



Epidemiology and treatment pattern of atopic dermatitis in patients attending a tertiary care teaching hospital

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ABSTRACT

An observational, prospective, cross sectional study was carried out on atopic dermatitis (AD) patients attending the dermatology outpatient department of Amrita Institute of Medical sciences, Kochi from January 2010 to May 2010. The study population consisted of 6250 outpatients and the entire 60 patients from all the age groups who were diagnosed to have atopic dermatitis based on the Hanifin and Rajka's diagnostic criteria and who agreed to participate in the study were included. Relevant data was obtained from patients, patients' parents and/or relatives by interviewing them and by individual analysis of the patient's prescription and was compiled using Microsoft excel and descriptive statistical analysis carried out. The prevalence of AD was found to be 0.96% in the study population. Majority of the patients were in the age group of 3 to 10 years with a mean age of 13.8 ± 15.1 years and the mean age at onset was 10.6 ± 14.8 years. 31.7% of the patients had "pure" AD and 68.3% suffered from a "mixed" type. The disease severity assessment showed that 51.7% of patients had moderate AD, followed by mild type in 30.0% of patients. Family history of atopy was seen in 56.7% of patients. Majority of the patients had aggravation of the disease during winter months. Most of the patients (95.0%) were prescribed topical emollients while topical steroids in 75% and short courses of systemic steroids in 25% of patients. Adverse drug reactions reported include gastric irritation in 6.7% of patients, followed by weight gain in 3.3%, folliculitis & exacerbation of eyelid dermatitis in 1.7%. It was concluded from this study that the prevalence was slightly higher than those reported from northern India. Only moderate and mild type of AD was found in the study population and majority of the patients could be controlled with topical emollients and topical steroids.

Keywords: Atopic dermatitis; Prevalence; Treatment pattern; Atopy; Adverse drug reaction.

INTRODUCTION

Atopic dermatitis (AD) is a chronic inflammatory skin disease associated with cutaneous hyper reactivity to environmental triggers and is often the first step in the atopic march that results in asthma and allergic rhinitis (Leung 2004). It can be classified as "mixed" and "pure" type according to its association with respiratory allergies (Rackal 2004). The disease is characterized by acute, sub acute and chronic lesions. In the acute phase, the affected areas present as erythematous papules and vesicles that become excoriated, exudative and secondarily infected. In the sub acute phase, there are excoriations and erythematous scaling papules and plaques present. Chronic dermatitis is characterized by changes secondary to repeated rubbing

and scratching resulting in lichenification (Tay 1999).

The prevalence of atopic dermatitis has doubled or tripled in industrialized countries during the past three decades; 15 to 30% of children and 2 to 10% of adults are affected, but remain much lower in countries with predominantly rural or agricultural areas (Bieber 2008). A study by Williams *et al* shows great worldwide variation in the prevalence of AD, ranging from 0.6% to 20.5%. The fundamental tools of epidemiology will provide a basis for validating new information derived from basic and clinical science and may allow us better understanding on disease definitions, the role of atopy, family history and alternative treatment options. Most of the Indian studies on the epidemiology of atopic dermatitis are based on the North Indian population and there are only few data from South India. The purpose of this study is to determine the prevalence of AD in patients attending a tertiary care teaching hospital, to identify clinical features like personal and family history of atopy, concomitant atopic diseases, morphology of dermatitis which includes site of involvement, type of eczema and the severity of the disease,

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associated skin conditions and to study treatment pattern and adverse drug reactions occurred.

PATIENTS AND METHODS

Study design & center

The present study was an observational, prospective, cross sectional study carried out on patients with atopic dermatitis diagnosed at the dermatology outpatient department of Amrita Institute of Medical sciences, Kochi from January 2010 to May 2010.

Inclusion criteria

1. Patients diagnosed to have atopic dermatitis by the dermatologist based on the Hanifin and Rajka's diagnostic criteria.
2. Patients under all age groups.
3. Patients or their care-givers capable of providing complete information in the data collection form.

Exclusion criteria

1. Patients who do not fulfill the Hanifin and Rajka's diagnostic criteria for atopic dermatitis.
2. Patients or their care-givers with incomplete information.
3. Patients or their care-givers unwilling to participate in the study.

Sample size

The entire 60 patients from the outpatient department of dermatology who satisfied the study criteria and agreed to participate in the study were included in this study.

Data collection

Patient data relevant to the study was obtained by interviewing the patient and/ or patient's care givers and also by examination of the patient's medical record and recorded in a standardized data collection form which provided the information regarding the demography of the patient which includes age, sex, area of residence, social history, age at onset of disease etc, clinical data including type of atopic dermatitis-pure or mixed, personal and family history of atopy, morphology of dermatitis which includes site of involvement, type of eczema and the severity of the disease. Information regarding any allergies for the patient was also obtained. Data regarding the associated findings such as ichthyosis vulgaris, infective complications, and laboratory findings & aggravating factors were also collected.

For the purpose of this study, the eczema was categorized after a thorough examination of the lesions with the help of a dermatologist. Oozing lesions with papules and vesicles, with or without underlying erythema were included in '*acute eczema*' while those patches with minimal oozing and moderate scaling was

defined as '*sub acute eczema*' and '*chronic eczema*' as lichenified plaques with no oozing and with or without scaling (Sarkar 2004). The distribution of eczema was noted for each patient, along with predominant sites of involvement (flexors, extensors, face etc). The severity of atopic dermatitis was determined by the following criteria: *mild*, presence of skin lesions on less than 10% of the total body surface; *moderate*, involvement of 10-50 % of the body surface; *severe*, involvement of more than 50% of the body surface (Sugiura 1998). Individual analysis of the patient's prescriptions was also carried out to study the treatment pattern and the patient's were monitored for the presence of any adverse drug reaction due to the treatment. The collected data were compiled using Microsoft excel and presented in graphical format using pie charts, histograms etc. Calculation of the mean and standard deviation were done by using online statistical calculator.

RESULTS

A total of 6250 patients with skin diseases were seen at the dermatology outpatient department during the study period of five months. Out of these, 60 patients with atopic dermatitis met the criteria for this study, thus giving a prevalence of 0.96%. There was a slight female preponderance with 31 females (51.7%) and 29 males (48.3%). The majority of the patients were in the age group of 3 to 10 years with a mean age of 13.8 ± 15.1 years (Table 1). The youngest patient was a 4 month old baby girl, while the oldest one was a 70 year old male.

Table 1: Age distribution of patients with atopic dermatitis

Age group	No. of patients(N=60)	Percentage (%)
0- 2 years	12	20.0
3-10 years	26	43.3
11-20 years	9	15.0
21-30 years	5	8.3
31- 50 years	5	8.3
51-70 years	3	5.0

The age at onset of atopic dermatitis in the sample population is shown in Table 2 and the mean age at onset was 10.6 ± 14.8 years. The majority of the patients developed symptoms of atopic dermatitis in the first 10 years of life (71.7%). In a significant proportion, however, atopic dermatitis first developed during the teenage and early adult years (16.7%), and in 11.7%, it first developed after the age of 31 years. Most of the patients were from the urban area (70%) while few from rural area (30%).

Allergies were noted in 38 patients (63.3%). The most common was dust allergy found in 21.7% of patients. Allergy to egg was found in 11.7% of patients & 10.0% to Non Veg. 3 patients each (5.0%) were found allergic to Seafood, Milk products & wheat. Drug allergy was found in 5% of patients; 1 patient each was allergic to penicillin, paracetamol and phenytoin (eptoin®). Figure

1 shows the frequency of "pure" and concomitant atopic diseases: 19 patients (31.7%) had "pure" atopic dermatitis and 41 (68.3%) suffered from a "mixed" type with concomitant respiratory allergies; 20 (33.3%) had allergic rhinitis, 18 (30.0%) had asthma, and 3 (5.0%) had asthma and allergic rhinitis.

Table 2: Age at onset of atopic dermatitis in the sample population

Age group	No. of patients (N=60)	Percentage (%)
0-2 years	28	46.7
3-10 years	15	25.0
11-20 years	7	11.7
21-30 years	3	5.0
31-50 years	5	8.3
51-70 years	2	3.3

Figure 2 shows the frequency of a family history of atopy: 34 patients (56.7%) had at least one first-degree family member with atopy; asthma 19 patients (31.7%), allergic rhinitis 11(18.3%) and atopic dermatitis 4 patients (6.7%).In 26 patients (43.3%), there was no family history of atopy.

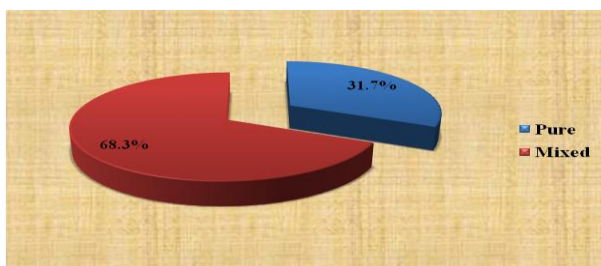


Figure 1: Frequency distribution of pure & mixed type of atopic dermatitis

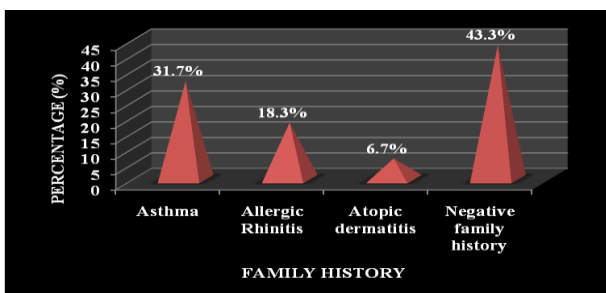


Figure 2: Frequency of family history of atopy in patients with atopic dermatitis

The majority of our patients had sub acute type of eczema (71.7%) followed by chronic type of eczema in 23.3% of patients while 5.0% had acute type of eczema (Figure 3).

The distribution of eczematous lesions on the body was observed for each patient and the severity of the disease was determined (Figure 4). In this study more than about half of the patients (31 patients, 51.7%) had moderate AD, followed by mild type of AD in 18patients (30.0%) and severe type of AD in 11 patients (18.3%).

Figure 5 shows the predominant sites of involvement with the extensor surface being most affected site in 80.0% of patients ,followed by flexors in 36.7% of patients and face in 18.3% of patients.Neck was the least affected site found in only 6.7% of patients.

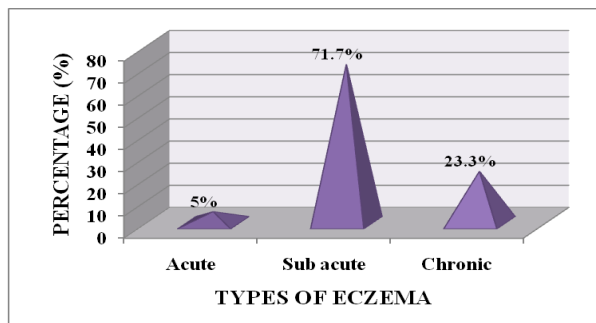


Figure 3: Types of eczema in atopic dermatitis patients

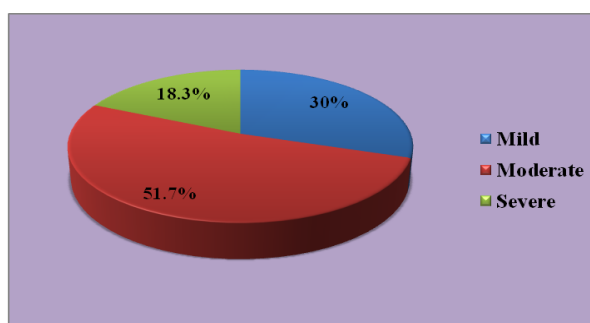


Figure 4: Severity of the disease in patients with atopic dermatitis (n=60)

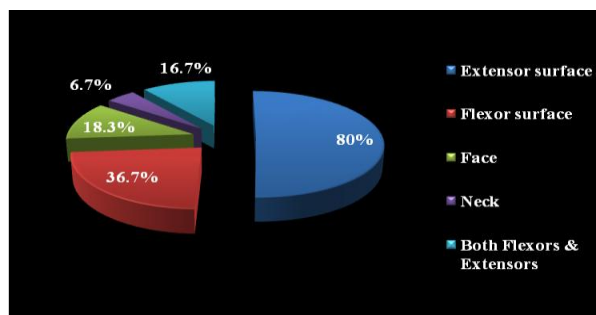


Figure 5: Body sites involved in atopic dermatitis

Table 3 shows the frequencies of the various infective complications that occurred in the patients involved in this study. The most common complication was bacterial infection: 14 patients (23.3%), followed by fungal infections: 7patients (11.7%).

Table 3: Infective complications of atopic dermatitis patients

Complications	No. of Patients (N=60)	Percentage (%)
Bacterial infections	14	23.3
Fungal infections	7	11.7

Table 4 shows the associated skin conditions in patients with atopic dermatitis. The most frequent condition was xerosis in 53.3% of patients, followed by hyper linear palms in 36.6% of patients and 9 patients had ichthyosis vulgaris, 5 patients each had erythroderma & seborrheic dermatitis.

Table 4: Frequency of co-existing skin conditions in atopic dermatitis patients

Skin condition	No. of patients (N=60)	Percentage (%)
Xerosis	32	53.3
Hyper linear palms	22	36.6
Ichthyosis vulgaris	9	15.0
Erythroderma	5	8.3
Seb. dermatitis	5	8.3
Pityriasis alba	3	5.0
Eyelid dermatitis	2	3.3
Peri Orbital darkening	2	3.3
Alopecia areata	2	3.3
Lichen amyloid	1	1.7
Psoriasis	1	1.7
Nipple eczematization	1	1.7

The common environmental triggers that were observed to reactivate atopic dermatitis are shown in Figure 6. Common aggravating factors reported include winter season in 25 patients (41.6%), followed by sweating in 9 patients (15%), and stress in 4 patients (6.7%).

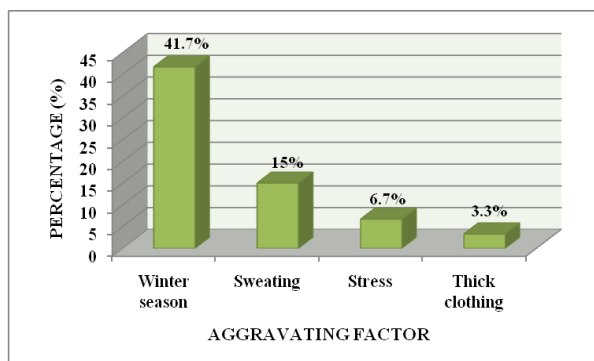


Figure 6: Aggravating factors for atopic dermatitis in the studied patients (N=60)

Complete blood counts were performed in 25 patients and, in 9 patients elevated eosinophil counts were noted (36.0%). Serum immunoglobulin E (IgE) levels were elevated in 22 patients (88.0%), 4 patients each had neutropenia and lymphocytopenia (16.0%). Figure 7 shows the prescribing pattern of topical therapy in the studied patients. Majority of the patients were treated with emollients (in 95.0% of patients) and topical corticosteroids were used as anti-inflammatory therapy in 75.0% of patients. Calcineurin inhibitors were prescribed in 5.0% of patients. Topical antibacterial and antifungals were used in 6.7% of patients each and keratolytics in 5.0% of patients.

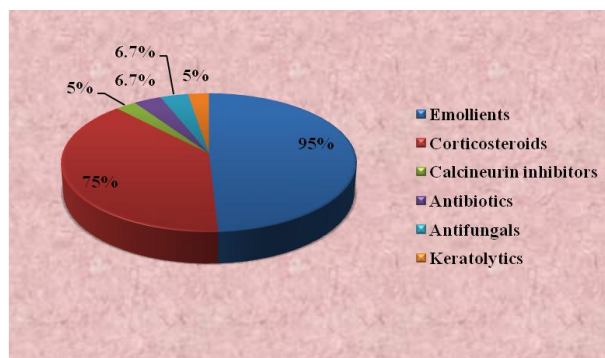


Figure 7: Prescribing pattern of topical therapy in atopic dermatitis patients

Antihistamines were the most commonly used drugs in systemic therapy (in 75% of patients). Systemic corticosteroids were used in 25% of patients with severe chronic AD. Cyclosporine was used in 3.3% of patients with severe, recalcitrant disease and antibiotics were prescribed in 20.0% of patients (Figure 8). Also short-wave ultraviolet B radiation was used in 18.3% of patients as adjunctive therapy in chronic, recalcitrant atopic dermatitis.

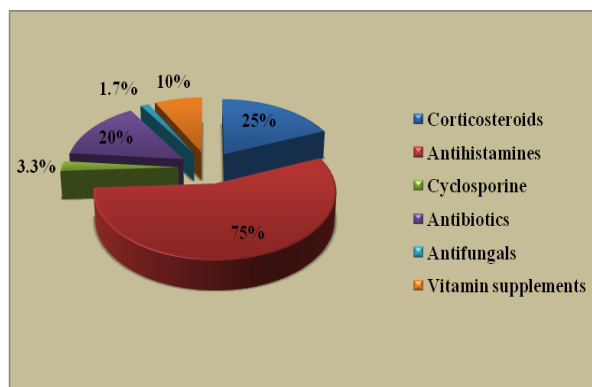


Figure 8: Prescribing pattern of systemic drugs in atopic dermatitis patients

All the 60 patients who participated in this study were interviewed during their follow-up visits and any adverse drug reaction (ADR) occurred was noted (Figure 9). Gastric irritation was the commonly reported ADR which was observed in 4 patients (6.7%) followed by, weight gain in 2 patients (3.3%) and folliculitis as well as exacerbation of eyelid dermatitis in 1 patient each (1.7%).

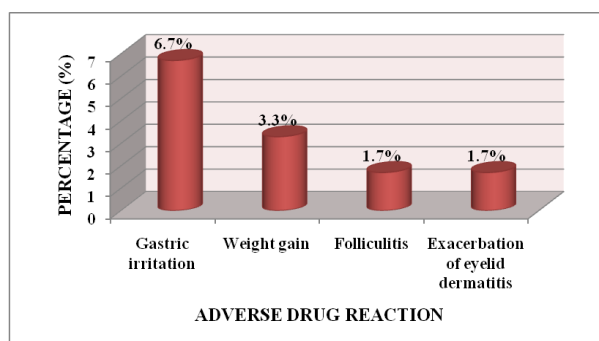


Figure 9: Adverse drug reactions reported in atopic dermatitis patients during treatment

DISCUSSION

Atopic dermatitis (AD), also known as atopic eczema or Besnier's prurigo, has been defined as an eczematous eruption that is pruritic, recurrent, often flexural, symmetrical and associated with IgE-mediated diseases such as asthma, allergic rhinitis and conjunctivitis (Nnoruka 2004). Atopic dermatitis being one of the commonest dermatoses in pediatric population in India, its severity and course is quite different than in the west (Dhar 2002). The overall prevalence of atopic dermatitis in two different Indian studies was 0.42% (Dhar 1998) and 0.38% (Sinha 1972), a figure much smaller than that in the west. A prospective study of 100 children by Dhar *et al.* at the Institute of Child Health, Kolkata showed a prevalence of 0.55%. The prevalence of atopic dermatitis in this study was 0.96%, a figure slightly higher than the above mentioned Indian studies but lower than that reported in western literature. Various reasons put forth to explain this increase are urbanization, increased awareness, smaller families, and better case detection techniques and the hypothesis for increased prevalence of eczema include the decline in breast feeding, earlier weaning and the widespread use of food additives (Sarkar 2004).

Atopic dermatitis is a disease of infancy and childhood with 80 - 90% of cases occurring before the age of 7 years (Rajka 1989). In a retrospective study by Tay *et al.* at the National Skin Center, Singapore 61.2% of the patients developed symptoms of atopic dermatitis in the first 10 years of life and in 20.9% the disease first developed during the teenage and early adult years. However in 6.1%, it first developed after the age of 31 years. Similar findings were obtained in this study with majority of the patients (71.7%) had the onset of the disease before 10 years of age. In a significant proportion, however, atopic dermatitis first developed during the teenage and early adult years (16.7%), and in 11.7% it first developed after the age of 31 years.

According to Rajka, girls are affected more frequently by AD than boys. Several other studies have also shown that females outnumbered males (Nnoruka 2004, Olumide 1986). In this study also there is a preponderance of female patients. Atopic dermatitis appears to be more prevalent in the overcrowded urban area (Dhar 1998, Sarkar 2004). In the present series also the prevalence of AD was much more in the urban population (70.0%) as compared to the rural (30.0%). The reason for this increase may be the greater atmospheric pollution which also point towards the role of environment in determining disease expression.

As per Hanifin and Rajka, a personal history of atopy is found in approximately 50.0% of patients with AD. In the present study 68.3% suffered from a "mixed" type with concomitant respiratory allergies while 31.7% of the patients had "pure" atopic dermatitis. The figure is high, probably because of the fact that a significant

proportion of the patients involved in this study were from the adolescent and adult age groups which again confirm the fact that atopic features often develop much later in life (Rudzki 1994). Similar findings were obtained by the study by Tay *et al.* Allergic rhinitis appears to be more commonly associated with atopic dermatitis than asthma (Diepgen 1992, Hanifin 1980). Similar findings were also obtained in this study; with 33.3% had allergic rhinitis and 30.0% had asthma. Family history of atopy has varied in different series, for example, 70% in Hanifin and Rajka, 60% in Roth and Kierland, 43% to 51% in Rystedt's series. Other reports also show the presence of a family history of atopy in 50% to 70% of cases with AD. In the present study, 56.7% of patients had at least one first-degree family member with atopy. This is also found to be in accordance with the study in Singapore school children (Tay 2002).

Sub acute type of eczema was seen in 71.7% of patients, chronic type in 23.3% and only 5.0% had acute type of eczema. This was found to be in agreement with the study from Singapore (Tay 1999). A predominance of acute type of eczema was reported by some Indian studies (Dhar 1998, Sarkar 2004). This difference probably point towards a regional variation in the clinico-epidemiological features of AD. These studies were carried out in the northern India where the intensity of cold and duration of winter are much more than those of South India. The disease severity assessment showed that 51.7% of patients had moderate AD, followed by mild type in 30.0% of patients and severe form was seen in only 18.3%. This further confirmed the observation that the severity of AD is lesser in India as compared to that in the west (Dhar 1995, Rudzki 1994). This could be due to various factors, like the difference in climatic conditions, dietary habits, low frequency of personal and family history of atopy and also because of the prolonged breast feeding in Indian children (Sarkar 2004).

In 80% of patients extensor surface was the most affected site followed by the flexors in 36.7% of patients. This was found to be in accordance with the study from Nigeria (Nnoruka 2004). Another study from North India also showed similar findings (Dhar 1998). A study by Dhar & Kanwar showed that involvement of extensors was more in patients with mild and moderate AD. In this study also a predominance of moderate and mild AD with majority of the patients having extensor involvement was seen. This observation further supports findings of the study by Dhar & Kanwar.

Various minor clinical features of AD vary in specificity in different age groups of patients. The two most frequently occurring minor features in this study were "xerosis" and "early age at onset" which is in accordance with the findings of Sarkar & Kanwar. The high significance of these is clear from the fact that these two have been included in the diagnostic criteria for AD by Hanifin and Rajka. Atopic dermatitis is known to

exacerbate during the winter probably because of seasonal variation in skin moisturization (Rajka 1989), while some patients may have aggravation during the summer because the hot humid weather leads to hyperhidrosis, itching and secondary skin infections (Rajka 1986). In this study, majority of the patients (41.7%) had aggravation during winter months while 15.0% had exacerbation during the summer.

Management of the patients is directed at preventing the inflammation, the itch, and the secondary lesions (Tofte 2001). Emollients or moisturizers were used in 95.0% of patients. These when applied immediately after bathing (within 3 minutes), retains the skin hydration and prevents the contraction of stratum corneum which may otherwise lead to fissures and impairment of the epidermal barrier (Tofte 2001). Mild to moderate strength topical steroids like fluticasone, mometasone, clobetasol etc were used as anti-inflammatory therapy in 75.0% of patients. Topical Calcineurin inhibitor such as tacrolimus was prescribed in 5.0% of patients. These agents form a complex that results in inhibition of calcineurin, which normally initiates T-cell activation. Through inhibition, the complex subdues the inflammatory component of atopic dermatitis (Cheigh 2008). Antihistamines were used in 75.0% of patients to break the "scratch-itch cycle." Although the use of systemic corticosteroids is discouraged in the care of atopic dermatitis due to their multiple side-effects and an unwanted rebound flare when they are discontinued, sometimes they may be necessary at times to control a severe exacerbation (Tay 1999). Short courses of systemic steroids were prescribed in 25.0% of patients to control acute flares. For severe, widespread involvement with AD, a systemic drug such as cyclosporine was used in 2 patients (3.3%). Despite the many side effects reported with these agents, they may be safer than systemic corticosteroids, which require chronic re-treatment leading to tachyphylaxis, cumulative long-term toxicity, and "steroid addictive" behavior (Tofte 2001).

Adverse drug reactions reported during the treatment were also noted and gastric irritation was observed in 6.7% of patients, followed by weight gain in 3.3% of patients. Folliculitis and exacerbation of eyelid dermatitis was noted in 1 patient each (1.7%). Systemic corticosteroids like prednisolone were responsible for gastric irritation and weight gain while the main culprit for folliculitis was the emollient, efa-derm[®] cream and the exacerbation of eyelid dermatitis was due to a topical corticosteroid (Lycor[®] cream).

CONCLUSION

The prevalence of atopic dermatitis in this study was 0.96%, which is similar to, although slightly higher than that reported from other Indian studies which may be due to increasing industrialization and changes in the lifestyle. Majority of the patients had the onset of the disease before 10 years of age. About 70% of the pa-

tients were from the urban area which point towards the role of environment in determining disease expression. A personal history of atopy was seen in 68.3% of patients, a figure slightly higher than the reported literature, probably because of the fact that a significant proportion of the patients involved in this study were from the adolescent and adult age groups. A predominance of sub-acute type of eczema was seen & more than 80% of patients had mild to moderate disease which confirms that the disease is less severe in India. Majority of the patients had aggravation of disease during winter months and could be controlled with emollients and topical steroids.

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