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Assessment of Epidemiological Parameters, Etiology, Clinical Features, and Disease Progression in Erythroderma

Dr. Shatanik Bhattacharya, MD[1], Dr Asish Kumar Bhattacharyya[2]
[1]Senior Resident, Department of Dermatology, Venereology and Leprosy, Medical College and Hospital, Kolkata, West Bengal, India
[2]Senior consultant, Divisional railway hospital howrah

Corresponding Author
Dr. Shatanik Bhattacharya
Department of Dermatology, Venereology and Leprosy Medical College and Hospital Kolkata, West Bengal, India Email: shatanik.bhattacharya.97@gmail.com

Keywords:
Erythroderma; Epidemiological Parameters; Etiology; Clinical Features; Disease Progression

Abstract:

Background/Aim: Erythroderma, a severe inflammatory skin disorder marked by widespread erythema and scaling, poses significant diagnostic and therapeutic challenges. Thus, this study aimed to assess epidemiological parameters, etiology, clinical features, and disease progression in erythroderma among a total of 73 inpatient and outpatient cases, utilizing parameters such as patient complaints, medical history, addictions, and general/cutaneous and nail examinations.
Results: We found a geriatric predominance (64.38% of cases aged >50 years) and identified psoriasis as the primary etiology (54.29%). The scalp and trunk were the most common sites of onset (31.49% combined). Systemic features included edema (30.13%) and lymphadenopathy (27.4%), while nail changes prominently featured onycholysis (40%). Central obesity risks were significant (female waist ≥88 cm: 88%). Addictions (tobacco 47.9%) and comorbidities (HTN 24.65%, DM 17.80%) drove disease progression.
Conclusion: Integrated dermatologic-metabolic management targeting modifiable risks is crucial to mitigate erythroderma severity and recurrence.

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Introduction

Erythroderma, also known as exfoliative dermatitis, is a severe inflammatory skin condition characterized by widespread erythema and scaling affecting over 90% of the body surface area, often presenting as a dermatological emergency in both indoor (hospitalized) and outdoor patients [1, 2]. Studies have shown that, epidemiologically, it predominantly affects middle-aged males (M:F ratio 2-3:1, mean age 45-55 years), with insidious onset in most cases (>50% duration 1-6 months). Key clinical features include universal erythema/scaling, intense pruritus (60-90%), facial/pedal edema (50-70%), fever/chills (30-50%), lymphadenopathy (15-20%), and systemic signs like hypoalbuminemia, anemia, and electrolyte imbalances due to high epidermal turnover [3].

According to past studies, its etiology is multifactorial, with pre-existing dermatoses like psoriasis (30-50%) and eczema/atopic dermatitis (20-30%) being most common in Indian cohorts, followed by drug eruptions (10-25%, e.g., anticonvulsants like carbamazepine/phenytoin), pemphigus, contact dermatitis, or rarely

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malignancies/idiopathic cases (~10-15%) [4]. Moreover, its progression involves acute hyperproliferation, cytokine-mediated inflammation (e.g., TNF-α, IL-2), fluid/heat loss leading to hemodynamic instability, secondary infections, and potential mortality (3-10%) if untreated. Further, histopathology (spongiosis, parakeratosis, acanthosis) correlates clinically in 70-85% of cases, guiding targeted therapy like topical steroids, emollients, and etiology-specific interventions [3, 4].

Henceforth, as per our literature research, there was limited data available on erythroderma's local epidemiology, triggers, and progression in Kolkata, which necessitates this study to tailor region-appropriate diagnostics and management, reducing morbidity in diverse indoor and outdoor patients.

Aim

To study epidemiological parameters, etiology, clinical features, and disease progression in erythroderma among both indoor and outdoor patients.

Materials and Methods

We conducted a cross-sectional descriptive study among 73 patients reported to the Department of Dermatology, Medical College & Hospital, Kolkata from August 2022 to January 2024 from both outpatient and inpatient departments. We utilized parameters including demographics, complaints (redness, scaling, itching, burning, fever), history (prior episodes, aggravating/relieving factors, family/addiction/drug/comorbidities, weight loss), general/cutaneous exams (pallor, vitals, BMI, lesion features like erythema/pruritus/scaling/oozing, mucosal/hair/nail changes), and follow-ups at 1, 2, and 3 months.

Inclusion Criteria

All ages
Both sexes (male and female)

Exclusion Criteria

Critically ill or moribund patients
Pregnant females
Those who did not give informed consent

Statistical Analysis

Descriptive statistics were used to analyze and summarize data across several factors. The measurement of central tendency was conducted. Numerical data were presented as range, arithmetic mean, and standard deviation, whereas categorical data were presented as frequency. Subgroup comparisons, including gender and age categories, were conducted using the chi-square test for categorical data and the unpaired t-test for continuous data. A p-value of ≤0.05 was deemed significant. Microsoft Excel 2013 was used for graph creation.

Results

Figure 1: Sex Distribution

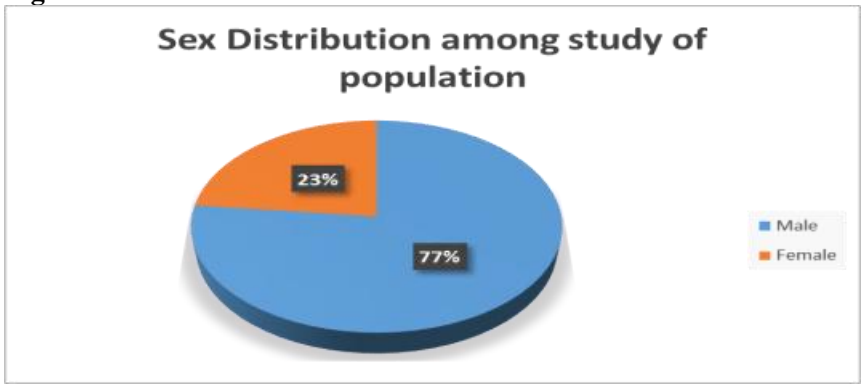

Figure 1 Sex Distribution

Figure 1 showed that 56 (77%) of the patients were males and the remaining 17 (23%) were females.

Table 1: Age Distribution

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Age Group	Number of Cases	Percentage
01-10 Years	1	1.37%
11-20 Years	3	4.11%
21-30 Years	2	2.74%
31-40 Years	7	9.59%
41-50 Years	8	10.96%
51-60 Years	22	30.13%
61-70 Years	25	34.25%
71-80 Years	5	6.85%
Total	**73**	**100%**

Table 1 showed that the majority of the patients were from the 61-70 years age group with 25 cases (34.25%), followed by 51-60 years with 22 cases (30.13%).

Table 2: Distribution of Erythroderma Site of Onset

SITE OF ONSET	FREQUENCY	PERCENTAGE
Scalp	13	17.8%
Trunk	10	13.69%
Back	9	12.32%
Hand	9	12.32%
Legs	6	8.21%
Face	6	8.21%
Knee	5	6.84%
Abdomen	5	6.84%
Groin	5	6.84%
Limbs (General)	4	5.47%
Other single sites (Forehead, Umbilicus, etc.)	*1 each*	*1.36% each*

Table 3: Distribution Based on Past Illness

DISEASE	FREQUENCY	PERCENTAGE
Nil	18	24.65%
Chronic Plaque Psoriasis	18	24.65%
Hypertension (HTN)	15	20.54%
Diabetes Mellitus (DM)	13	17.80%
Tuberculosis (TB)	7	9.58%
Drug Hypersensitivity	4	5.47%
COPD / Cataract / CAD / BPH	3 each	4.10% each
Typhoid / Hemorrhoids / Asthma	2 each	2.73% each
Other single conditions	*1 each*	*1.36% each*

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Table 4: Type of Addiction

Type	Count	Percentage
Tobacco	35	47.9%
Nil	22	30.13%
Khaini	15	20.5%
Alcohol	14	19.17%
Betel Leaf	5	6.84%

Table 5: Based on Hypersensitivity (Allergy)

Allergy	Count	Percentage
Nil	41	56.16%
Brinjal	18	24.65%
Prawn	14	19.17%
Egg	13	17.80%
Other foods (Pumpkin, Spinach, etc.)	*1 each*	*1.36% each*

Table 6: Based on Etiological Diagnosis

Disease	Count	Percentage
Psoriasis	38	54.29%
Dermatitis	15	21.43%
Drug Induced	7	10.00%
Pityriasis Rubra Pilaris (PRP)	4	5.71%
Idiopathic	3	4.29%
Infections	3	4.29%
Non-bullous Ichthyosiform Erythroderma	2	2.86%
Prurigo Nodularis	1	1.43%

Table 7: Clinical Features (Survey)

Survey	Frequency	Percentage
Edema	22	30.13%
Lymphadenopathy	20	27.40%
Pallor	18	24.65%
Icterus	7	9.60%
Clubbing	6	8.21%

Table 8: Based on Cutaneous Examination

Cutaneous Examination	Frequency	Percentage
Erythema	59	80.8%
Scaling	32	43.8%
Papule / Plaque	26	35.6%
Excoriation	20	27.39%

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Cutaneous Examination	Frequency	Percentage
Lichenification	10	13.69%
Post-Inflammatory Hyperpigmentation	8	10.95%

Table 9: Based on Findings on Nail

Nail Findings	Frequency	Percentage
Onycholysis	28	38.35%
Rough Nails	15	20.54%
Colour Change	11	15.06%
Pitting	8	10.9%
Subungual Hyperkeratosis	8	10.9%

Table 10: Disease Progression Based on BMI

BMI Class	Count	Percentage
Normal (<25)	36	49.32%
Overweight (25-29.9)	19	26.03%
Obese (≥30)	14	19.18%
Underweight (<18)	4	5.48%

Figure 2 & 3: Waist Circumference (Male vs. Female)

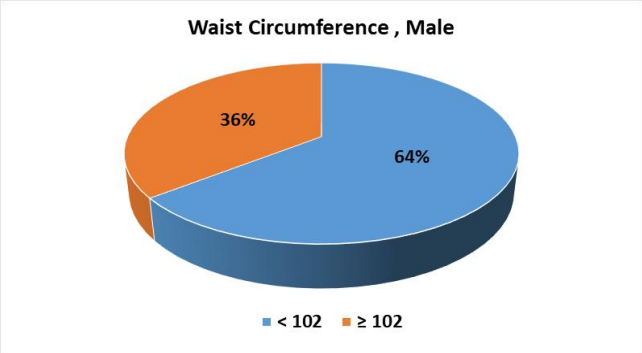

FIGURE 2: MALE WAIST

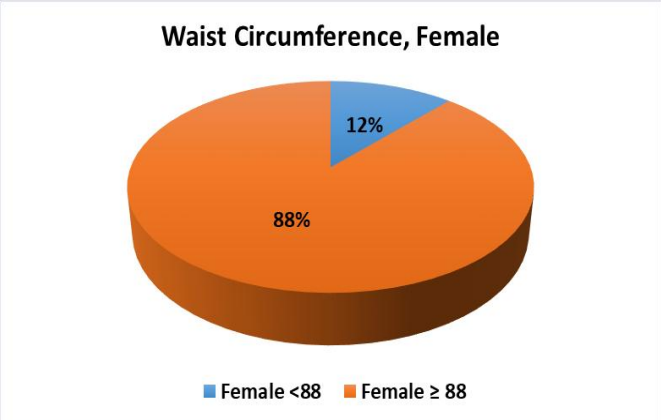

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FIGURE 3: FEMALE WAIST

According to Figures 2 and 3, the waist circumference of males was largely <102 cm (64%), while male waist ≥102 cm was in the minority (36%). Conversely, the waist circumference of females was predominantly ≥88 cm (88%), with <88 cm being in the minority (12%).

Discussion

Our study results revealed key epidemiological patterns, with a total of 73 cases showing a marked geriatric predominance. The age distribution peaked in the 61-70 years group (34.25%) and 51-60 years group (30.13%), accounting for over 64% of cases. This aligns with established dermatological literature where erythroderma often manifests in middle to late adulthood due to cumulative inflammatory triggers, comorbidities, and reduced skin barrier integrity [5]. On the other hand, in our study, the younger groups (1-30 years) represented less than 10%, suggesting infrequent pediatric or early-onset forms, possibly influenced by referral biases in a clinical setting focused on severe presentations.

Sites of onset further underscore psoriasis-like progression, with the scalp (17.8%), back/trunk (26.01% combined), and limbs (5.47%) acting as dominant locations. This reflects initial plaque localization before generalization, a pattern consistent across global erythroderma studies [6, 7]. Moreover, etiologically, psoriasis emerged as the leading diagnosis (24.65%), associated with past illnesses like chronic plaque psoriasis (24.65%), alongside metabolic comorbidities such as hypertension (20.54%), diabetes (17.80%), and addictions (tobacco 47.9%, khaini 20.5%). This distribution mirrors idiopathic/inflammatory dominance (psoriasis/dermatitis ~76%) over drug-induced (10%) or infectious causes, with hypersensitivity (e.g., brinjal/egg/prawn allergies ~47%) potentially acting as exacerbants via Th2/Th17 immune dysregulation.

Clinical features emphasized systemic involvement, including edema (30.13%), lymphadenopathy (27.4%), and pallor (24.65%), while cutaneous hallmarks like erythema (80.8%) and scaling (43.8%) highlighted acute exfoliative dermatitis. Furthermore, nail findings, notably onycholysis (38.35%) and pitting (10.9%), provided diagnostic specificity for psoriatic erythroderma, occurring in up to 50% of such cases in past studies [6, 8-12].

Disease progression correlates strongly with anthropometric markers. The BMI distribution shows 49.32% normal but 45.21% overweight/obese, linking adiposity to accelerated severity via pro-inflammatory adipokines (e.g., leptin, TNF-α). Waist circumference data amplifies this; males were predominantly <102 cm (64%, low-risk) versus females ≥88 cm (88%, high-risk), indicating gender-dimorphic central obesity. Females bear a higher metabolic syndrome burden, independent of BMI, which is predictive of poorer outcomes in inflammatory dermatoses. Collectively, these factors (tobacco, metabolic overload) likely propel progression from localized onset to an erythrodermic crisis.

Hence, erythroderma's epidemiological skew toward older adults with a psoriasis-centric etiology, multisystem clinical burdens, and progression fueled by addictions, allergies, and central adiposity underscores the need for integrated dermatologic-metabolic management to mitigate severity and recurrence.

Conclusion

This disease reveals a geriatric predominance (64% of cases over 50 years), with psoriasis as the primary etiology (54.29%). Scalp/trunk onset and systemic features like edema and nail dystrophy signal advanced disease. Comorbidities (HTN, DM), addictions (tobacco 47.9%), and central obesity (females 88% ≥88 cm waist) drive progression, underscoring metabolic-inflammatory interplay. Holistic management targeting modifiable risks is essential to curb severity and recurrence.

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