

Clinico-Epidemiological Profile of Non-Infectious Pediatric Dermatological Emergencies at a Tertiary Care Centre in South India

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ABSTRACT

Background: Non-infectious pediatric dermatological emergencies comprise a heterogeneous group of uncommon but potentially life-threatening disorders that require prompt recognition and timely intervention to reduce morbidity and mortality. These conditions range from congenital genodermatoses presenting in the neonatal period to severe cutaneous adverse drug reactions and acute inflammatory dermatoses. Data regarding the clinical spectrum of non-infectious pediatric dermatological emergencies from India remain limited. **Objectives:** To evaluate the clinico-epidemiological profile of non-infectious pediatric dermatological emergencies presenting to a tertiary care centre in South India. **Methods:** This hospital-based observational study included pediatric patients presenting with non-infectious dermatological emergencies at a tertiary care centre in South India. Demographic characteristics, clinical presentation, diagnosis, anatomical sites involved, and disease spectrum were recorded and analyzed using descriptive statistics. A total of 39 children with non-infectious dermatological emergencies were included in the study. **Results:** Among the 39 patients, 22 (56.4%) were males and 17 (43.6%) were females (male-to-female ratio 1.29:1). Neonates constituted the largest age group (35.9%). Congenital ichthyoses were the most common diagnosis (17, 43.6%), followed by inherited blistering disorders (9, 23.1%), Stevens Johnson syndrome/toxic epidermal necrolysis (9, 23.1%), and acute urticaria with or without angioedema (4, 10.3%). The palms and soles were the most frequently involved anatomical sites (46.2%), followed by the oral mucosa (33.3%), genital mucosa (17.9%), conjunctiva (12.8%), nail apparatus (12.8%), and nasal mucosa (2.6%). Congenital disorders predominated during the neonatal period, whereas acquired conditions such as severe cutaneous adverse drug reactions were more common in older children. **Conclusion:** Non-infectious pediatric dermatological emergencies are predominantly congenital disorders presenting early in life, with congenital ichthyoses constituting the largest disease category. Early recognition, comprehensive mucocutaneous examination, timely referral, and multidisciplinary management are essential to reduce morbidity and improve clinical outcomes. Larger multicentre studies are needed to further characterize the epidemiology and outcomes of these uncommon but clinically significant disorders.

Keywords: Pediatric dermatology; Dermatological emergencies; Congenital ichthyosis; Epidermolysis bullosa; Stevens Johnson syndrome; Toxic epidermal necrolysis; Urticaria; Genodermatoses; South India.

INTRODUCTION

Pediatric dermatological emergencies comprise a diverse group of disorders requiring prompt recognition and timely management to prevent significant morbidity and, in selected cases, mortality. Although the majority of dermatological conditions encountered in children are benign and self-limiting, certain disorders involving extensive cutaneous or mucosal involvement may rapidly progress to dehydration, electrolyte imbalance, sepsis, respiratory compromise, and multiorgan dysfunction if not diagnosed and treated early. Consequently, pediatric dermatological emergencies constitute an important component of both emergency medicine and pediatric dermatology practice (Kress, 2011; Inamdar & Ragunatha, 2009).

Non-infectious pediatric dermatological emergencies encompass a heterogeneous spectrum of conditions including congenital ichthyoses, inherited blistering disorders, severe cutaneous adverse drug reactions, autoimmune blistering diseases, erythroderma, and acute urticaria with angioedema. These disorders arise from diverse pathogenic mechanisms such as genetic abnormalities affecting epidermal barrier function, immune-mediated inflammation, and drug hypersensitivity reactions. Despite their relatively low incidence, they are associated with considerable morbidity and frequently require multidisciplinary management involving dermatologists, pediatricians, intensivists, ophthalmologists, nutritionists, and surgeons.

Among congenital disorders, inherited ichthyoses and epidermolysis bullosa commonly present during the neonatal period with profound impairment of the epidermal barrier, predisposing affected infants to excessive transepidermal water loss, hypothermia, electrolyte disturbances, recurrent infections, and nutritional deficiencies. Advances in molecular genetics have substantially improved the understanding and classification of these disorders, emphasizing the importance of early diagnosis, supportive management, and genetic counselling (Oji et al., 2010; Fine, 2010).

Similarly, **Stevens Johnson syndrome (SJS)** and **toxic epidermal necrolysis (TEN)** represent rare but potentially life-threatening severe cutaneous adverse reactions characterized by widespread keratinocyte apoptosis, epidermal detachment, and extensive mucosal involvement. These conditions require immediate withdrawal of the offending agent, intensive supportive care, and multidisciplinary management because delayed intervention is associated with increased morbidity and mortality. Acute urticaria and angioedema, although generally self-limiting, may rapidly progress to airway compromise and therefore also require prompt recognition and treatment.

Published literature on pediatric dermatological emergencies has predominantly focused on infectious dermatoses or individual disease entities, whereas studies specifically evaluating the **clinico-epidemiological profile of non-infectious pediatric dermatological emergencies** remain limited, particularly in the Indian setting. Most available Indian studies are single-center reports with relatively small sample sizes, making regional epidemiological data scarce. Improved understanding of the local disease spectrum is essential for facilitating early diagnosis, appropriate referral, and optimal management of these uncommon but clinically significant conditions.

Therefore, the primary objective of the present study was to evaluate the clinico-epidemiological profile of non-infectious pediatric dermatological emergencies presenting to a tertiary care centre in South India. The study describes the demographic characteristics, disease spectrum, and pattern of anatomical involvement among affected children and aims to contribute to the limited Indian literature on these uncommon but important disorders.

MATERIALS AND METHODS

Study Design and Setting

This was a **hospital-based descriptive observational study** conducted in the Departments of Dermatology and Pediatrics at **Bapuji Hospital** and **Chigateri General Hospital**, both teaching hospitals affiliated with **J.J.M. Medical College, Davangere, Karnataka, India**. The study was carried out over a **24-month period**, from **January 2024 to December 2025**, during which all eligible pediatric patients presenting with non-infectious dermatological emergencies were enrolled consecutively according to the predefined inclusion and exclusion criteria.

Study Population

The present study included **39 pediatric patients (<15 years of age)** diagnosed with **non-infectious dermatological emergencies**. These comprised congenital ichthyoses, inherited blistering disorders, Stevens–Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), acute urticaria, and urticaria with angioedema. Patients with infectious dermatological emergencies were excluded from the present analysis.

Sample Size

All eligible pediatric patients presenting with non-infectious dermatological emergencies during the study period who fulfilled the inclusion criteria were included. As these conditions are uncommon, consecutive sampling was adopted.

Inclusion Criteria

- Children younger than 15 years diagnosed with a non-infectious dermatological emergency.
- Parents or legal guardians willing to provide written informed consent.

Exclusion Criteria

- Children aged 15 years or older.
- Patients with burn injuries.
- Patients with infectious dermatological emergencies.

Data Collection

Written informed consent was obtained from the parents or legal guardians before enrolment. A detailed clinical history, including presenting complaints, past history, family history, birth history, maternal history, and developmental history, was obtained using a structured proforma. All patients underwent a comprehensive dermatological examination, including assessment of the skin, mucous membranes, hair, nails, and palms and soles. Disease severity at presentation was assessed using the Nelson severity score. Relevant laboratory and ancillary investigations were performed wherever indicated to establish the diagnosis.

Outcome Measures

The primary outcome was the clinico-epidemiological profile of non-infectious pediatric dermatological emergencies. The variables analyzed included:

- Age distribution
- Sex distribution
- Spectrum of dermatological emergencies
- Specific clinical diagnoses
- Anatomical sites involved
- Mucosal involvement
- Nail involvement
- Palmoplantar involvement

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using IBM Statistical Package for the Social Sciences (SPSS) version 20.0 for Windows. Categorical variables were summarized as frequencies and percentages.

Continuous variables were summarized as mean $\pm$ standard deviation or median (interquartile range), wherever applicable. Categorical variables were expressed as frequencies and percentages. A p-value <0.05 was considered statistically significant.

Ethical Approval

The study protocol was reviewed and approved by the Institutional Ethics Committee of J.J.M. Medical College, Davangere, Karnataka, India. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Informed Consent

Written informed consent was obtained from the parents or legal guardians of all enrolled children prior to participation in the study.

RESULTS

Demographic Characteristics

A total of 39 children with non-infectious pediatric dermatological emergencies were included in the study. The largest proportion of patients belonged to the neonatal age group (35.9%), followed by school-aged children (25.6%), infants (20.5%), and preschool children (17.9%). Overall, 22 (56.4%) patients were male and 17 (43.6%) were female, with a male-to-female ratio of 1.29:1, indicating a slight male predominance. The demographic profile of the study population is summarized in Table 1.

Table 1. Demographic Characteristics of Children with Non-Infectious Pediatric Dermatological Emergencies (N = 39)

Characteristic	n	%
Neonates (0–28 days)	14	35.9
Infants (29 days–1 year)	8	20.5
Preschool (1–5 years)	7	17.9
School-age (>5–15 years)	10	25.6
Male	22	56.4
Female	17	43.6
Male:Female ratio	1.29:1	—

Spectrum of Non-Infectious Pediatric Dermatological Emergencies

The spectrum of non-infectious pediatric dermatological emergencies encountered in the present study is shown in Table 2. Ichthyosis constituted the largest disease category, accounting for 17 (43.6%) cases. Within this group, lamellar ichthyosis was the predominant subtype, comprising 10 (58.8%) of the ichthyosis cases, followed by non-bullous congenital ichthyosiform erythroderma (4, 23.5%) and collodion baby (3, 17.6%). Inherited blistering disorders

represented the second most common category, with 9 (23.1%) patients. Epidermolysis bullosa accounted for the majority of these cases (8, 88.9%), while chronic bullous dermatosis of childhood was observed in one patient (11.1%). An equal proportion (9, 23.1%) of patients presented with severe cutaneous adverse drug reactions, of whom Stevens Johnson syndrome constituted the majority (7, 77.8%) and toxic epidermal necrolysis accounted for the remaining 2 (22.2%) cases. Acute urticaria and angioedema together constituted the smallest disease category, with 4 (10.3%) patients.

Table 2. Distribution of Non-Infectious Pediatric Dermatological Emergencies (N = 39)

Disease Category	Subtype	n	%
Ichthyosis	Lamellar ichthyosis	10	25.6
	NBCIE	4	10.3
	Collodion baby	3	7.7
Inherited blistering disorders	Epidermolysis bullosa	8	20.5
	Chronic bullous dermatosis of childhood	1	2.6
Severe cutaneous adverse drug reactions	Stevens–Johnson syndrome	7	17.9
	Toxic epidermal necrolysis	2	5.1
Urticaria/Angioedema	Acute urticaria	3	7.7
	Urticaria with angioedema	1	2.6
Total		39	100

Figure 1: Distribution of Non-Infectious Pediatric Dermatological Emergencies by Disease Category

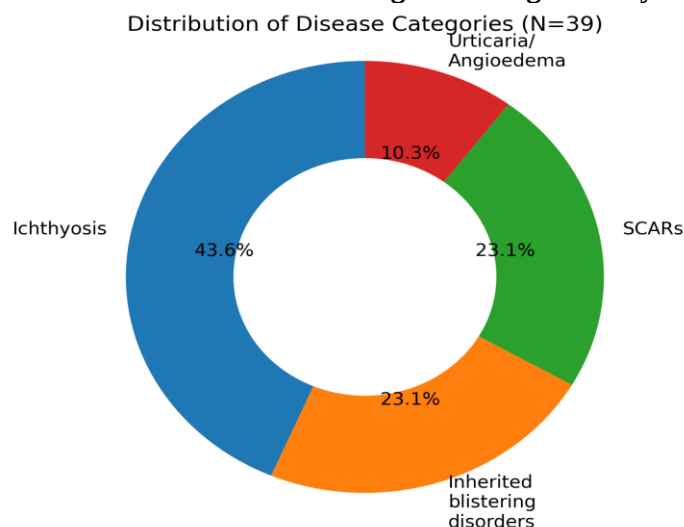


Figure 1. Doughnut chart showing the distribution of non-infectious pediatric dermatological emergencies according to disease category. Ichthyosis constituted the largest group (43.6%), followed by inherited blistering disorders (23.1%), severe cutaneous adverse drug reactions (23.1%), and urticaria/angioedema (10.3%).

Distribution of Sites of Involvement

The distribution of anatomical sites involved is presented in Table 3. Palmar and/or plantar involvement was observed in 18 (46.2%) patients. Among mucosal sites, the oral mucosa was the most frequently affected, with involvement in 13 (33.3%) patients, followed by genital mucosal involvement in 7 (17.9%) patients, conjunctival involvement in 5 (12.8%) patients, and nasal mucosal involvement in 1 (2.6%) patient. Nail involvement was identified in 5 (12.8%) patients. Multiple anatomical sites were involved in several patients, particularly those with epidermolysis bullosa and severe cutaneous adverse drug reactions.

Table 3. Distribution of Sites of Involvement in Non-Infectious Pediatric Dermatological Emergencies (N = 39)

Site of Involvement	n	%
Palms and/or soles	18	46.2
Oral mucosa	13	33.3
Genital mucosa	7	17.9
Conjunctival mucosa	5	12.8
Nail apparatus	5	12.8
Nasal mucosa	1	2.6

Note: Patients may have involvement of more than one site; therefore, percentages do not total 100%.

Figure 2: Distribution of Sites of Involvement

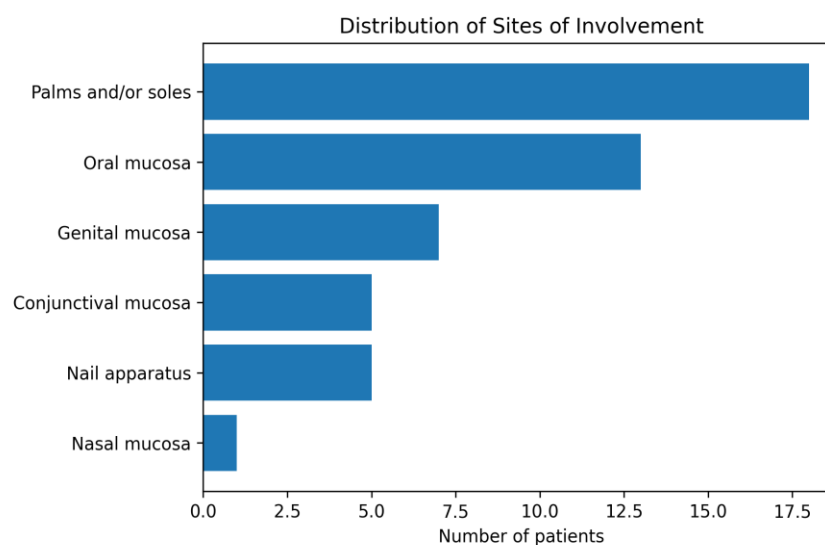


Figure 2. Horizontal bar chart illustrating the frequency of involvement of different anatomical sites among children with non-infectious pediatric dermatological emergencies.

DISCUSSION

The present study describes the clinico-epidemiological profile of **39 children with non-infectious pediatric dermatological emergencies** managed at a tertiary care center in South India. Although pediatric dermatological emergencies are relatively uncommon, they encompass a heterogeneous group of disorders associated with significant morbidity and, in selected cases, mortality if diagnosis and intervention are delayed (Hassan & Anwar, 2013; Inamdar & Ragunatha, 2009). In the present study, inherited disorders, particularly congenital ichthyoses and epidermolysis bullosa, constituted nearly two-thirds of all non-infectious emergencies, while severe cutaneous adverse drug reactions and acute urticaria with or without angioedema comprised the remaining cases. This distribution demonstrates that, unlike adults in whom inflammatory and drug-induced dermatoses predominate, pediatric dermatological emergencies encountered at tertiary referral centers

frequently involve congenital and inherited disorders requiring specialized multidisciplinary care.

A notable finding of the present study was the predominance of **neonatal presentations**, with more than one-third of patients presenting during the neonatal period. This observation is expected because congenital ichthyoses and inherited blistering disorders usually manifest at birth or shortly thereafter owing to underlying genetic abnormalities affecting epidermal differentiation and skin barrier integrity (Ragunatha & Inamdar, 2010; Fine, 2010). Defective epidermal barrier function predisposes these infants to excessive transepidermal water loss, electrolyte imbalance, hypothermia, recurrent infections, nutritional compromise, and sepsis, making early recognition and prompt supportive management essential (Ragunatha & Inamdar, 2010). Similar neonatal predominance has been reported in studies evaluating pediatric dermatological emergencies from tertiary care hospitals, highlighting

the disproportionate contribution of congenital dermatoses to emergency dermatology in children (Hassan & Anwar, 2013).

The disease spectrum observed in the present study further emphasizes the diversity of pediatric dermatological emergencies. **Congenital ichthyoses** formed the largest disease category, followed by **epidermolysis bullosa**, **Stevens–Johnson syndrome/toxic epidermal necrolysis (SJS/TEN)**, and **acute urticaria with angioedema**. Each of these conditions represents a dermatological emergency through distinct mechanisms, including severe impairment of the epidermal barrier, extensive epidermal necrosis, mucosal involvement, or acute airway compromise. Consequently, successful management requires close collaboration between dermatologists, pediatricians, intensivists, ophthalmologists, nutritionists, and other specialists depending on the clinical presentation (Inamdar & Ragunatha, 2009; Ragunatha & Inamdar, 2010).

Overall, the findings of the present study contribute to the limited Indian literature on non-infectious pediatric dermatological emergencies and reinforce the need for heightened awareness among clinicians. Early diagnosis, timely referral to specialized centers, and institution of appropriate supportive measures remain fundamental to reducing morbidity and improving outcomes in these uncommon but potentially life-threatening disorders.

The present study demonstrated that **neonates constituted the largest proportion (35.9%) of non-infectious pediatric dermatological emergencies**, followed by school-aged children (25.6%), infants (20.5%), and preschool-aged children (17.9%). The predominance of neonatal presentations can largely be attributed to the high frequency of congenital disorders such as lamellar ichthyosis, non-bullous congenital ichthyosiform erythroderma, collodion baby, and epidermolysis bullosa, all of which typically manifest at birth or during the early neonatal period because of inherited defects affecting epidermal differentiation and skin barrier function (Ragunatha & Inamdar, 2010; Fine, 2010). Similar observations have been reported in previous Indian studies, where neonatal dermatological emergencies were predominantly composed of congenital genodermatoses and severe blistering disorders requiring immediate multidisciplinary care (Hassan & Anwar, 2013).

Although school-aged children constituted the second largest age group in the present study, this distribution was primarily attributable to patients with **Stevens–Johnson syndrome (SJS)** and **toxic epidermal necrolysis (TEN)**, conditions that are generally encountered more frequently beyond infancy owing to increased exposure to medications and infectious triggers. Previous studies have similarly reported that

severe cutaneous adverse drug reactions are more common among older children and adolescents than in neonates (Sarkar et al., 2013). This age-related variation reflects the differing etiological spectrum of pediatric dermatological emergencies, with congenital disorders predominating during early life and acquired inflammatory or drug-induced disorders becoming relatively more frequent with increasing age.

A slight **male predominance (56.4%)** was observed in the present study, with a male-to-female ratio of **1.29:1**. Similar male predominance has been reported in several Indian studies evaluating pediatric dermatological emergencies (Mathias et al., 2011; Sarkar et al., 2013). However, there is no convincing evidence that most congenital ichthyoses or inherited blistering disorders exhibit true sex predilection because the majority are inherited in an autosomal recessive or autosomal dominant fashion. Therefore, the observed male predominance is more likely to reflect differences in healthcare-seeking behavior, referral practices, and hospital attendance rather than an actual biological susceptibility. Similar explanations have been proposed in previous Indian hospital-based studies (Hassan & Anwar, 2013).

Overall, the demographic profile observed in the present study reinforces that **non-infectious pediatric dermatological emergencies are predominantly diseases of early childhood, particularly the neonatal period**, emphasizing the importance of prompt recognition of congenital dermatoses, early referral to specialized centers, and coordinated multidisciplinary management to minimize complications and improve survival.

Congenital ichthyoses constituted the **largest group of non-infectious pediatric dermatological emergencies**, accounting for **17 (43.6%)** of the 39 cases in the present study. Among these, **lamellar ichthyosis** was the predominant subtype, followed by **non-bullous congenital ichthyosiform erythroderma (NBCIE)** and **collodion baby**. This predominance highlights the significant burden of inherited disorders of keratinization encountered at tertiary referral centers, particularly in the neonatal period, where disruption of the epidermal barrier can rapidly result in dehydration, electrolyte imbalance, hypothermia, secondary bacterial infections, feeding difficulties, and failure to thrive if not managed promptly (Oji et al., 2010; Ragunatha & Inamdar, 2010). The predominance of **lamellar ichthyosis (58.8% of all ichthyosis cases)** in the present study is comparable to previous reports describing lamellar ichthyosis as one of the commonest forms of autosomal recessive congenital ichthyosis presenting during infancy. Most affected neonates are born encased within a collodion membrane, which subsequently sheds to reveal generalized plate-like scaling with varying degrees of ectropion, eclabium,

palmoplantar keratoderma, and heat intolerance. Mutations involving the **TGM1** gene remain the most frequently identified genetic abnormality, although several other genes associated with epidermal cornification have also been implicated (Oji et al., 2010; Vahlquist et al., 2018).

Non-bullous congenital ichthyosiform erythroderma (NBCIE) accounted for **23.5%** of ichthyosis cases in the present study. Patients with NBCIE typically present with generalized erythroderma and fine white scaling shortly after birth, often following an initial collodion membrane. Although generally less severe than harlequin ichthyosis, persistent impairment of the epidermal barrier predisposes these children to recurrent infections, excessive transepidermal water loss, impaired thermoregulation, and nutritional deficiencies, thereby necessitating long-term multidisciplinary follow-up (Oji et al., 2010).

Three neonates presented as **collodion babies**, representing **17.6%** of the ichthyosis group. Rather than a distinct diagnosis, the collodion baby phenotype represents the initial presentation of several inherited disorders of cornification, including lamellar ichthyosis and NBCIE. Early neonatal management is primarily supportive and includes maintenance of temperature and hydration, prevention of secondary infections, nutritional support, liberal use of bland emollients, and careful ophthalmologic evaluation when ectropion is present (Ragunatha & Inamdar, 2010; Vahlquist et al., 2018).

The predominance of congenital ichthyoses in the present study probably reflects the referral pattern of a tertiary care center where neonates with severe barrier dysfunction are frequently transferred for specialized dermatological care. The finding also emphasizes the importance of **early diagnosis, genetic counselling, parental education, and multidisciplinary management**, which have significantly improved survival and long-term quality of life among affected children over the past two decades (Oji et al., 2010; Vahlquist et al., 2018).

Inherited Blistering Disorders

Inherited blistering disorders accounted for **9 (23.1%)** cases of non-infectious pediatric dermatological emergencies in the present study, making them the second most common disease category. **Epidermolysis bullosa (EB)** constituted the majority of cases (88.9%), while **chronic bullous disease of childhood (CBDC)** was observed in one patient. The predominance of EB in our study is consistent with the recognized epidemiology of pediatric blistering disorders, in which inherited mechanobullous diseases present more frequently during infancy and early childhood because of genetically determined defects in structural proteins responsible for dermoepidermal adhesion (Fine, 2010; Has et al., 2020).

Epidermolysis bullosa comprises a heterogeneous group of inherited disorders characterized by mechanical fragility of the skin and mucous membranes, resulting in recurrent blistering following minimal trauma. Depending on the level of tissue cleavage and the underlying genetic defect, EB is classified into four principal types: epidermolysis bullosa simplex, junctional epidermolysis bullosa, dystrophic epidermolysis bullosa, and Kindler epidermolysis bullosa (Fine, 2010; Has et al., 2020). Although molecular classification was beyond the scope of the present study, the clinical severity observed in several patients emphasizes the importance of early diagnosis and referral to specialized centers.

The emergency nature of epidermolysis bullosa extends beyond cutaneous blistering. Extensive erosions compromise the epidermal barrier, predisposing patients to dehydration, electrolyte disturbances, recurrent bacterial infections, chronic anemia, malnutrition, and sepsis. Mucosal involvement may result in feeding difficulties, esophageal strictures, ocular complications, and airway involvement, substantially increasing disease-related morbidity and affecting long-term quality of life (Fine, 2010; El Hachem et al., 2014). Consequently, management requires a multidisciplinary approach involving dermatologists, pediatricians, nutritionists, surgeons, ophthalmologists, dentists, physiotherapists, and specialized wound-care teams.

One patient in the present study was diagnosed with **chronic bullous disease of childhood (CBDC)**, also referred to as **linear IgA bullous dermatosis**. Although considerably less common than inherited forms of epidermolysis bullosa, CBDC represents the most frequent acquired autoimmune blistering disease in childhood. Early recognition is important because the condition usually responds well to medical therapy, particularly dapsone, in contrast to inherited blistering disorders that primarily require supportive care (Levy et al., 2019). The low frequency of CBDC in the present study is comparable to previous reports describing its rarity among pediatric dermatological emergencies.

The high proportion of inherited blistering disorders observed in the present study probably reflects the referral bias inherent to tertiary care hospitals, where patients with severe congenital blistering disorders are more likely to be managed. These findings underscore the importance of **early diagnosis, meticulous wound care, nutritional rehabilitation, infection prevention, genetic counselling, and long-term multidisciplinary follow-up**, all of which have substantially improved survival and quality of life among affected children in recent years (Has et al., 2020).

Stevens–Johnson Syndrome and Toxic Epidermal Necrolysis

Severe cutaneous adverse drug reactions constituted **9 (23.1%)** of all non-infectious pediatric dermatological emergencies in the present study. Among these, **Stevens–Johnson syndrome (SJS)** accounted for **7 (77.8%)** cases, while **toxic epidermal necrolysis (TEN)** was diagnosed in **2 (22.2%)** patients. These findings are consistent with previous reports demonstrating that SJS is more frequently encountered than TEN in the pediatric population, with TEN representing the more severe but less common end of the disease spectrum (Schopf et al., 1991; Hsu et al., 2016).

Stevens–Johnson syndrome and toxic epidermal necrolysis are rare but potentially life-threatening mucocutaneous disorders characterized by extensive keratinocyte apoptosis leading to epidermal detachment and mucosal erosions. Medications remain the most common precipitating factor in children, particularly antibiotics, antiepileptic drugs, and non-steroidal anti-inflammatory drugs, although infections such as *Mycoplasma pneumoniae* have also been implicated (Schwartz et al., 2013; Hsu et al., 2016). Because the present study was primarily designed to evaluate the clinico-epidemiological profile of pediatric dermatological emergencies, detailed analysis of causative agents was beyond its scope.

The predominance of SJS over TEN observed in the present study is comparable to findings from previous pediatric studies, where SJS consistently represents the majority of severe cutaneous adverse drug reactions (Sarkar et al., 2013). The relatively lower frequency of TEN may reflect its rarity in childhood as well as improvements in early recognition and referral before progression to more extensive epidermal detachment. Nevertheless, both disorders remain true dermatological emergencies because of the risk of rapid fluid loss, electrolyte imbalance, secondary infections, respiratory complications, and multiorgan dysfunction (Schwartz et al., 2013).

Mucosal involvement was a prominent feature in our study, particularly involving the oral cavity, with additional conjunctival and genital mucosal involvement observed in several patients. These findings are in accordance with the characteristic clinical presentation of SJS/TEN, in which painful mucosal erosions often precede or accompany widespread epidermal necrosis (Creamer et al., 2016). Early ophthalmological assessment is particularly important because ocular involvement may result in chronic sequelae including symblepharon formation, severe dry eye disease, corneal scarring, and permanent visual impairment if not treated promptly (Schwartz et al., 2013).

Management of SJS/TEN remains largely supportive and should ideally be undertaken in specialized intensive

care units or burn centers with multidisciplinary involvement. Immediate withdrawal of the suspected offending drug, meticulous wound care, aggressive fluid and electrolyte replacement, nutritional support, pain management, infection prevention, and ophthalmological care constitute the cornerstones of treatment (Creamer et al., 2016). Although immunomodulatory therapies such as systemic corticosteroids, intravenous immunoglobulin, cyclosporine, and tumor necrosis factor- α inhibitors have been increasingly used, evidence regarding their efficacy in children remains limited, and treatment decisions should be individualized based on disease severity and institutional protocols (Creamer et al., 2016; Hsu et al., 2016).

The findings of the present study reinforce that SJS and TEN continue to represent important pediatric dermatological emergencies despite their relative rarity. Prompt diagnosis, early referral, identification and withdrawal of the offending agent, and comprehensive supportive care remain essential to minimize acute complications and reduce long-term sequelae.

Acute Urticaria and Angioedema

Acute urticaria and angioedema accounted for **4 (10.3%)** of the non-infectious pediatric dermatological emergencies in the present study, comprising three cases of acute urticaria and one case of urticaria associated with angioedema. Although numerically the smallest disease category, these conditions warrant inclusion among dermatological emergencies because of their potential to cause rapid airway compromise, particularly when angioedema involves the larynx or upper respiratory tract (Zuberbier et al., 2022).

Acute urticaria is characterized by the sudden appearance of transient pruritic wheals resulting from mast cell and basophil activation with subsequent release of histamine and other inflammatory mediators. In children, the most common precipitating factors include viral infections, bacterial infections, foods, medications, insect bites, and, less frequently, immunizations (Bernstein et al., 2014). Despite extensive evaluation, an identifiable trigger is often not found, particularly in younger children.

The majority of patients in the present study presented with isolated acute urticaria, whereas only one patient had associated angioedema. Similar observations have been reported in pediatric studies, where acute urticaria generally follows a benign, self-limiting course and responds well to antihistamine therapy. However, angioedema deserves particular attention because swelling involving the tongue, pharynx, or larynx may progress rapidly and result in respiratory obstruction, necessitating immediate intervention (Zuberbier et al., 2022). Consequently, careful assessment of airway involvement should remain an integral part of the initial

evaluation of every child presenting with urticaria and angioedema.

Current international guidelines recommend **second-generation H1-antihistamines** as the first-line treatment for acute urticaria because of their efficacy and favorable safety profile in children. Systemic corticosteroids may be considered for severe or refractory episodes, whereas intramuscular adrenaline remains the treatment of choice when urticaria or angioedema occurs as part of anaphylaxis (Zuberbier et al., 2022; Bernstein et al., 2014). Prompt recognition of these high-risk presentations and early initiation of appropriate therapy are essential to prevent potentially life-threatening complications.

Although acute urticaria represented the least common dermatological emergency in the present study, its inclusion highlights the broad spectrum of pediatric dermatological emergencies encountered in tertiary care practice. Awareness of the possibility of airway compromise, together with timely treatment and close observation, remains fundamental to achieving favorable outcomes.

Pattern of Anatomical Involvement

The present study demonstrated that the **palms and soles were the most frequently involved anatomical sites (46.2%)**, followed by the **oral mucosa (33.3%)**, **genital mucosa (17.9%)**, **conjunctiva (12.8%)**, **nail apparatus (12.8%)**, and **nasal mucosa (2.6%)**. Since multiple sites were involved in several patients, these findings reflect the multisystem nature of pediatric dermatological emergencies rather than isolated cutaneous disease.

The high frequency of palmoplantar involvement observed in the present study can largely be attributed to the predominance of congenital ichthyoses and inherited blistering disorders. Palmoplantar skin is continuously exposed to friction and mechanical stress, making it particularly susceptible to hyperkeratosis, fissuring, blistering, and painful erosions in disorders associated with impaired epidermal integrity. Such involvement significantly affects mobility, daily activities, and quality of life, particularly in older children, while extensive fissuring also increases the risk of secondary bacterial infection (Oji et al., 2010; Has et al., 2020).

Oral mucosal involvement represented the second most common clinical finding and was observed predominantly among patients with **Stevens–Johnson syndrome and toxic epidermal necrolysis**. Painful oral erosions frequently interfere with feeding and hydration and may contribute to nutritional compromise, especially in younger children. Similar observations have been consistently reported in studies of pediatric SJS/TEN, where oral mucosal involvement is among the earliest and most frequent manifestations of disease (Creamer et al., 2016; Schwartz et al., 2013).

Ocular involvement was documented in **12.8%** of patients in the present study. Although relatively less frequent, it remains clinically significant because untreated conjunctival inflammation may progress to symblepharon formation, severe dry eye disease, corneal scarring, limbal stem cell deficiency, and permanent visual impairment. Current recommendations therefore emphasize early ophthalmological evaluation and prompt institution of ocular surface protection in all children with suspected SJS/TEN (Creamer et al., 2016). Similarly, genital mucosal involvement observed in the present study has important clinical implications because delayed recognition may lead to painful ulceration, secondary infection, adhesions, urethral complications, and long-term functional impairment. Early multidisciplinary management involving dermatologists, pediatricians, ophthalmologists, and pediatric surgeons or urologists, when indicated, is therefore essential to reduce long-term sequelae (Schwartz et al., 2013).

Overall, the pattern of anatomical involvement observed in the present study highlights that pediatric dermatological emergencies frequently extend beyond the skin and involve multiple mucocutaneous surfaces. Comprehensive examination of the skin, oral cavity, eyes, genitalia, and nails is therefore essential during the initial assessment to facilitate early diagnosis, identify potential complications, and guide timely multidisciplinary management.

Strengths and Limitations of the Study

The present study provides valuable insight into the spectrum of **non-infectious pediatric dermatological emergencies** encountered at a tertiary care center in South India. One of its major strengths is the inclusion of a broad range of uncommon but clinically significant disorders, including congenital ichthyoses, inherited blistering disorders, severe cutaneous adverse drug reactions, and acute urticaria with angioedema. These conditions are infrequently reported collectively in the Indian literature, and the present study therefore contributes important regional data regarding their clinical presentation and epidemiological profile. Furthermore, the study highlights the predominance of congenital disorders among pediatric dermatological emergencies, emphasizing the importance of early diagnosis and multidisciplinary management in improving patient outcomes.

Another strength of the study is its focus on children requiring emergency dermatological care, a relatively under-researched area compared with outpatient pediatric dermatology. By documenting the age distribution, disease spectrum, and pattern of anatomical involvement, the study provides clinically relevant information that may assist physicians in recognizing

life-threatening dermatological conditions at an early stage and initiating appropriate referral and treatment.

The present study, however, has certain limitations. It was conducted at a **single tertiary care center**, and therefore the findings may not be generalizable to the wider pediatric population or to primary and secondary healthcare settings. Referral bias is also likely, as severe congenital disorders and complex dermatological conditions are more frequently referred to tertiary hospitals, potentially overestimating the proportion of inherited disorders.

The **relatively small sample size** further limits the ability to perform subgroup analyses or identify statistically significant associations between demographic and clinical variables. In addition, the study primarily evaluated the clinico-epidemiological profile of patients and did not include long-term follow-up, treatment outcomes, genetic confirmation of inherited disorders, or assessment of prognostic factors. These parameters would have provided a more comprehensive understanding of disease burden and long-term outcomes.

Future multicentric studies involving larger cohorts, longer follow-up periods, and incorporation of molecular diagnostic techniques are warranted to better define the epidemiology, genetic characteristics, treatment outcomes, and prognostic indicators of non-infectious pediatric dermatological emergencies in the Indian population.

Clinical Implications

The findings of the present study have important implications for clinical practice. The predominance of congenital ichthyoses and inherited blistering disorders underscores the need for clinicians, particularly neonatologists and pediatricians, to recognize these conditions early and initiate prompt supportive management before complications such as dehydration, electrolyte imbalance, sepsis, and nutritional compromise develop. Similarly, rapid identification of **Stevens–Johnson syndrome** and **toxic epidermal necrolysis**, together with immediate withdrawal of the offending drug and institution of multidisciplinary supportive care, remains essential for reducing morbidity and mortality.

The study also highlights the importance of a **systematic mucocutaneous examination**, including assessment of the oral cavity, eyes, genitalia, nails, palms, and soles, as involvement of these sites may indicate severe disease and influence management decisions. Strengthening collaboration between dermatologists, pediatricians, ophthalmologists, intensivists, nutritionists, and surgeons can facilitate comprehensive care and improve clinical outcomes.

In addition, increasing awareness of pediatric dermatological emergencies among healthcare providers working in emergency departments and peripheral healthcare centers may promote earlier referral to specialized institutions, thereby reducing preventable complications and improving survival. The findings also support the development of standardized institutional protocols for the assessment and management of pediatric dermatological emergencies to ensure timely diagnosis and evidence-based treatment.

CONCLUSION

The present study provides a comprehensive overview of the **clinico-epidemiological profile of non-infectious pediatric dermatological emergencies** encountered at a tertiary care center in South India. Congenital disorders, particularly **ichthyosis** and **inherited blistering disorders**, constituted the majority of cases, highlighting the significant contribution of genodermatoses to pediatric dermatological emergencies in the neonatal and infant age groups. **Stevens–Johnson syndrome/toxic epidermal necrolysis** and **acute urticaria with or without angioedema** represented important acquired emergencies requiring prompt recognition and timely intervention to prevent serious complications.

Neonates formed the largest age group affected, reflecting the early presentation of inherited disorders associated with impaired epidermal barrier function. The frequent involvement of the **palms and soles** and **mucosal surfaces**, particularly the oral cavity, further emphasizes the multisystem nature of these conditions and the need for a meticulous mucocutaneous examination during the initial evaluation. Early diagnosis, prompt referral to tertiary care centers, multidisciplinary management, and appropriate supportive care remain fundamental to reducing morbidity and improving outcomes in affected children.

Although limited by its single-center design and relatively small sample size, the present study contributes valuable data to the limited Indian literature on non-infectious pediatric dermatological emergencies. The findings underscore the importance of increasing awareness among healthcare providers regarding these uncommon but potentially life-threatening conditions. Future multicenter studies incorporating larger patient populations, molecular diagnostic techniques, long-term follow-up, and treatment outcome analyses are warranted to further improve the understanding and management of these disorders.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Author Contributions

Dr. Laxmi B. Horatti: Conceptualization, study design, supervision, manuscript review and editing.

Dr. Tanmayi Komal Kumar: Data collection, patient recruitment, clinical assessment, data analysis, literature review, manuscript drafting, and correspondence.

Dr. Dilip Kumar N. R.: Data interpretation, critical revision of the manuscript, supervision, and final approval of the manuscript.

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Abbreviations

SJS: Stevens–Johnson Syndrome

TEN: Toxic Epidermal Necrolysis

EB: Epidermolysis Bullosa

NBCIE: Non-Bullous Congenital Ichthyosiform Erythroderma

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