around 11 patients (18.64%) reported worsening of the disease with the use of soap and detergent.

Furthermore, food items also played a crucial role in severity of AD depending on the patient's status (Mehta & Fulmali, 2022). Of 59 children, 41 (69.49%) definitely noted worsening of the disease after consuming certain foods. Among the foods, milk was most incriminated and posed threat to disease complications in 12 (28.57%) children. In 10 of the 12 studies, cow's milk was implicated while formula feeds were found to be responsible for the rest of the three cases and goat's milk in one patient

respectively (Ramírez-Marín *et al.*, 2022). This was succeeded by egg in 9 (21.4%) and meat in 5 (11.9%) patients. Meat is the most recurrent food identified in all the four children with chicken being the most common implicated food (Liao *et al.*, 2022). This was succeeded by wheat, biscuits, ragi and fish as the foods that were mentioned as likely causes of the situation in 9.5%, 7.1%, 7.15% and 2.38% patients respectively. Other highlighted foods were nuts, chocolate, seas foods and oranges.

Different studies have discussed about the link between Food allergy (FA) and atopic dermatitis (AD) which are prevalent. It is often established that food sensitization can be present in such patients (Domínguez *et al.*, 2020). However, before suggesting that the patient follows a restrictive diet which may prove to be detrimental to his/her health, allergy should be proven (Rustad *et al.*, 2022). Preschool children with AD are most commonly sensitized to egg, milk or peanut whereas school aged children and adults are commonly sensitized to HDM's, molds, animal dander or pollens. A barrier disturbance was found to play a main role in the process of sensitization and allergy, which is quite well known indeed (Ramírez-Marín *et al.*, 2022). Hence, concerning the fact that AD begins in early infancy, newborns' skin care using emollients and the early introduction of food seem to be crucial to define the tolerance to food (Mehta & Fulmali, 2022).

Apart from edible allergies, lack of breastfeeding was also a common factor associated with the prevalence of AD (Lin *et al.*, 2020). Inadequate breastfeeding was seen in 13.5% of 59 patients with atopic dermatitis, with a collective duration of less than one year. This may support the role of a varied solid food diet in exacerbating the disease. Additionally, atopic dermatitis was noted in 20.33% children whose weight was below the 3rd centile on the new combined WHO 2006 and IAP 2015 weight charts. Probably, nutrition will remain of interest for as long as safe and effective therapy methods against AD are being pursued (Trikamjee *et al.*, 2021).

While discussing about the severity of AD compared to the sample area population, Atopic dermatitis increased evidently in the study area of patients with winter exacerbation was significantly different from summer exacerbations (Belzer & Parker, 2023). According to the consequences of the disease, it was worsened in winter in 67.14% of patients with an infantile atopic dermatitis disease, and it occurred in summer in 25.42% of the patients. The research conducted also noted that the temperature of the environment did not fluctuate much from one year to the next in the coastal tropical zone which might have led to low prevalence. The researcher also found again that that majority of the patients were from upper or upper middle-income families.

## CONCLUSION

The present work aimed to assess children with atopic dermatitis in a tertiary care hospital. Female patients were more frequent than male ones. It was identified that children had the onset of the disease at an early

age, below 1 year of age, and there was significant itching as a common symptom in most children, which was worse at night (Song *et al.*, 2024). Thus, the most frequent and significant finding in patients' history was the presence of atopy in the first- and second-degree relatives, especially on the maternal side (Ai *et al.*, 2024). Food intolerance was evident mainly in milk products and foods containing milk, while contact urticaria and contact dermatitis from wool and lipid solvents were reported in one-third of the cases (Eyerich *et al.*, 2024). There was evident a seasonal pattern in the patients with half of the interviewees complaining of worsening of symptoms during summer (Fitzmaurice & Silverberg, 2024). Facial lesions were observed frequently, and the limbs' flexor surfaces had more extensive involvement than extensor surfaces (Geng & Sibbald, 2024). Xerosis contributed to almost all the patients; ichthyosis was more prevalent than keratosis pilaris. More to the point, there was a low prevalence of skin infections, and signs such as orbital darkening, pale face, dermatitis eyelids, and anterior neck folds (Herzum *et al.*, 2024). It is also noteworthy that most of the children had a rural origin, while most of them belonged to the upper or upper-middle social class. One alarming fact was that a major portion of children suffering from malnutrition were observed as 19% of the total study group (von Kobyletzki *et al.*, 2024).

### Recommendations

- Even though a simple observation of 'itching and dryness of the skin' confirms the disease in atopic dermatitis, other aspects mentioned as the major and minor criteria should be sought.
- Babies born to parents having personal/family history of atopy or any other allergic disorder should be put on 'no other milk' for the first 6 months and should continue breast feeding till 2 years as this postpones the onset and severity of the disease.
- Knowing certain triggers such as food will enable one to prevent the worsening of the disease.
- Parents should be made aware of the treatment options available that is there are facilities available for exact treatment rather than using other medicines like Ayurveda and Homoeopathy and proper advice should be provided to stick to Allopathy.

### Limitations

- This study is limited by the fact that the values that were derived represent the result of one particular hospital and from a selected population and therefore the findings of this research cannot be generalized to the whole population.
- This cross-sectional study orientation also precluded establishing causality between the identified precipitating factors and the clinico-radiological features of the disease.
- The age of onset, breastfeeding and other practices, type of precipitating factors like food, season and other irritants to diarrhea might suffer recall bias from the mothers or the primary care givers.

- They might also present reporting bias during the taking of the history.

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