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Patient Profile of Erythroderma: A Multicenter Retrospective Study in East and North Kalimantan 2018–2022

[1] Nurlaela Sari

[1] Tarakan Regional General Hospital, Tarakan City, North Kalimantan, Indonesia

Corresponding Email : drnurlaelasari19@gmail.com

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ABSTRACT

Introduction: Erythroderma is a severe, life-threatening dermatological condition characterized by universal erythema and scaling. Its etiology varies, including underlying skin diseases, drug reactions, systemic illnesses, and idiopathic causes. Data on the patient profile of erythroderma in East and North Kalimantan, Indonesia, is limited. This study aims to describe the profile of erythroderma patients in these regions from 2018 to 2022.

Methods: This was a multicenter retrospective descriptive study using secondary data from the medical records of inpatients diagnosed with erythroderma at Abdul Wahab Sjahranie Hospital (Samarinda), dr. Abdul Rivai Hospital (Berau), and Nunukan Hospital (Nunukan) from 2018 to 2022. Total sampling was employed, resulting in 46 cases from 40 patients. Data on demographic, clinical, etiological, and laboratory profiles were collected and analyzed using univariate analysis.

Results: A total of 46 cases were identified, with an incidence of 9.2 cases per year. The male-to-female ratio was 1.5:1, with a mean age of 51.3 ± 15.7 years. The most common clinical symptoms were scaling (97.8%), skin redness (84.8%), and pruritus (78.3%). The primary etiology was the exacerbation of a pre-existing skin disease (41.3%), most commonly psoriasis vulgaris (57.9%), followed by idiopathic causes (21.7%), drug reactions (19.6%), and systemic diseases (17.4%). Laboratory findings revealed anemia in 65.2% of cases, leukocytosis in 56.5%, and hypoalbuminemia in 76.0% of the tested cases. Electrolyte imbalances were also common: hyponatremia (51.9%), hypochloremia (33.3%), and hypokalemia (25.9%). The mortality rate was 8.7%.

Discussion: The demographic and clinical profiles align with previous studies, showing a male predominance and common symptoms of pruritus and scaling. However, the mean age was younger, and the leading etiology was the exacerbation of skin diseases, contrasting with some studies that found drug reactions to be most common. The high rates of anemia, leukocytosis, hypoalbuminemia, and electrolyte imbalances highlight the systemic involvement and metabolic demands of erythroderma. The relatively high idiopathic rate may be attributed to limited histopathological facilities in some study sites.

Conclusion: This study provides a comprehensive profile of erythroderma patients in East and North Kalimantan. The condition predominantly affects middle-aged males, with pre-existing skin diseases, particularly psoriasis, being the leading cause. Significant laboratory abnormalities are common. These

findings can serve as a basis for improving diagnosis and management strategies for erythroderma in these regions.

Keywords: Erythroderma, Exfoliative Dermatitis, Patient Profile, Retrospective Study, East Kalimantan, North Kalimantan.

INTRODUCTION

Erythroderma is classified as a severe, potentially life-threatening dermatological emergency. It is clinically characterized by universal erythema (erythema universalis), defined as redness covering greater than 90\% of the total body surface area, invariably accompanied by skin peeling or desquamation (*scaling*) of varying severity (Harper-Kirksey, 2018; Djuanda, 2021).

The historical foundation for understanding this condition was laid by Von Hebra in 1868, who recognized erythroderma as a systemic inflammatory state fundamentally linked to dysfunction of the skin barrier and associated metabolic disturbances (Tso et al., 2021). The etiology of erythroderma is diverse, encompassing: the extension of previously diagnosed chronic skin disorders (e.g., psoriasis, pemphigus foliaceus); hypersensitivity reactions to medications; underlying systemic illnesses; or internal malignancies, such as lymphoma, leukemia, and particularly Sézary syndrome (Ingram, 2016; Harper-Kirksey, 2018; Djuanda, 2021). Despite extensive diagnostic efforts, approximately 30\% of all cases globally are categorized as idiopathic, meaning the specific underlying cause remains unidentified (Harper-Kirksey, 2018).

Globally, erythroderma is considered rare, with an estimated incidence of 1 per 100,000 adults (Harper-Kirksey, 2018). Regional incidence rates exhibit significant variation; for instance, the United States reports a range of 0.9 to 71 cases per 100,000 dermatological outpatients, while the Netherlands documents an incidence of 0.9 per 100,000 in the general population (Harper-Kirksey, 2018; Setiawan, Thaha, & Purwoko, 2015). A recent study in Albania found 116 cases over 2012-2017 (Hoxha et al., 2020). The condition typically presents later in life, predominantly between the ages of 42 and 61 years, and is statistically more common in males, showing a reported male-to-female ratio ranging from 2:1 to 4:1 (Harper-Kirksey, 2018; Setiawan, Thaha, & Purwoko, 2015).

In the Indonesian context, local epidemiological data highlights regional differences: a study

in Palembang reported an incidence of 0.21\% with male predominance and the expansion of prior skin disease as the main cause (Setiawan, Thaha, & Purwoko, 2015). In contrast, a 2017 study in Surabaya reported a 5.3\% prevalence and a mortality rate of 6.1\%, where drug reactions were found to be the predominant trigger (Maharani & Setyaningrum, 2017).

The clinical course can be acute (often due to infections or drug hypersensitivity) or chronic and progressive (due to existing skin diseases or malignancy) (Tso et al., 2021). Following the onset and widespread coverage of erythema, scaling typically commences within 2 to 6 days. Systemic manifestations often include severe pruritus (itch), especially in cases related to atopic dermatitis or Sézary syndrome. Secondary signs may affect the eyes (ektropion, blepharitis), nails (onycholysis, onychomadesis), and hair (telogen effluvium). Laboratory evaluations frequently reveal markers of systemic compromise, such as anemia, leukocytosis, elevated ESR, and hypoalbuminemia. Specialized tests, including biopsy, are required for definitive diagnosis in select cases (Harper-Kirksey, 2018).

Given the significant disparity in etiological profiles across different regions of Indonesia and the complete absence of dedicated profile data for East and North Kalimantan, this multicenter retrospective study (2018–2022) aims to characterize the specific demographic, clinical, etiological, and laboratory profile of erythroderma patients managed in the three major regional hospitals.

The main purpose of this research is to determine the overall profile of erythroderma patients admitted for treatment at RSUD Abdul Wahab Sjahranie Samarinda, RSUD dr. Abdul Rivai Berau, and RSUD Nunukan during the 2018–2022 period.

METHODS

Research Design

This investigation utilizes a descriptive retrospective study design, wherein all necessary data are extracted exclusively from secondary sources, namely existing patient medical records.

Place and Time of Research

The research was executed as a multicenter study involving three key regional referral hospitals: RSUD Abdul Wahab Sjahranie Samarinda, RSUD dr. Abdul Rivai Berau (East Kalimantan), and RSUD Nunukan (North Kalimantan). The data collection and analysis were conducted from February to May 2023.

Target Population

The target population includes all patients diagnosed with erythroderma across the geographic regions of Samarinda, Berau (East Kalimantan), and Nunukan (North Kalimantan).

Accessible Population

The accessible population for this study comprises all erythroderma patients who were admitted for inpatient care at the three specified RSUDs.

Research Sample

The study sample consists of all erythroderma patients who underwent inpatient care at RSUD Abdul Wahab Sjahranie Samarinda, RSUD dr. Abdul Rivai Berau, and RSUD Nunukan between the years 2018 and 2022.

Sample Size

The **total sampling** method was utilized to determine the sample size, ensuring that all patients meeting the inclusion criteria who were hospitalized at the three hospitals during the designated five-year period were included in the analysis.

Sample Criteria

Inclusion Criteria

Erythroderma patients hospitalized at the three specified RSUDs during the 2018–2022 timeframe.

Exclusion Criteria

1. Erythroderma patients treated as outpatients or those who refused inpatient admission at the specified hospitals (2018–2022).
2. Erythroderma patients hospitalized at the specified RSUDs (2018–2022) whose medical records were incomplete or contained missing data required for the study.

Research Variables

Erythroderma served as the dependent variable. The independent variables explored were: demographic profile (age, sex); clinical profile (symptoms, signs, episode, length of stay, and patient discharge status); etiology (extension of prior skin disease, drug reaction, systemic disease, and idiopathic causes); and key laboratory parameters (leukocytes, hemoglobin, serum albumin, serum sodium, serum potassium, and serum chloride).

Operational Definitions

Erythroderma

- **Definition:** Erythema covering >90\% of the skin surface, accompanied by skin peeling (*scaling*, squama).
- **Measurement Method:** Diagnosis confirmed via patient medical records (2018–2022).

Age

- **Definition:** Age recorded at the time of erythroderma diagnosis.
- **Objective Criteria:** Grouped into 10-year intervals from 0–10 up to 80–90 years.

Sex

- **Definition:** Sex recorded at the time of erythroderma diagnosis.
- **Objective Criteria:** Male, Female.

Symptoms

- **Definition:** Clinical symptoms recorded at the time of diagnosis.
- **Subjective Criteria:** Pruritus (itch), skin redness, peeling skin, fever, and other recorded clinical symptoms.

Signs

- **Definition:** Clinical signs recorded at the time of diagnosis.
- **Objective Criteria:** Erythema, *Scaling* or squama, Temperature > 38.0^{\circ {C, and other recorded clinical signs.

Erythroderma Episode

- **Definition:** The episode of complaint onset at diagnosis.
- **Objective Criteria:** First Episode, Recurrent Episode (Recurrence).

Length of Stay

- **Definition:** Duration of hospitalization in days, from admission to discharge.
- **Measurement Method:** Duration recorded in medical records.

Patient Discharge Status

- **Definition:** Status recorded when the patient was discharged from the Hospital.
- **Objective Criteria:** Deceased, Alive.

Etiology

- **Definition:** Etiology recorded at diagnosis.
- **Objective Criteria:** Extension of Prior Skin Disease, Drug Reaction, Systemic Disease, Idiopathic.

Leukocyte Value

- **Definition:** Leukocyte value from the CBC at diagnosis.
- **Objective Criteria:** Leukocytosis (>11,000/\mu{L); Not Leukocytosis (National Center

for Biotechnology Information, 2023).

Hemoglobin Value

- **Definition:** Hemoglobin value from the CBC at diagnosis.
- **Objective Criteria:** Anemia (Men < 13.5 g/dl, Women < 12.0 g/dl, Children < 11.0 g/dl); Not Anemia (National Center for Biotechnology Information, 2022).

Serum Albumin Value

- **Definition:** Serum albumin value from the serum protein profile at diagnosis.
- **Objective Criteria:** Hypoalbuminemia (< 3.5 g/dl or 35 g/l); Not Hypoalbuminemia (National Center for Biotechnology Information, 2022).

Serum Sodium Value

- **Definition:** Serum sodium value from the serum electrolyte test at diagnosis.
- **Objective Criteria:** Hyponatremia (< 135 mEq/l); Not Hyponatremia (Hulmani et al., 2014; National Center for Biotechnology Information, 2021).

Serum Potassium Value

- **Definition:** Serum potassium value from the serum electrolyte test at diagnosis.
- **Objective Criteria:** Hypokalemia (< 3.5 mEq/l); Not Hypokalemia (Hulmani et al., 2014; National Center for Biotechnology Information, 2023).

Serum Chloride Value

- **Definition:** Serum chloride value from the serum electrolyte test at diagnosis.
- **Objective Criteria:** Hypochloremia (< 98 mEq/L); Not Hypochloremia (Hulmani et al., 2014).

Research Instruments

The sole instrument utilized for data collection was the comprehensive medical records of

all included erythroderma patients hospitalized between 2018 and 2022 at the three participating RSUDs.

Data Processing and Analysis

Data management included the routine steps of data examination (*editing*), coding, and structured organization (*tabulating*). Univariate statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, version 26.

Research Flowchart

The methodology proceeded by first identifying all erythroderma patients hospitalized during the study period (2018–2022). Subsequently, inclusion and exclusion criteria were rigorously applied to select the final research subjects. Data regarding clinical profile, etiology, and laboratory parameters were extracted, followed by data processing, analysis, and generation of the research findings.

RESULTS

Profile of Patient and Case Distribution

The initial review identified 42 erythroderma patients across the three centers during the five-year study period (2018–2022). However, 2 patients were excluded due to incomplete medical records, specifically missing laboratory data, resulting in a final cohort of 40 patients. These 40 patients were associated with a total of 46 documented erythroderma case episodes.

The annualized incidence rate was calculated at 9.2 cases/year. Analysis of the distribution revealed that RSUD A.W. Sjahranie Samarinda managed the majority of patients, contributing 30 cases (75.0\%). RSUD Nunukan contributed 8 patients (20.0\%), and RSUD dr. Abdul Rivai Berau contributed 2 patients (5.0\%). The high concentration of cases at RSUD A.W. Sjahranie confirms its role as the major referral center for complex dermatological conditions in the region.

Table 1.2 Profile of Erythroderma Based on Hospital Distribution

Variable	Category	N	%
Number of Patients	RSUD A.W. Sjahranie	30	75.0
	RSUD dr. Abdul Rivai	2	5.0
	RSUD Nunukan	8	20.0
Total		**40**	**100**

The temporal distribution showed significant fluctuation, with 2018 recording the peak incidence of 21 cases (45.7\%). This high figure was followed by a substantial drop in 2019, registering only 2 cases (4.3\%), before rebounding to 13 cases (28.3\%) in 2022. The dramatic instability in annual case numbers warrants careful consideration, as it may suggest variability in coding or reporting practices rather than a true epidemiological trend over time.

Table 1.3 Profile of Erythroderma Based on Case Count and Year

Variable	Category	N	%

Year of Case	2018	21	45.7
	2019	2	4.3
	2020	6	13.0
	2021	4	8.7
	2022	13	28.3
Total		**46**	**100**

Demographic Profile

The demographic analysis of the 40 patients indicated a clear male dominance, with 24 male patients compared to 16 female patients, establishing a ratio of 1.5:1.

The calculated mean age for the erythroderma patients was 51.3 +/- 15.7 years, spanning a wide range from the youngest patient at 22 years to the oldest at 81 years. When cases (N=46) were grouped by age bracket, the highest frequency occurred in the 30–40 year range (10 cases, 21.7\%). The 40–50 year and 50–60 year brackets followed closely, each contributing 9 cases (19.6\%). This finding, where the peak incidence occurs earlier than the globally documented 5th and 6th decades, strongly anticipates the dominance of an underlying etiology that typically presents earlier in life, such as inflammatory skin disorders.

Table 1.4 Demographic Profile of Erythroderma

Variable	Category	N	%
Sex	Male	24	60.0
	Female	16	40.0
Total		**40**	**100**
Mean Age	51.3 +/- 15.7 years		
Age	0-10 Years	0	0
	10-20 Years	0	0
	20-30 Years	4	8.7
	30-40 Years	10	21.7
	40-50 Years	9	19.6
	50-60 Years	9	19.6
	60-70 Years	7	15.2

	70-80 Years	6	13.0
	80-90 Years	1	2.2
Total		**46**	**100**

Clinical Profile

Main Symptoms and Signs

The defining features of erythroderma were consistently recorded. Skin peeling was documented in 45 cases (97.8\%), and skin redness in 39 cases (84.8\%). Pruritus was also a highly frequent complaint, reported in 36 cases (78.3\%). Systemic fever (>38.0^{\circ{C) was relatively uncommon, noted in only 9 cases (19.6\%) for symptoms and 4 cases (8.7\%) for objective signs.

Table 1.5 Profile of Erythroderma Based on Main Symptoms

Variable	Category	N	%
Pruritus	Itchy	36	78.3
	Not Itchy	10	21.7
Total		**46**	**100**

Skin Redness	Skin Redness	39	84.8
	No Skin Redness	7	15.2
Total		**46**	**100**
Peeling Skin	Peeling Skin	45	97.8
	No Peeling Skin	1	2.2
Total		**46**	**100**
Fever	Fever	9	19.6
	No Fever	37	80.4
Total		**46**	**100**

Table 1.6 Profile of Erythroderma Based on Associated Symptoms

Variable	**Category**	**N**	**%**
Associated	Angina Pectoris	1	1.7

Symptoms			
	Black Stool (Melena)	1	1.7
	Generalized Body Weakness	4	6.7
	Decreased Urination	1	1.7
	Tea-Colored Urine	1	1.7
	Cough	1	1.7
	Body Swelling	5	8.3
	Facial Swelling	1	1.7
	Diarrhea	1	1.7
	Dry Skin	1	1.7
	Suppurative Blisters	1	1.7

	Watery Eyes	1	1.7
	Chills	1	1.7
	Nausea-Vomiting	3	5.0
	Headache	1	1.7
	Painful Swallowing	1	1.7
	Skin Pain	10	16.7
	Joint Pain	1	1.7
	Mouth Ulcers (Canker Sores)	1	1.7
	Shortness of Breath	3	5.0
	None	20	33.3
Total		**60**	**100**

Table 1.7 Profile of Erythroderma Based on Main Signs

Variable	Category	N	%
Erythema	Erythema	39	84.8
	No Erythema	7	15.2
Total		**46**	**100**
Scaling	Scaling	45	97.8
	No Scaling	1	2.2
Total		**46**	**100**
Body Temp > 38°C	Body Temp > 38°C	4	8.7
	No Body Temp > 38°C	42	91.3
Total		**46**	**100**

Associated Manifestations and Outcomes

Skin pain was the most common associated symptom, reported in 10 cases (16.7\%). Other

systemic complaints included generalized body swelling (8.3\%) and shortness of breath (5.0\%). The most frequent associated sign was hyperpigmentation (6 cases, 11.1\%), a finding relevant to diagnostics in pigmented populations, as noted by the 15.2\% of cases where erythema was clinically absent.

Table 1.8 Profile of Erythroderma Based on Associated Signs

Variable	Category	N	%
Associated Signs	Skin Edema	1	1.9
	Lip Erosion	2	3.7
	Inguinal Erosion	1	1.9
	Skin Erosion	3	5.6
	Skin Fissure	3	5.6
	Hyperpigmentation	6	11.1
	Icterus (Jaundice)	1	1.9
	Maculopapular Lesion	2	3.7

	Lichenification	1	1.9
	Madidans Pedis (Weeping Feet)	1	1.9
	Hypopigmented Macule	1	1.9
	Erythematous Papule and Plaque	1	1.9
	Hyperkeratosis Plaque	3	5.6
	Skin Pustules	1	1.9
	Cellulitis	1	1.9
	Inguinal Vesiculobullous Lesion	1	1.9
	Xerosis Cutis	4	7.4

	None	21	38.9
Total		**54**	**100**

Regarding the disease course, 37 cases (80.4\%) were categorized as the first episode, with 9 cases (19.6\%) being recurrent. The mean length of inpatient stay was exceptionally short at 6.5 days. Despite this brief hospitalization period, the overall mortality rate was 8.7\% (4 cases). This high mortality combined with a short LOS suggests that patients often present with advanced disease severity and may not have the physiological reserve to withstand prolonged hospitalization, indicating a severe, acute presentation or delayed presentation to the specialized centers.

Table 1.9 Profile of Erythroderma Based on Case Episode

Variable	**Category**	**N**	**%**
Case Episode	First Episode	37	80.4
	Recurrent Episode	9	19.6
Total		**46**	**100**
Mean Length of Stay	6.5 days		

Discharge Status	Deceased	4	8.7
	Alive	42	91.3
Total		**46**	**100**

Etiological Profile

The most prevalent etiology observed was the extension of prior skin disease, accounting for 19 cases (41.3\%). Idiopathic causes represented the second largest group (10 cases, 21.7\%), followed by drug reactions (9 cases, 19.6\%), and systemic diseases (8 cases, 17.4\%).

Table 1.10 Profile of Erythroderma Based on Etiology

Variable	Category	N	%
Etiology	Extension of Prior Skin Disease	19	41.3
	Drug Reaction	9	19.6
	Systemic Disease	8	17.4
	Idiopathic	10	21.7

Total		**46**	**100**

Among the cases due to the extension of prior skin disease (N=19), Psoriasis Vulgaris was the most dominant cause, observed in 11 cases (57.9\%). This high prevalence of Psoriasis establishes a direct connection to the finding of a younger median age for the overall cohort. Seborrheic dermatitis was the next most common, contributing 2 cases (10.5\%), with remaining causes including Allergic Contact Dermatitis, Nummular Dermatitis, Leprosy, Bullous Pemphigoid, Pemphigus Vulgaris, and Cellulitis.

Table 1.11 Profile of Erythroderma Due to Extension of Prior Skin Disease

Variable	Category	N	%
Extension of Prior Skin Disease	Allergic Contact Dermatitis	1	5.3
	Nummular Dermatitis	1	5.3
	Seborrheic Dermatitis	2	10.5
	Leprosy	1	5.3

	Bullous Pemphigoid	1	5.3
	Pemphigus Vulgaris	1	5.3
	Psoriasis Vulgaris	11	57.9
	Cellulitis	1	5.3
Total		**19**	**100**

In the drug reaction group (N=10), 40.0\% were categorized as "Unclear" due to difficulties in isolating the specific culprit drug amidst polypharmacy. Antibiotics were the most frequent specific agents (20.0\%), followed by analgesics, Anti-Tuberculosis Drugs (OAT), Herbal Medicine, and Hansen's Disease Drugs (MH).

Table 1.12 Profile of Erythroderma Due to Drug Reaction

Variable	Category	N	%
Drug Reaction	Analgesics	1	10.0
	Antibiotics	2	20.0

	Anti-Tuberculosis Drug (OAT)	1	10.0
	Herbal Medicine	1	10.0
	Hansen's Disease Drug (MH)	1	10.0
	Unclear	4	40.0
Total		**10**	**100**

Systemic disease-induced erythroderma (N=8) was most commonly associated with Chronic Kidney Disease (CKD), found in 2 cases (25.0\%). Other systemic causes were heterogeneous, including Autoimmune Hemolytic Anemia (AIHA), Congestive Heart Failure (CHF), Coronary Artery Disease (CAD), Cholangitis, Systemic Lupus Erythematosus (SLE), and one unclear case, each contributing 12.5\%. The noteworthy absence of any documented malignancy cases, combined with the high idiopathic rate, suggests a significant gap in diagnostic capability. The lack of histopathology access at the peripheral centers likely prevents the definitive identification of cutaneous lymphomas, which may be misclassified as idiopathic erythroderma.

Table 1.13 Profile of Erythroderma Due to Systemic Disease

Variable	Category	N	%

Systemic Disease	Autoimmune Hemolytic Anemia (AIHA)	1	12.5
	Chronic Kidney Disease (CKD)	2	25.0
	Congestive Heart Failure (CHF)	1	12.5
	Coronary Artery Disease (CAD)	1	12.5
	Cholangitis	1	12.5
	Systemic Lupus Erythematosus (SLE)	1	12.5
	Unclear	1	12.5
Total		**8**	**100**

Laboratory Profile

The laboratory data reveals exceptionally high systemic morbidity within this cohort. Anemia was detected in 30 cases (65.2\%), with a mean hemoglobin level of 11.5 +/- 2.4 g/dl. Leukocytosis was observed in 26 cases (56.5\%), with a mean leukocyte count of 13,051 +/- 6,173 cells/\mu{L. These elevated rates compared to established benchmarks globally and nationally (e.g., Surabaya, Portugal) indicate a higher degree of systemic inflammation or underlying infection in the Kalimantan patient pool requiring hospitalization.

Severe protein loss was confirmed by the high prevalence of hypoalbuminemia, found in 19 out of 25 cases tested (76.0\%). The mean serum albumin was critically low at 2.8 +/- 0.6 g/dl. This severe hypoalbuminemia is a direct physiological consequence of the massive protein loss associated with the accelerated epidermal turnover and scale shedding inherent to erythroderma, compounded by potential chronic nutritional deficits.

Electrolyte assessment (N=27 cases) highlighted widespread fluid imbalance. Hyponatremia was the most common abnormality, affecting 14 cases (51.9\%). Hypochloremia was found in 9 cases (33.3\%), and hypokalemia in 7 cases (25.9\%). The mean serum sodium level (134 +/- 6.0 mEq/l) was below the lower limit of normal, reflecting substantial fluid loss across the compromised skin barrier. The prevalence of these electrolyte disturbances mandates that aggressive and systematic fluid and electrolyte replacement therapy be prioritized during the management of erythroderma in this regional context.

Table 1.14 Laboratory Profile of Erythroderma

Variable	Category	N	%
Mean Hemoglobin	11.5 +/- 2.4		

Anemia	Anemia	30	65.2
	Not Anemia	16	34.8
Total		**46**	**100**
Mean Leukocyte	13,051 +/- 6,173		
Leukocytosis	Leukocytosis	26	56.5
	Not Leukocytosis	20	43.5
Total		**46**	**100**
Mean Serum Albumin (N=25)	2.8 +/- 0.6		
Hypoalbuminemia	Hypoalbuminemia	19	76.0
	Not Hypoalbuminemia	6	24.0
Total		**25**	**100**

Mean Serum Sodium (N=27)	134 +/- 6.0		
Hyponatremia	Hyponatremia	14	51.9
	Not Hyponatremia	13	48.1
Total		**27**	**100**
Mean Serum Potassium (N=27)	3.9 +/- 0.9		
Hypokalemia	Hypokalemia	7	25.9
	Not Hypokalemia	20	74.1
Total		**27**	**100**
Mean Serum Chloride (N=27)	101 +/- 6.0		
Hypochloremia	Hypochloremia	9	33.3

	Not Hypochloremia	18	66.7
Total		**27**	**100**

DISCUSSION

Demographic Profile

The annualized case rate of 9.2 cases/year for East and North Kalimantan is comparable to low-incidence data from Portugal (Cesar et al., 2016), but substantially less than figures reported in high-density Indonesian regions like Palembang and Surabaya (Setiawan, Thaha, & Purwoko, 2015; Maharani & Setyaningrum, 2017). This difference suggests that the absolute burden of erythroderma requiring specialized care may be lower in this less populous region or reflects challenges related to patient referral and accessibility to specialized dermatological services.

The confirmation of male predominance (1.5:1 ratio) is consistent with epidemiological patterns observed worldwide (Harper-Kirksey, 2018; Setiawan, Thaha, & Purwoko, 2015; Maharani & Setyaningrum, 2017; Miyashiro & Sanches, 2020; Hoxha et al., 2020; Cesar et al., 2016; Itty et al., 2021). However, the observed peak incidence in the 30–40 year age bracket, resulting in a mean age of 51.3 years, stands out as younger than many established international and national cohorts (Setiawan, Thaha, & Purwoko, 2015; Maharani & Setyaningrum, 2017; Cesar et al., 2016; Miyashiro & Sanches, 2020; Itty et al., 2021). This deviation from older age profiles typically seen elsewhere must be understood as being fundamentally related to the specific etiology dominant in this region, setting the stage for the subsequent etiological findings (Harper-Kirksey, 2018).

Clinical Profile

The universal presence of scaling and high prevalence of pruritus confirm the expected

inflammatory nature of the disease. The low rate of documented fever (19.6\%) contrasts with findings from other international centers where drug reactions and infections are more frequent primary causes (Cesar et al., 2016; Hoxha et al., 2020; Itty et al., 2021). Since fever is a marker of thermal dysregulation and hyperperfusion caused by extensive inflammation, the lower incidence may reflect that the specific inflammatory pathways triggered by Psoriasis, the leading cause in this study, produce less profound systemic temperature elevation compared to drug hypersensitivity syndromes (Harper-Kirksey, 2018).

A critical observation is the high mortality rate (8.7\%) juxtaposed with the very short average length of stay (6.5 days). This short time window for intervention, compared to cohorts with longer LOS, such as Portugal (11.8 days) and Albania (12.6 days), indicates that patients in Kalimantan are likely presenting severely decompensated or dying quickly despite hospital admission (Cesar et al., 2016; Hoxha et al., 2020). This finding raises concerns regarding delayed presentation, the severe nature of the underlying systemic complications (anemia, hypoalbuminemia), or potential resource constraints limiting prolonged, intensive care crucial for managing a dermatological emergency of this magnitude, especially compared to Surabaya, which reported a mortality rate of 6.1\% (Maharani & Setyaningrum, 2017). The presence of hyperpigmentation (11.1%) as an associated sign may contribute to the 15.2\% of cases where erythema was clinically absent (Maharani & Setyaningrum, 2017).

Etiological Profile

The dominance of the extension of prior skin disease (41.3\%) as the primary cause aligns with data from Palembang and Portugal (Setiawan, Thaha, & Purwoko, 2015; Cesar et al., 2016; Itty et al., 2021), but differs from Surabaya where drug reactions were predominant (Maharani & Setyaningrum, 2017). Psoriasis Vulgaris was the single most important trigger, accounting for 57.9\% of skin disease-related cases, aligning with findings in Surabaya and Portugal (Maharani & Setyaningrum, 2017; Cesar et al., 2016). This fact explains the younger age profile of the cohort.

However, this contrasts with Palembang (Seborrheic Dermatitis) and India (Eczema) (Setiawan, Thaha, & Purwoko, 2015; Itty et al., 2021).

Regarding drug reactions, antibiotics were the most common identified specific trigger (20\%), consistent with Portugal (Cesar et al., 2016), but contrasting with Brazil (Anticonvulsants) and Palembang (OAT) (Miyashiro & Sanches, 2020; Setiawan, Thaha, & Purwoko, 2015). The inclusion of regional-specific drugs, such as OAT and MH medication, underscores the unique co-morbidities faced by this population.

Systemic disease-induced erythroderma (N=8) was most commonly associated with Chronic Kidney Disease (CKD), found in 2 cases (25.0\%). Unlike Portugal, where malignancy was the primary systemic cause (Cesar et al., 2016), no malignancies were detected in this study. The high incidence of idiopathic erythroderma (21.7\%) contrasts sharply with low rates documented in Portugal (3.9\%) and India (5.2\%) (Cesar et al., 2016; Itty et al., 2021). This high rate suggests infrastructural limitations, particularly the absence of routine histopathological capability in the peripheral Type C RSUDs feeding this cohort, likely leading to the underdiagnosis of chronic neoplastic causes such as cutaneous T-cell lymphoma.

Laboratory Profile

The laboratory data provide the most compelling evidence for the systemic severity experienced by this cohort. The prevalence of anemia (65.2\%) and leukocytosis (56.5\%) is significantly higher than comparison studies, including Surabaya (Anemia 20.5%, Leukocytosis 37.3%), Portugal (Anemia 30.1%, Leukocytosis 48.5%), and India (Anemia 33.8%, Leukocytosis 24.7%) (Maharani & Setyaningrum, 2017; Cesar et al., 2016; Itty et al., 2021).

The finding that 76.0\% of tested patients suffered from hypoalbuminemia (mean 2.8 g/dl) is exceptionally high compared to Surabaya (27.2\%) and India (33.8\%) (Maharani & Setyaningrum, 2017; Itty et al., 2021). This condition is a direct result of massive protein loss through the

exfoliating skin surface combined with the systemic inflammatory state and possible chronic nutritional deficits (Maharani & Setyaningrum, 2017; Itty et al., 2021). This severity necessitates the urgent implementation of aggressive nutritional support protocols.

Furthermore, the high rates of electrolyte disturbances, particularly hyponatremia (51.9\%), hypokalemia (25.9\%), and hypochloremia (33.3\%), confirm that the compromised barrier function of the skin leads to critical fluid and salt losses (Maharani & Setyaningrum, 2017; Hulmani et al., 2014). The mean sodium level being below the normal range provides biochemical evidence of volume depletion, emphasizing the non-negotiable requirement for rigorous electrolyte monitoring and appropriate fluid resuscitation to stabilize patients and prevent cardiovascular and renal complications (Hulmani et al., 2014; Maharani & Setyaningrum, 2017).

CONCLUSION

The retrospective analysis of erythroderma patients in East and North Kalimantan (2018–2022) established a distinct regional profile defined by a high mortality rate (8.7\%) and significant systemic morbidity. The cohort, primarily male (1.5:1 ratio) with a younger peak age (30–40 years), demonstrates a heavy reliance on the extension of prior skin disease (41.3\%) with Psoriasis Vulgaris as the key etiological trigger (57.9\% of skin disease cases).

The clinical severity is underscored by laboratory findings that exceed those published in other Indonesian and international centers, particularly the overwhelming prevalence of severe hypoalbuminemia (76.0\%), high anemia (65.2\%), and critical electrolyte imbalance (hyponatremia 51.9\%, hypochloremia 33.3\%, hypokalemia 25.9\%). The combination of high mortality and a short length of stay (6.5 days) suggests patients present late or require highly specialized, rapid interventions. The substantial idiopathic rate (21.7\%) highlights a critical need to enhance diagnostic infrastructure, specifically providing access to histopathological facilities for definitive etiological classification and appropriate clinical management. These findings should guide the

development of specialized triage, treatment, and referral pathways in the East and North Kalimantan provinces.

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