

A CLINICAL STUDY OF LOWER LEG AND FOOT ECZEMA AND RELEVANCE OF PATCH TEST IN DETERMINATION OF ITS CAUSATIVE AGENTSVinita John¹, Srinivas M²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: Eczema of the hands and feet is one of the commonest conditions encountered in dermatologic practice affecting 1% of adults. The patch test is the only scientific proof of contact allergy, a positive reaction to a correctly prepared and applied patch test confirms the person has allergic contact sensitivity. There are not much studies done on the patterns of lower leg and foot eczema's especially from India. Hence this study tries to determine the patterns of lower leg and foot eczema and also to evaluate the common allergens by patch testing. The aim of this study is: To determine the pattern of lower leg and foot eczema. Confirm the common allergens responsible by patch testing using Indian Standard Series. **METHODS:** A prospective clinical study was done comprising of 50 clinically suspected cases of lower leg and foot eczema for a period of 2 years from September 2008 to September 2010. The study included 32 males and 18 females. An informed consent was obtained from all the patients and detailed history with particular emphasis on age of onset, site of initial lesion, extent of dermatitis, seasonal variation, aggravating factors and association with atopy were noted. **RESULTS:** Mean age of 50 patients in this study was 44.52 years with a standard deviation of 15.8 (range 7 - 70 years). The most common age group affected was 46-60 years (40%), followed by 31-45 years (30%). 32 cases (64%) were males and 18 cases (36%) were females with a male to female ratio of 1.78: 1.0. Out of 50 cases, 23 patients (46%) showed positive patch test result to at least a single allergen. To the 26 allergens in Indian standard series tested, around 19 allergens were found to be positive. Some were having positivity to multiple allergens, giving a total of 51 positive results. Out of which 46 were relevant (90.20%) against which only 5 cases were non-relevant (9.80%) according to the history.

KEYWORDS: Foot eczema, Contact dermatitis, Allergen, Patch test, Indian Standard Series, CODFI.

INTRODUCTION: Eczema of the hands and feet is one of the commonest conditions encountered in dermatologic practice affecting 1% of adults.¹ Legs and feet can be affected by both endogenous and exogenous types of eczema. Although most cases of eczema of the lower legs are secondary to venous hypertension, it must be remembered that many other types of eczema can affect this region, and in many cases there are multiple causative factors. The lower leg is particularly prone to contact allergy.²

In eczema, the patch test is gold standard test in detecting the etiologic factor and the only scientific proof of contact allergy. A positive reaction to a correctly prepared and applied patch test confirms the person has allergic contact sensitivity, although this doesn't necessarily mean that the substance is the cause of presenting clinical dermatitis and its relevance should always be carefully considered.

There is not much study on the patterns of lower leg and foot eczema in literature especially from India. Hence this study tries to determine the patterns of lower leg and foot eczema and also to evaluate the common allergens by patch testing using Indian Standard Series.

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MATERIALS AND METHODS:

Source of Data: The study comprised of 50 clinically suspected cases of lower leg eczema above 5 years of age who attended Dermatology OPD of the hospital (Vinayaka Mission's University), Pondicherry from September 2008 to September 2010.

Method of Collection of Data: After obtaining approval and clearance from the institutional ethical committee, an informed consent was taken before involving them in the study and all the patients were patch tested. A detailed history with particular emphasis on age of onset, site of initial lesion, extent of dermatitis, seasonal variation, aggravating factors and association with atopy were noted.

Associated symptoms such as pain, pruritus, dryness, scaling, redness and oozing were observed. An occupational history with emphasis onto the common allergens that the patient may be exposed to was elicited followed by a detailed clinical examination and all the findings were recorded on a proforma. All patients were patch tested using Indian standard series approved by the Contact & Occupational Dermatoses Forum of India (CODFI).

If any positive patch test result was obtained further testing with extended set of allergens were done. Patients on steroids /immunosuppressants/ antihistamines/ UVA, UVB, phototherapy were advised to stop at least one week before the patch testing.

INDIAN STANDARD SERIES: ANTIGENS.

1.Vaseline	11.Paraphenylenediamine
2.Peru of balsam	12.Parthenium
3.Formaldehyde	13.Neomycin sulphate
4.Mercaptobenzothiazole	14.Benzocaine
5.Potassium bichromate	15.Wool alcohol
6.Nickel sulphate	16.Chlorocresol
7.Cobalt sulphate	17.Fragrance mix
8.Colophony	18.Thiuram mix
9.Epoxy resins	19.Nitrofurazone
10.Paraben mix	20.Black rubber mix

TABLE 1

FOOT WEAR SERIES: ANTIGENS.

21.Hydroquinone	24.Disperse orange
22.Glutaraldehyde	25.Disperse blue
23.Dioctyl-phthalate	26.Kaathon CG

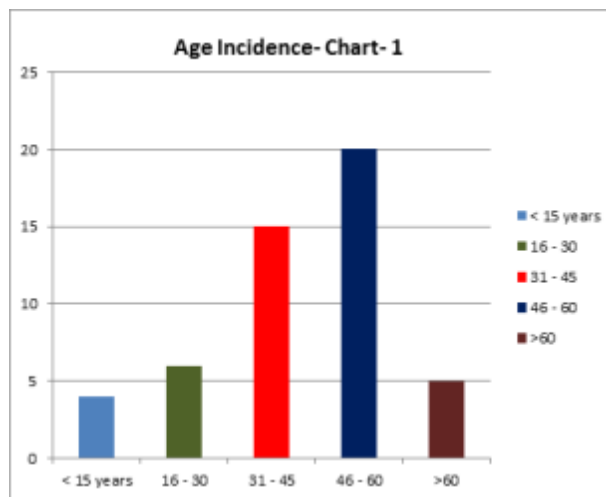
TABLE 2

Inclusion Criteria: All patients with active predominant localized lower leg and foot eczema were included.

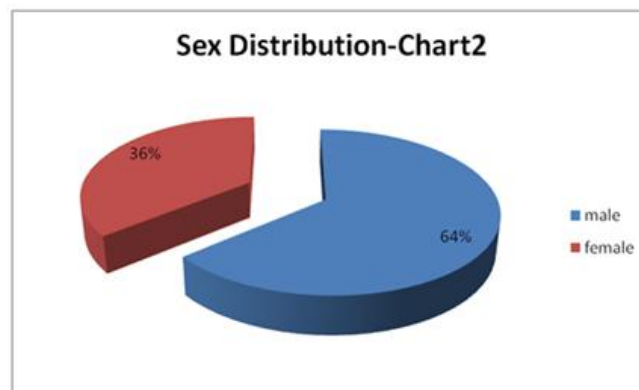
Exclusion Criteria:

1. Patients with widespread dermatitis along with the lower legs and feet.
2. Patients not willing to be part of the study.
3. Pregnant women (no known adverse effect, but as a precautionary method).
4. Children below 5 years of age (due to risk of non-compliance).

Statistical Methods: The data was analyzed statistically using descriptive statistics namely, Mean, Standard Deviation and 'p' value (test of significant) was noted. Wherever necessary the results are depicted in the form of graphs of percentages.

RESULTS:**DEMOGRAPHIC DATA****Age distribution:**

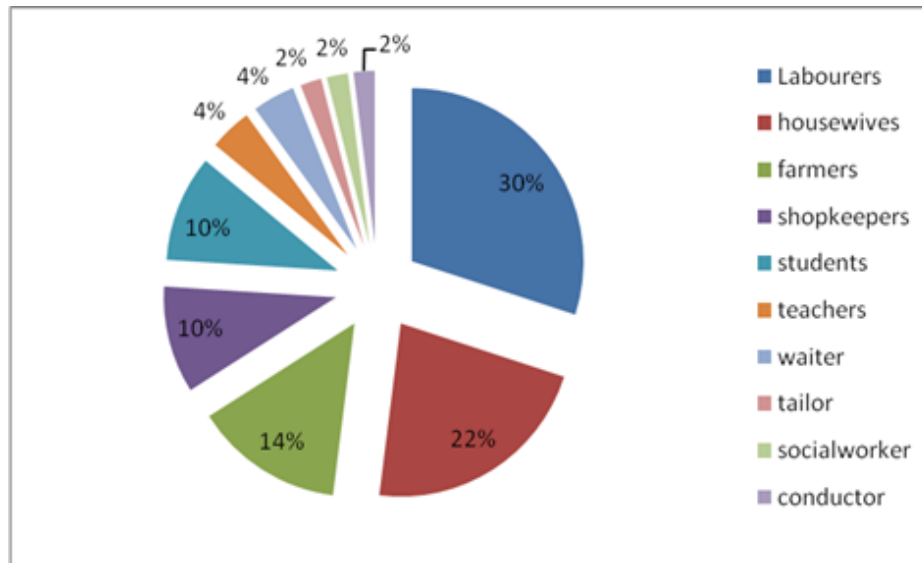
Mean age of 50 patients in this study was 44.52 years with a standard deviation of 15.8 (range 07- 70 years). The most common age group affected was 46- 60 years (40%), followed by 31-45 years (30%), 16-30 years (12%), 60-70 years (10%) followed by age group less than 15 years (8%).

Sex distribution:

32 cases (64%) were males and 18 cases (36%) were females with a male to female ratio of 1.78: 1.0.

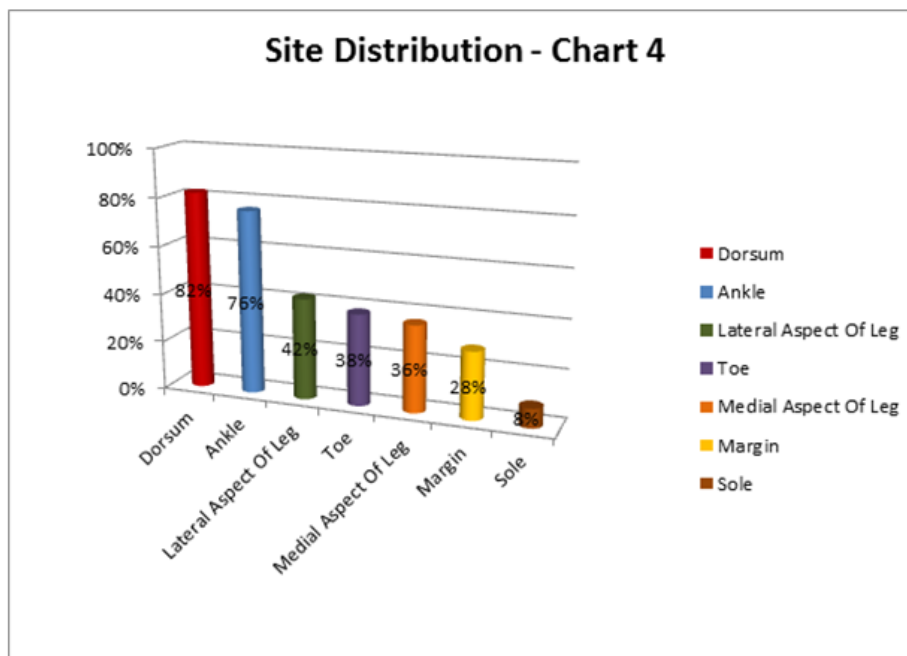
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Chart 3: Incidence of Occupation:



Majority of the study population were laborers (15 cases- 30%), followed by housewives (10 cases-20%), farmers (7 cases- 14 %), shopkeepers (5 cases- 10%) as shown in the chart.

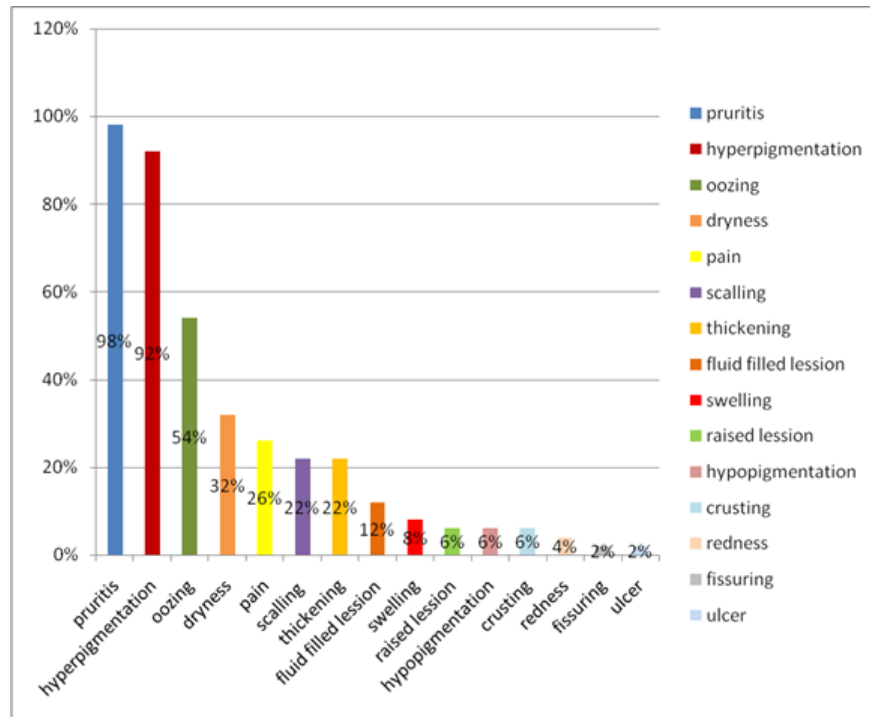
Distribution of lesions:



Eczemas were bilateral in 41 cases (82%) and the rest 9 cases (18%) being unilateral. Site of involvement in decreasing order of frequency were as follows: dorsum of foot (82%), ankle (76%), lateral aspect of lower leg (42%), toes (38%), medial aspect of lower leg (36%), margin (28%), soles (8%).

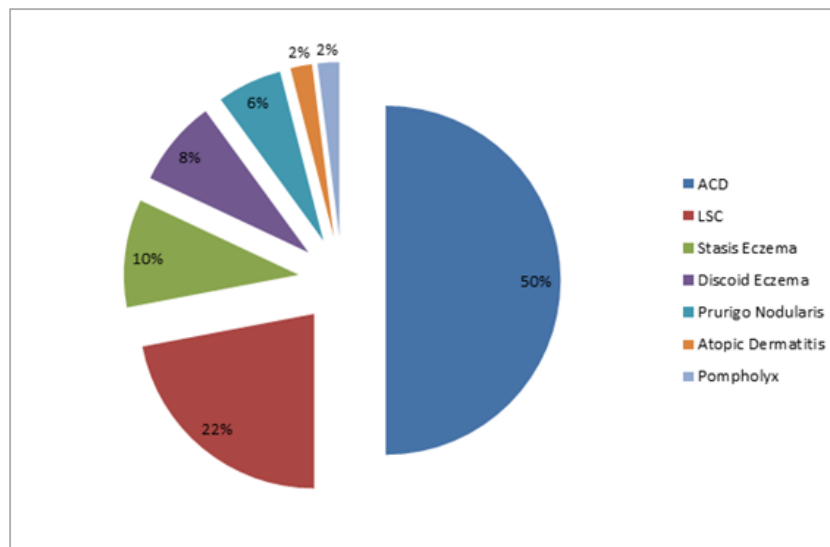
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Chart 5: Symptomatology:



Pruritus was the most common symptom noted in 98% of cases, followed by oozing 54% and hyperpigmentation seen in 50% of cases. Other symptoms noted included pain, dryness, redness, hypopigmentation and scaling.

Chart 6: Types of eczema:



Allergic contact dermatitis (ACD) was the most common type seen in 25 cases (50%), followed by 11 cases of lichen simplex chronicus (22%), stasis eczema - 5 cases (10%), discoid

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eczema 4 cases (8%), prurigo nodularis - 3 cases (6%), one case each of atopic dermatitis and pompholyx. Most of the cases were of chronic type (27 cases - 54%), followed by subacute type (19 cases-38%) and few of acute eczema (4 cases- 8%).

Eczemas in Various Age Groups:

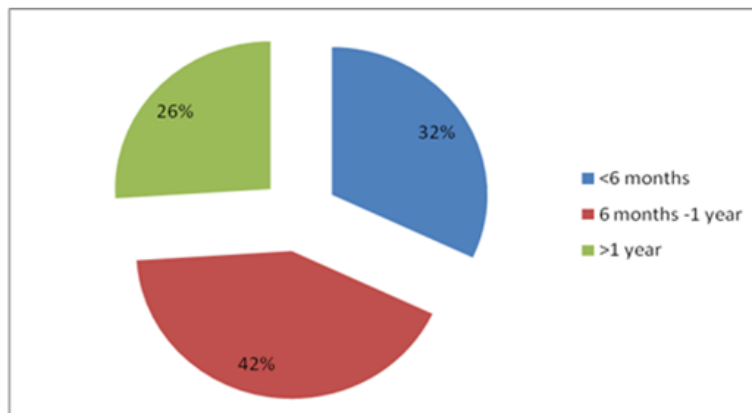
Age Group	ACD	LSC	STASIS E	DISCOID E	AD	POMPHOLYX	PRURIGO NODULARIS
<15 years	-	-	-	1	1	1	1
15-30	5	-	-	-	-	-	1
31-45	8	3	2	1	-	-	-
46-60	10	5	3	2	-	-	-
>60years	2	3	-	-	-	-	-
Total	25	11	5	4	1	1	2

Table 3

The common eczemas in patients less than 15 years of age were atopic dermatitis, discoid eczema, pompholyx and prurigo nodularis. The most common eczema in 15-60 years age group was allergic contact dermatitis (23 cases) and in patients more than 60 years was lichen simplex chronicus (3 cases).

Gender and type of eczema: ACD (17 out of 25 cases-68%), LSC (9 out of 11 cases-81%) and stasis eczema (4 out of 5 cases-80%) were noted more commonly in males were as discoid eczema (all 4 cases) and prurigo nodularis (all 3 cases) were exclusively seen only in females in our study.

Chart 7: Duration of Eczema:



Distribution and type of eczema: Most of the cases of eczema were bilateral (41 cases-82%) were as few were unilateral (9 cases- 18%). Most of the cases of allergic contact dermatitis (23 out of 25 cases-92%) were bilateral in distribution, while discoid eczema had predominantly unilateral distribution (3 out of 4 cases-75%).

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History of atopy and eczema: History of atopy was present in 8 cases (16%) of lower leg and foot eczema. History of atopy was seen in allergic contact dermatitis (2 out of 25 cases), LSC (2 out of 11 cases), similarly in one case each of atopic dermatitis, pompholyx, prurigo nodularis and stasis eczema.

Test of significance for Occupation:

Eczemas	Laborers	Other Work Groups	Total
ACD	11	14	25
Other Types	4	21	25
Total	15	35	50

Table 4

p value- 0.0307. X² value- 3.43

On comparing, the number of laborers with other work groups in cases of ACD and other endogenous eczemas, the p value was found to be 0.0307 which is significant (if $p < 0.05$) and X² value of 3.43. This signifies that ACD is more common in laborers.

Allergic Contact Dermatitis: Out of the 25 patients of allergic contact dermatitis who were patch tested, 13 patients had positive results (52%), to at least one allergen. Most of the patients showed positive reaction to nickel sulfate (5 cases) and potassium bichromate (5 cases). Other allergens including paraben mix, epoxy resin, cobalt sulfate and parthenium also showed positive reactions.

PATCH TEST RELEVANCE:

Patch Test	Positive Cases	%
Relevant	46	90.20%
Non-Relevant	5	9.80%

Table 5

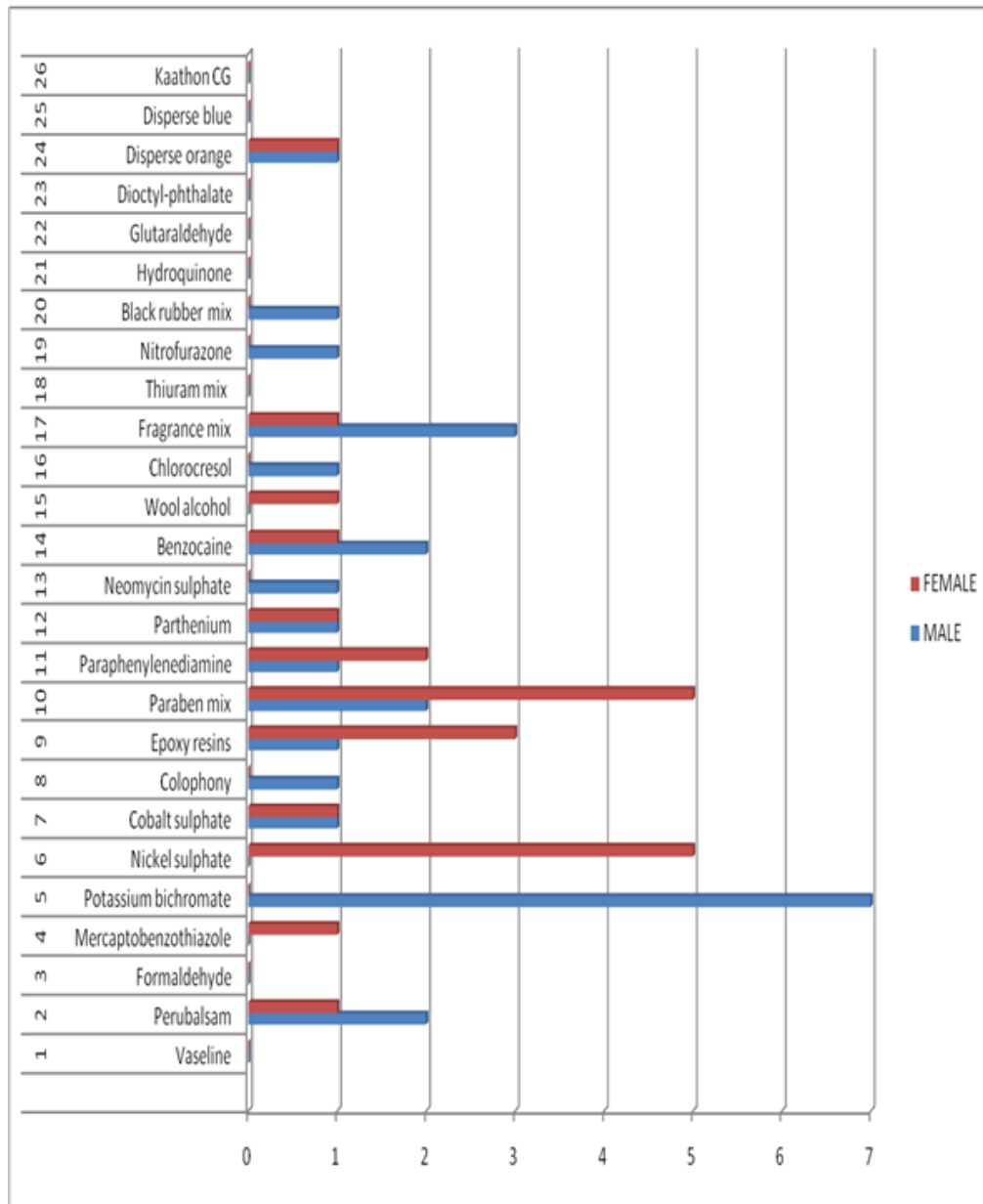
Significance of patch testing:

Eczemas	Patch Test Positive	Patch Test Negative	Total
ACD	13	12	25
Other Types	10	15	25
Total	23	27	50

Table 6

p value-0.5715. X² value- 0.32

Chart 8: Patch Test Results:



DISCUSSION: Legs and feet can be affected by both endogenous and exogenous types of eczema. The lower leg is particularly prone to contact allergy.

This is a preliminary study on lower leg and foot eczema and the various allergens causing them in our population. Many studies have been done in general on eczemas or on hand eczemas, but not many studies have been done on the various types of lower leg and foot eczema especially in India.

In our study, the age of patients ranged from 7 to 70 years with a mean of 44.5 years which is comparable to that seen in most studies but the incidence of childhood eczema was very less in our study with only one child having pompholyx. Most patients with lower leg eczema belonged to 31-60

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year age group. Chougule et al³ had reported a similar mean age of 40.5 years and most of the cases in their study also belonged to 31-60 year age group. Ertam et al⁴ had also reported a mean age of 40.38 years with a standard deviation of 14.69 years.

The occurrence of more allergic reactions in the adult females of 31-60 years is probably due to more exposure of these women to wet work and detergents domestically which damages the skin barrier function predisposing to eczemas. In the males more allergic reactions were seen in 46-60 years age group probably because occupational sensitization commonly occurs only after decades of exposure to allergens, and also due to the fact that the number of allergies acquired increasingly accumulate with age.⁵

In contrast to other studies in general, the number of male patients was significantly more as compared to females in our study. However, Saha et al⁶ and Freeman S⁷ had reported slightly higher prevalence for males than females. Vani et al⁵ also reported a male to female ratio of 1.77:1 in cases of hand and foot dermatitis, which is coinciding with our study. This may be due to the fact that, males in general have more of occupational exposure and they wear more of occlusive footwear than females.

In study done by Vani et al⁵ eczemas were commonly seen in semiskilled workers followed by housewives. This was similar to our findings in which laborers were the most commonly affected cases, followed by housewives. Saha Met al⁶ had reported that the mean duration in 80% of patients was more than 6 months. This is same as in our study were mean duration of eczema was 15 months and only 16 cases (32%) of cases had duration less than 6 months.

Chougule et al³ had noted history of atopy in 3 out of 29 cases (10%) of ACD which was similar to our result of 2 out of 25 cases (8%) and most of these cases had atopic diathesis clinically presenting as prurigo nodularis, pompholyx, atopic dermatitis and ACD to nickel sulphate.

Most of the cases had a bilaterally symmetrical involvement of lower legs with the commonest sites of involvement being the dorsum of the legs, ankle, lateral and medial aspect of the lower legs and toes. Saha Met al⁶ had found similar distribution with dorsum of foot being the commonest site of involvement seen in 90% of the cases, which is comparable to our study of 82% incidence in dorsum of feet.

Most common type of eczema affecting lower legs and feet in our study was ACD followed by LSC, Stasis Eczema, Discoid Eczema in that order. Chougule et al³ had found the most common eczema involving the lower legs to be lichen simplex chronicus (36%) followed by discoid eczema (18.5%), allergic contact dermatitis (14.5%) and stasis eczema (7.5%).

ACD was the most common type of eczema in our study (50%), this is similar to a study done by Waranya B. et al⁸ in Thailand, who had reported an incidence of 57% cases of ACD.

The most common allergens noted by him were potassium bichromate (27%), nickel sulfate (26%) followed by fragrance mix and paraben mix. These were coinciding with our study, were we got potassium bichromate (20%), nickel sulfate (20%), followed by paraben mix and epoxy resin as the common allergens positive on patch testing.

In our study, stasis eczema was observed in 5 cases (10%). Most of the cases seen in our study were shopkeepers (3 cases), as they are involved in standing for long duration. 4 cases (80%) of stasis eczema had a positive patch test, all to multiple allergens. The common allergen seen in our study in cases of stasis eczema included perubalsam, benzocaine, nitrofurazone, fragrance mix, black rubber mix, potassium dichromate, PPD, and paraben mix.

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In a study done by Jindal et al⁹ on contact sensitization on venous eczema, positive patch test results were noted in 50% of the cases with most of them being males (M:F, 16:1). Common allergens were fragrance mix, PPD, nickel, balsam of Peru, cobalt chloride, potassium dichromate, epoxy resin and thiuram mix.

The most common allergens in our study in total on patch testing were potassium bichromate (30%) and paraben mix (30%), followed by nickel sulphate (21%), epoxy resin (17%) and fragrance mix (17%). This was in accordance to a study done by Anyur A et al¹⁰ on various types of eczema, the most frequent allergens being nickel sulphate, cobalt chloride and potassium dichromate (metal allergens).

Recently, study done by Waranya Bet al⁸ in Thailand, the most frequent allergen found was potassium bichromate with an incidence of 27%, which is comparable to our study (30%).

In another study, the frequency of contact allergy to fragrance mix was reported to be 20.7%⁸ which was compatible with our study where we got positive reactions in 17% cases. The high incidence is attributed to the widespread use of perfumes in cosmetics and house hold products. The overall prevalence of footwear dermatitis among contact dermatitis cases in our study was 24% (6/25) which is higher than that seen by Saha et al⁶ (11.7%) but similar to that seen by Chowdhuri S et al (24.22%).¹¹

Positive patch test reactions to footwear allergens were found in 53.3%, which was similar to a study done by Angelini et al¹² who had reported an incidence of 65.4%. The probable reasons for this higher prevalence are indiscriminate use of footwear chemicals, lack of quality control of footwear, and hot climate associated with profuse sweating. The most common site involved was on the dorsum of the feet corresponding to the shape of the footwear (v-shaped chapels). This type of footwear is usually worn without socks and is preferred by people living in warm and humid climates as in this coastal town.

None of the cases reported any flare up of the disease on patch testing. No delayed reactions were noted in any of the patients. Thus patch testing was helpful in finding the incriminating cause of the dermatitis, avoidance of which may result in resolution of the disease. Also on basis of patch testing we can suggest alternative advice and at the same time, it is a very safe "in vivo" test independent of any laboratory procedure.

CONCLUSION: In this clinical study of lower leg and foot eczema including 50 cases, the following analysis is made after analyzing the data:

- Mean age of 50 patients in this study was 44.52 years with a standard deviation of 15.8 (range 7 years to 70 years).
- The most common age group affected was 46- 60 years (40%), followed by 31-45 years (30%).
- 32 cases (64%) were males and 18 cases (36%) were females with a male to female ratio of 1.78: 1.0.
- History suggestive of atopy was noted in 8 cases.
- Eczemas were bilateral in 82% of cases. Site of involvement in decreasing order of frequency were as follows: dorsum of foot, ankle, lateral aspect of lower leg, toes, medial aspect of lower leg, margin, soles.
- Pruritus was the most common symptom noted in 98% of cases. This was followed by oozing which was noted in 54% of cases and hyperpigmentation seen in 50% of cases.

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- Allergic contact dermatitis (ACD) was the most common type of lower leg eczema (50%), followed by lichen simplex chronicus (22%), stasis eczema (10%), discoid eczema (8%), prurigo nodularis (6%), atopic dermatitis and pompholyx (2%) each.
- Out of 50 cases, 23 patients (46%) showed positive patch test result to at least a single allergen. To the 26 allergens in Indian standard series tested, around 19 allergens were found to be positive. Some were having positivity to multiple allergens, giving a total of 51 positive results. Out of which 46 were relevant (90.20%) against which only 5 cases were non-relevant (9.80%) according to the history.
- Most of the patients in footwear series (7 cases -30.43%) were found to have positive patch test result to potassium bichromate. All the patients who showed positive reactions to potassium bichromate were males, with the majority of the cases being labourers, coming in contact with cement on a regular basis.
- Patients were found to be positive to paraben mix (7 cases- 30.43%), with most of the cases being relevant.
- The most common allergen in females was nickel sulfate (5 cases- 21.74%), with all patients having history of use of jewellery.
- Epoxy resin (4 cases-17.39%) and fragrance mix was also found to be other common allergens on patch testing.

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