Epidemiological profile and clinical pattern of atopic dermatitis in South Indian teaching hospital

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Abstract
Introduction: Atopic dermatitis is an itchy, chronic or chronically relapsing inflammatory skin condition, posing a significant burden on health-care resources and patients' quality of life, affecting 15-20% of children and 1-3% of adults worldwide. It is a complex disease with a wide spectrum of clinical presentations and combinations of symptoms.
Objective: 1. To determine the prevalence of atopic dermatitis (AD) in south India, 2. To study the various patterns of clinical manifestations of atopic dermatitis
Materials and Methods: A prospective, descriptive study conducted from January 2014 to June 2015. The study population included 100 atopic dermatitis patients attending the Out Patient Department of Dermatology of Tertiary care centre in south India
Results: Prevalence of AD was 0.58%. 49% of patients were in the age group of 0-1 year. Male: Female ratio was 1.3:1. 52% of patients belonged to middle socio economic class, 76% of patients were from Urban area. Personal and family history of atopy were noted in 66% and 56% of cases respectively. 60% of patients gave history of seasonal variation of their symptoms The most common site of involvement was face (72%), all 100 cases had pruritus – one of the major criteria, xerosis – one of the minor criteria, was present in 99% of cases. 67% of patients had mild disease.
Conclusion: This study throws light upon epidemiological data of atopic dermatitis in southern part of India. The prevalence of atopic dermatitis remains low in South India compared to developed countries and disease manifestation is mild in Indian patients.

Keywords: Atopic dermatitis, Epidemiology, Clinical pattern, SCORAD.

Introduction
Atopic dermatitis is an itchy, chronic or chronically relapsing inflammatory skin condition, posing 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.[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 part of the country, the reported prevalence among dermatology outpatient department attendees being 0.42% and 0.55%, respectively. 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]

AD is a complex disease and has a wide spectrum of dermatological manifestations. The diagnosis of AD is based on a constellation of signs and symptoms. There is no laboratory "gold standard" for the diagnosis of AD. Nevertheless, results and reproducibility of genetic, etiological, epidemiological, diagnostic and therapeutic studies depend on establishing reliable and valid diagnostic criteria. 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]

This study has been undertaken to establish the prevalence and various clinical patterns of AD in our teaching hospital since there is scarcity of such data related to AD in south India.

Material and Method
A prospective, descriptive study was conducted over a period of eighteen months from January 2014 to June 2015 after approval from ethical committee. The study included 100 atopic dermatitis patients attending the Out Patient Department of Dermatology in South Indian teaching Hospital.

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

Exclusion Criteria
Patients with Contact dermatitis, Stasis eczema, Lichen Simplex Chronicus, Infective eczema.

Tools
Analysis was done by using Mean, Standard Deviation, Independent sample 't' test, ANOVA test, Multiple correlation test and Tetrachoric correlation. Analysis of Data by using Statistical software.

After noting the demographic data, a detailed history was taken with reference to the age of onset and its duration, triggering factors, family and personal history of atopy. After taking informed consent from patients, a detailed cutaneous examination was done to determine the sites of involvement, morphology and severity of the disease (using the SCORAD Index- Fig. 1). A thorough general physical examination and systemic examination was done.

Results

A total of 95,727 cases attended the Out Patient Department of Dermatology during the study period (January 2014- June 2015) of which 562 cases were AD contributing to the prevalence of 0.58%.

57% were males and 43% were females. 49% patients were in the age group 0-1 year and 23% patients were in the age group of 1-5 years, 8% patients were above 40 years of age, 7% patients were in the age group of 5-10 years, 5% patients were in the age group of 15-20 years and 20-40 years each and 3% patients were in the age group of 10-15 years. (Table 1). 52% of patients belonged to middle socio-economic class, 25% of patients belonged to lower socio-economic class and 23% of patients belonged to upper socio-economic class. (Table 2). 76% of patients were from Urban area and 24% of patients were from Rural area.

60% of patients gave history of seasonal variation of their symptoms, 56% of patients gave family history and 66% of patients gave personal history of atopy. Facial involvement (Fig. 2) was seen in 72% of patients, 46% had involvement of lower limb, 45% had involvement of upper limb, 29% had involvement of flexures, 28% had involvement of extensors, 16% had involvement of seborrheic area, 15% had involvement of trunk and 4% had generalized distribution of lesions. (Table 3). 67% of patients had mild disease (SCORAD 0-25) and 33% had moderate severity (SCORAD 26-50) and none had severe disease (SCORAD above 51) according to SCORAD scores. (Table 4).

All 100% of patients had pruritus. Typical morphology and distribution was seen in 98% of patients, 82% of patients had chronic or chronically relapsing course and 92% of patients had personal and/or family history of atopy. (Table 5). Xerosis was noticed in 99% of patients, 51% of patients had ichthyosis, palmar hyperlinearity or keratosis pilaris, early age of onset was seen in 85%, tendency towards cutaneous infections seen in 68% of patients, intolerance to wool and lipid solvents was seen in 9% of patients, in 49% of patients, disease course was influenced by environmental factors, 28% of patients had itch when sweating, pityriasis alba (Fig. 3) was seen in 27%, recurrent conjunctivitis and tendency towards nonspecific hand and foot eczema was seen in 21% of cases each, nipple eczema, anterior neck fold, perifollicular accentuation, orbital darkening and cataract was seen in 2% each, dennie morgan folds (Fig. 4) and food intolerance and cheilitis (Fig. 5) were seen in 8% of cases each and facial pallor was seen in 6% of cases. (Table 6).

Discussion

The results obtained after compiling the data were compared with similar studies and are discussed below. The present study was an attempt to establish the clinical and epidemiological profile of the AD and it has also provided the outpatient-based prevalence of AD in dermatology clinic in a teaching hospital of south India with several interesting findings.

The prevalence of atopic dermatitis among patients attending the Out Patient Department in our study was 0.58% which was in accordance with the study done by Dhar S et al[6] 2002 (Kolkata), who observed the prevalence of 0.55%. In other studies done by Sarkar R et al[7] (Punjab), Dhar S et al[8] 2005 (Kolkata), Sinha PK et al[9] (Bihar), Sehgal VN et al[10] (Delhi) and Karthikeyan K et al[11] (Tamil Nadu), prevalence of 29.9%, 0.42%, 0.38%, 0.24% and 0.01% respectively were observed. Various studies done in different parts of India have reported the prevalence ranging from 0.01% to as high as 29.9%. This may be due to environmental factors, food habits.[12]

Most of the patients belonged to 0-1 years age group (49%), 23% of patients were in the age group of 1-5 years, 8% patients were in the age group of above 40 years, 7% patients were in the age group of 5-10 years. There was equal distribution of cases in age groups 15-20 years and 20-40 years (5% each) and 3% of patients were in the age group of 10-15 years. The mean age of patients in current study was 7.52 years, ranging from 3 months to 72 years. Results of present study are almost comparable to the study done by Dhar S et al[8], where 0-1 year age group constituted 37% of the study population, 22% of patients were in the age group of 1-5 years and 10-15 years each and 19% were in the age group of 5-10 years. However, present study showed varied results from the study done by Sehgal VN et al[10], where 53% of the cases were in the age group of 1-5 years, 15% of cases were in the age group of 0-1 year, 11% of cases were in the age group of 5-10 years and 10-15 years each and 10% were in the age group of 15-20 years. This variation of prevalence of AD in different age groups is probably due to occurrence of AD in susceptible individuals.

Males (57%) outnumbered females (43%) in our study with sex ratio 1.3:1. Results of our study is exactly similar to that of study done by Dhar S et al[8] with sex ratio of 1.3:1 and is almost comparable with the studies done by Sarkar et al[7] (1.6:1).This is probably because males are more susceptible for AD compared to females in all the mentioned studies.

In our study, more than half (52%) of cases belonged to middle socio-economic class, 25% belonged to Lower, 23% belonged to upper socio-economic class, which is almost similar to various other studies.[3,7] This may be attributed that, in India most of the patients who seek medical treatment in government hospital belong to middle or lower socio-economic class. Over all, AD is more common in upper and middle class population due to difference in food habits, psychological stress and hygiene.[12]

In this study, majority (76%) of patients were from urban areas and 24% patients were from rural areas. Similar findings were observed in a study done by Sarkar et al[7], where 70% and 30% patients belonged to urban and rural areas respectively. AD is more common in urban areas compared to rural areas. This is probably because, urban population is more exposed to AD triggering factors like psychological stress, environmental pollution, industrialization, wearing more of synthetic clothes.[12]

Seasonal variation was noticed in 60% of patients with winter (45%) and summer (15%) exacerbation. In the present study the percentage of exacerbation during winter (45%) and summer (15%) was less when compared to other studies.[6,7,13] However, in all these studies including the present study there is worsening of AD in winter compared to summer.

We categorized the distribution of skin lesions broadly into 8 headings, flexures (29%), extensors (28%), seborrheic areas (16%), face (72%), upper limb (45%), lower limb (46%), trunk (15%) and generalized (4%).

In our study, 72% of patients had facial distribution of lesions, which is similar to the study done by Dhar S et al[13] (74.5%), followed by involvement of flexures in 29% of patients, which is almost similar to the study done by Dhar S et al[13] (35.53%).

In 67% of patients, AD was mild in severity and 33% of patients had moderate severity of AD. Present study results are almost similar to the studies done by Dhar S et al[8] 2002 (Mild-54%, Moderate-27% and Severe-19%) and Dhar S et al[5] 2010 (Mild-41.25%, Moderate-55% and Severe-3.75%) which were conducted at Kolkata in India. Whereas in another study done by Weber MB et al[14] in Brazil showed, 22.70% of patients with mild AD, 52.30% of patients with moderate AD and 25% of patients with severe AD. However, none of the patients in our study had severe AD. These variations in the severity of disease can be attributed to genetics, environmental factors, temperature, humidity, food habits, clothing and psychological factors.

All 100% of patients in our study had pruritus. Pruritus is an essential feature of AD and is an important part of Hanifin and Rajka's major criteria. It is characterized by flexural lichenification or linearity in adults and facial and extensor involvement in infants and children.

Typical morphology and distribution was present in 98% of AD patients in our study which has no significant difference in comparison to the studies done by Yazganoglu et al[15] (99.7%) and Wisuthsarewong W et al[16] (99.1%). In young infants, the involvement of cheeks and perioral areas is quite classical and it is due to dribbling of saliva and smearing of liquid foods on these areas. As the infant starts crawling, the eczematous process tends to get localized to the extensors. The probable reasons for typical morphology & distribution of lesions in AD in the form of involvement of flexures in adults include sweating, contact with synthetic clothes, environmental allergens and bacterial colonization.[12]

In present study, 82% of patients had Chronic or chronically relapsing course, which is exactly similar to the results observed by Kumar MK et al[17] (82%). Since majority of study population in our study was in the age group of 0-1 year and it was the initial presentation to the hospital, chronic relapsing nature of the disease could not be elicited in remaining 18% of patient. AD tends to resolve in 50% of paediatric patients when they attain the age of 2 years, which could be the probable cause for varied result in the present study where 18% of patients did not have relapse, in comparison to the observations reported by Yazganoglu et al[15] and Wisuthsarewong W et al[16] where 100% of their study population had relapse of AD.

Atopy in general means a tendency to develop allergic manifestations. We defined atopy as the existence of one or more parameters in past or present or represent or previously diagnosed; asthma and/or eczema and/or allergic rhino-conjunctivitis.

In present study, 66% patients of AD had either one or more of these 3 features of atopy - allergic rhinitis, bronchial asthma and conjunctivitis whereas 56% patients of AD had history of atopy in their families. Results are almost comparable to the studies done by Dhar S et al[8] and Kumar MK et al[17], where they found personal history of atopy in 54% and 65.8% of patients and family history of atopy in 65% and 68.9% of patients respectively. Whereas other studies, Yazganoglu et al[15] (44.2% and 24.3%) and Dhar S et al[13] 1998 (15.35% and 36.44%) reported lower incidence of personal and family history of atopy which varied from our study results. Presence of family history of atopy, increases the risk of developing AD several folds when both parents are atopic.[12]

Xerosis was noted in 99% patients of AD. Results of present study are comparable with studies done by Bohme M et al[18] (100%) and Yazganoglu et al[15] (86%). It was proposed that xerosis to be included as major criteria as it has shown to have a very strong association with AD[12], which is similarly seen in present study. In the present study Hyperlinearity of palms, ichthyosis or keratosis pilaris was present 51% of patients, which is much higher when compared to other studies, Bohme M et al[18] (<25%), Yazganoglu et al[15] (29.7%) and Wahab MA et al[19] (24.8%).

85% of AD patients gave history of early onset of disease. The present study results are comparable to study done by Yazganoglu et al[15] (72.9%). However in other studies by Wahab MA et al[19] (31%), Bohme M et al[18] (<25%), frequency of early age of onset was less compared to present study.

An increased tendency towards cutaneous infections has been seen in AD patients due to defective epidermal barrier and increased bacterial colonization.[12] In the present study, 68% of AD patients gave a history for recurrent cutaneous infections. The present study result is almost comparable to study done in Asia by Wahab MA et al[19] (80%), which is probably due to environmental factors, lack of hygiene, defect in immune mechanism.[12] However studies done in Europe by Yazganoglu et al[15] (24.9%) and Bohme M et al[18] (<25%) showed lower incidence of cutaneous infections, which varied from our study results.

This could be due to better hygienic conditions in western countries.[12]

Wool fiber has frequently been an irritant to the skin of atopic patients and hence wool intolerance had been included in HRC.[12] In the present study increased sensitivity to wool fiber was present in only 9% of patients, which is low as compared to various other studies.[15,18,19] This could be due to variation in clothing pattern.[12]

Frequency of intolerance to one or more ingested foods was seen in 8% AD patients, which is low as compared to other studies.[15,18,19] The most common foods to which patients could relate their condition were milk and milk products, meat, egg and fish. AD patients are known to have allergy for protein part of the food.[12]

In present study, itch when sweating was observed in 28% of AD patients. The results are almost similar to study done by Wahab MA et al[19] (26.7%), this is probably due to release of acetylcholine during sweating that causes itching.[12] However, other studies conducted by Yazganoglu et al[15] (69.5%) and Bohme M et al[18] (34%) had reported higher values.

Nipple eczema was present in 2% patients which is comparable to study done by Yazganoglu et al[15] (6%). In present study, cheilitis or perioral eczema was seen in 8% patient. Hand and/or foot eczema in present study was observed in 21% of patients of AD, results are comparable with study done by Wahab MA et al[19] (16.6%) and Bohme M et al[18] (28%)

Pityriasis alba was present in 27% of patients. It is a condition commonly seen in children between 3-16 years of age. The incidence in present study is comparable to the study done by Yazganoglu et al[15] (18.1%) and Bohme M et al[18] (<25%). Lower incidence was noted in study done by Wahab MA et al[19] (14.3%). However Pityriasis alba has got good association with AD.[12]

Periorbital hyperpigmentation (PH) is present in only 2% patients. The results in present study are lower as compared to study done by Yazganoglu et al[15] (35.6) and Bohme M et al[18] (<25%), but study conducted by Wahab MA et al[19] showed no cases of Periorbital hyperpigmentation. The darkening around the eyes could be due to stress in AD patients.[12] Recurrent conjunctivitis was noted in 21% of AD patients, these results are almost similar to the study done in Chandigarh by Kaujalgi et al[20], where conjunctival involvement was seen in 20.9% cases of AD. In a study done by Bohme M et al,[19] recurrent conjunctivitis was seen in <25% and no cases were reported in the study conducted by Wahab MA et al.[19] Dennie-Morgan fold was seen in only 8% patients in our study. The results were very low, as compared to other studies.[15,18,19] Cataract was present in 2% of patients. Cataract due to atopic dermatitis develops as characteristic anterior subcapsular cataract in second and third decade of life and is an uncommon finding. Results are comparable to the study done by Yazganoglu et al[15] (1.1%).

In the present study, influence of environmental and emotional factors on the course of disease was seen in 49% of patients, results are relatively comparable to study done by Yazganoglu et al[15] (34.7%). Other studies done by Wahab MA *et al*[19] (66.7%) and Bohme M et al[18] (87%), showed higher magnitude of influence of environmental and emotional factors on the course of disease, which indicates environmental and emotional factors play a major role in the etiopathogenesis of AD.[12]

Perfollicular accentuation noted in 2% of patients, which is less in comparison with other studies, Yazganoglu et al[15] (9.5%) and Bohme M et al[18] (<25%).

Frequency of facial pallor in our study (6%) is comparable to the study done by Yazganoglu et al[15] (3.7%), but less in comparison with study done by Bohme M et al[18] (<25%). Facial pallor may be due to abnormal vasoconstriction in AD patients. But facial erythema, also popularly called "Head light sign" is due to hyperaemic circulation. In AD, blood vessels do have both vasoconstriction and vasodilation.[12]

Anterior neck folds noticed in 2% patients of AD. The results are very low when compared to other studies done by Yazganoglu et al[15] (25.3%) and Bohme M et al[18] (<25%). However, in another study done by Wahab MA et al[19] anterior neck folds were not observed.

Table 1: Age and sex -wise distribution of atopic dermatitis

Age groups	P=0.239, Cases (n) = 100				
	Male	Percentage (%)	Female	Percentage (%)	Total
0 to 1 Year	31	54.3	18	41.9	49
1 to 5 Years	11	19.2	12	27.9	23
5 to 10 Years	5	8.7	2	4.7	7
10 to 15 Years	1	1.8	2	4.7	3
15 to 20 Years	2	3.7	3	6.9	5
20 to 40 Years	4	7	1	2.3	5
Above 40 Years	3	5.3	5	11.6	8
Total	57		43		100

Table 2: Socio- economic status of atopic dermatitis

Socio-economic status	χ^2=1.440, P=0.230, Cases (n) = 100	
	Number of Cases	Percentage (%)
Upper	23	23
Middle	52	52
Lower	25	25
Total	100	100

Table 3: Sites of Distribution of lesions in the atopic dermatitis

Sites	Cases (n) = 100	
	Number of Cases	Statistics
Flexures	29	χ^2 = 17.640, P=0.000 (S)
Extensors	28	χ^2 =19.360, P=0.000 (S)
Facial	72	χ^2 =19.360, P=0.000 (S)
Seborrheic	16	χ^2 =46.240, P=0.000 (S)
Trunk	15	χ^2 =49.000, P=0.000 (S)
Upper limb	45	χ^2 =1.000, P=0.317
Lower limb	46	χ^2 =0.640,P=0.424
Generalized	4	χ^2 =84.640, P=0.000 (S)

Table 4: Severity of disease

Severity of Disease	Cases (n) = 100, χ^2=10.240, P=0.001 (S)	
	Number of Cases	Percentage (%)
Mild	67	67
Moderate	33	33
Severe	0	0

Table 5: Distribution pattern of major criteria in atopic dermatitis

Major criteria	Cases (n) = 100		
	Number of Cases	Percentage (%)	Statistics
Pruritus	100	100	-
Typical morphology & distribution	98	98	χ^2 =92.160, P=0.000 (S)
Chronic or chronically relapsing course	82	82	χ^2 =40.960, P=0.000 (S)
Personal and/or family H/o atopy	92	92	χ^2 =70.560, P=0.000 (S)

Table 6: Distribution pattern of minor criteria in atopic dermatitis

Minor Criteria	Cases (n) = 100	
	Percentage of Cases	Statistics
Xerosis	99%	χ^2 =96.040, P=0.000 (S)
Orbital darkening	2%	χ^2 =92.160,P=0.000 (S)
Ichthyosis, Hyperlinearity of palms and soles, keratosis pilaris	51%	χ^2 =0.040, P=0.841
Early age of onset	85%	χ^2 =49.000, P=0.000 (S)
Raised serum IgE	84%	χ^2 =46.240, P=0.000 (S)
Tendency towards cutaneous infection	68%	χ^2 =12.960, P=0.000 (S)
Facial pallor	6%	χ^2 =77.440, P=0.000 (S)
Anterior neck folds	2%	χ^2 =92.160, P=0.000 (S)
Intolerance to wool & lipid solvents	9%	χ^2 =67.240, P=0.000 (S)
Food intolerance	8%	χ^2 =70.560, P=0.000 (S)
Nipple eczema	2%	χ^2 =92.160, P=0.000 (S)
Cheilitis	8%	χ^2 =70.560, P=0.000 (S)
Cataract	2%	χ^2 =92.160, P=0.000 (S)

Dennie Morgan fold	8%	χ^2 =70.560, P=0.000 (S)
Recurrent conjunctivitis	21%	χ^2 =33.640, P=0.000 (S)
Non-specific hand and/or foot eczema	21%	χ^2 =33.640, P=0.000 (S)
Pityriasis alba	27%	χ^2 =21.160, P=0.000 (S)
Itch when sweating	28%	χ^2 =19.360, P=0.000 (S)
Perifollicular accentuation	2%	χ^2 =92.160, P=0.000 (S)
Course influenced by environmental & emotional factors	49%	χ^2 =0.160, P=0.689

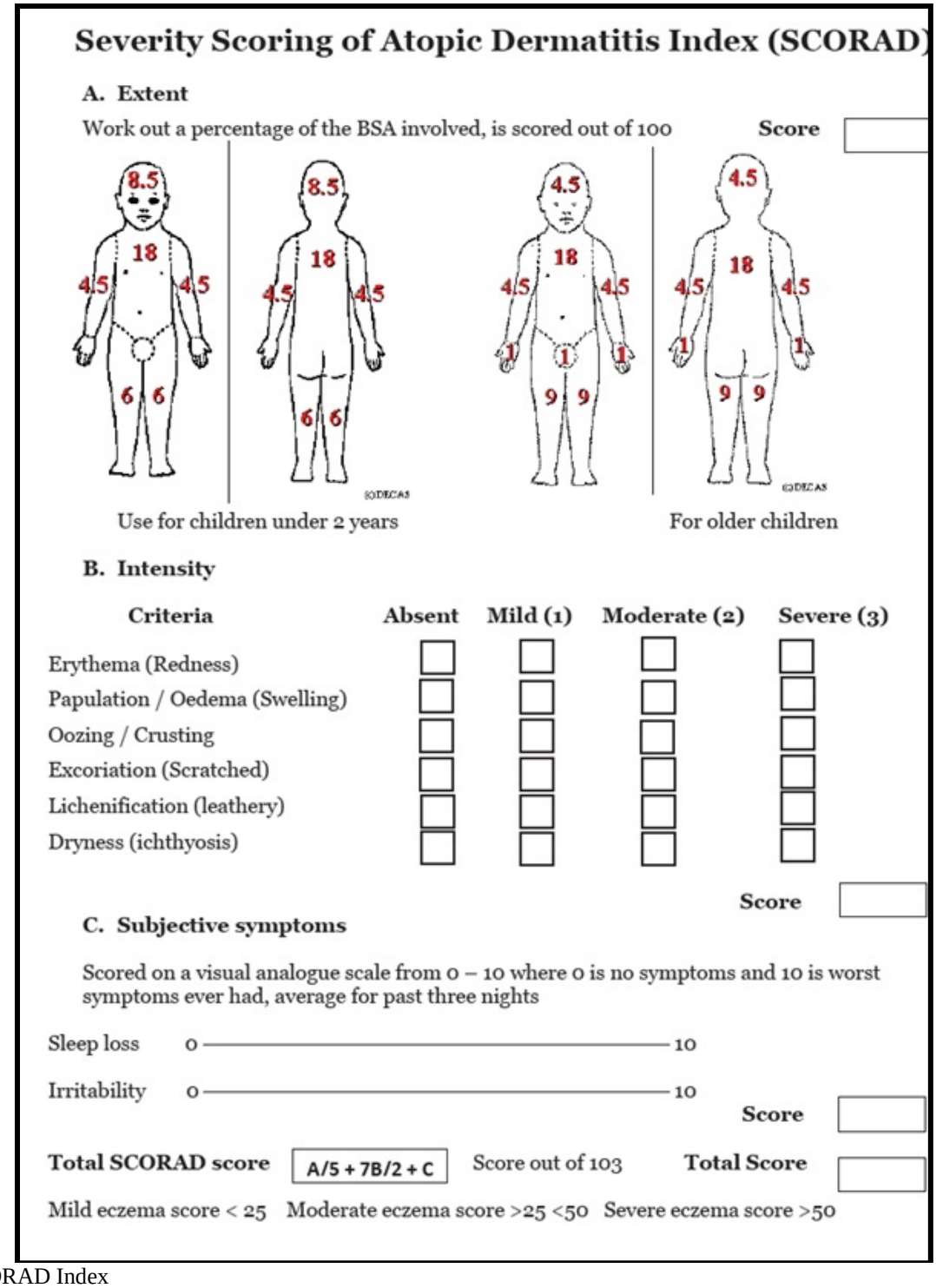

Fig. 1: SCORAD Index

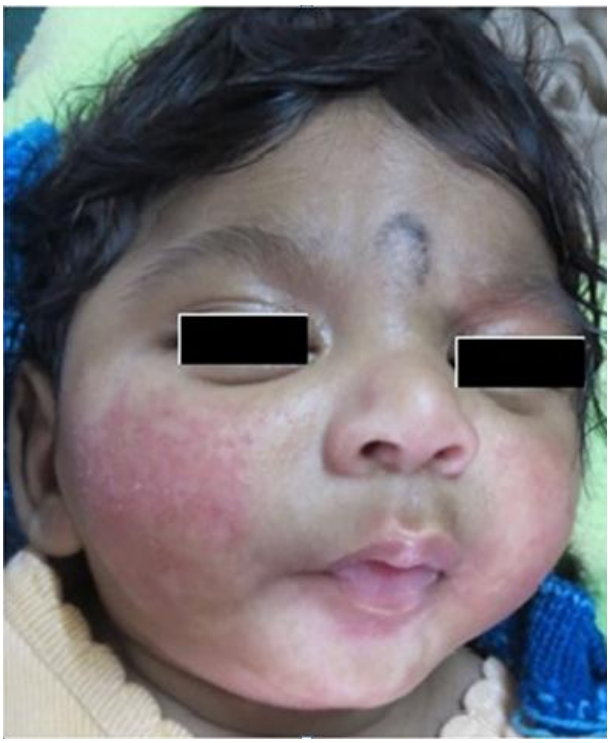

Fig. 2: Facial involvement

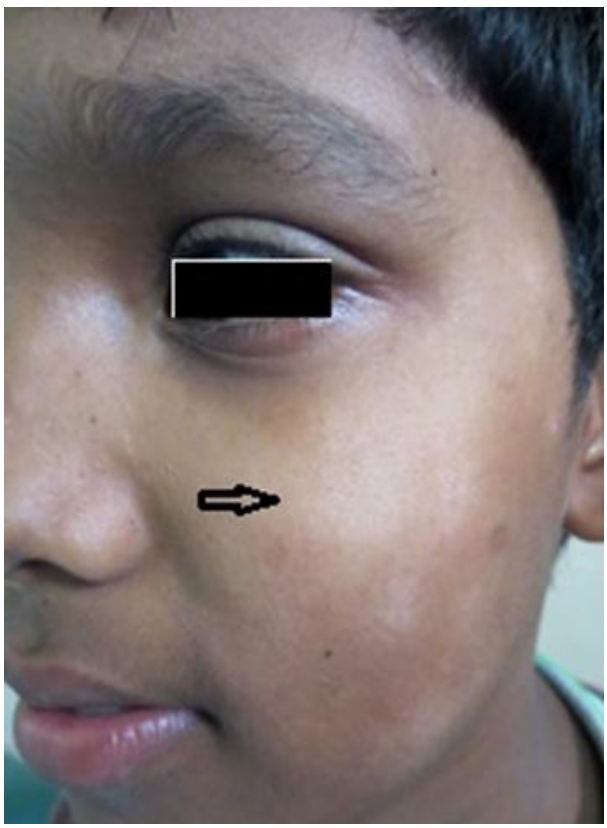

Fig. 3: Pityriasis alba

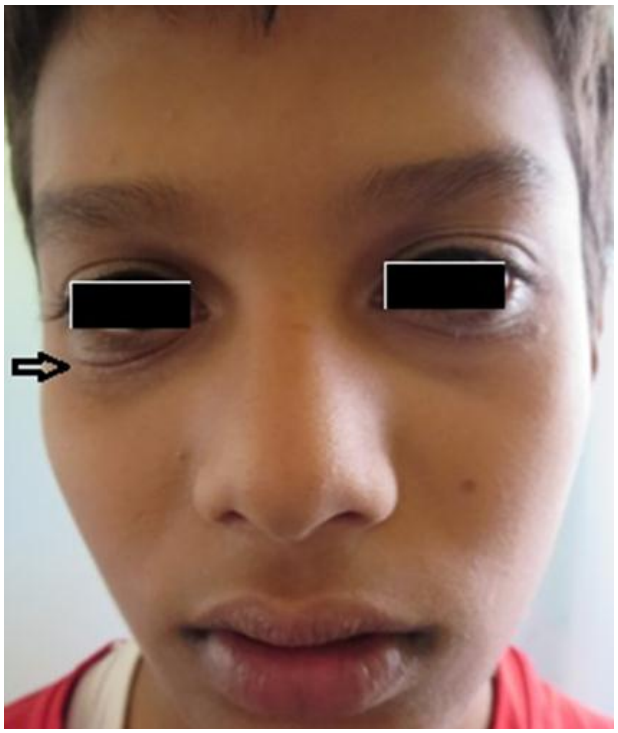

Fig. 4: Dennie morgan folds

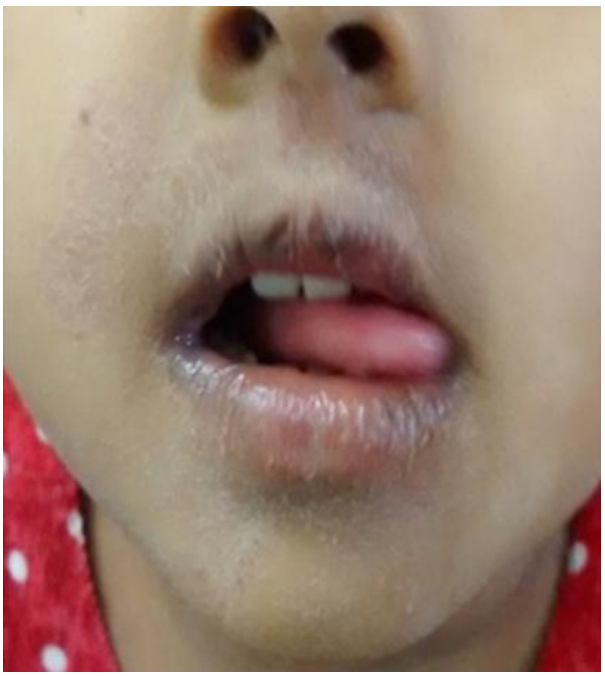

Fig. 5: Cheilitis

Conclusion

This study throws light upon epidemiological data and various clinical patterns of atopic dermatitis in southern part of India**.** The prevalence of atopic dermatitis remains low in south India 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.

Conflict of Interest: None.

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