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RESEARCH ARTICLE

The Beetle Behind The Burn : A Hospital Based Study On Clinico-Epidemiological Patterns Of Paederus Dermatitis In Chengalpattu District

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Abstract: ***Introduction*** Paederus dermatitis (PD) is an irritant contact dermatitis caused by contact with the vesicant chemical pederin in the body fluids of Paederus beetles. ***Aims and Objectives*** To study the epidemiological patterns ,clinical patterns and features of PD ***Materials & Methods*** This descriptive study included patients diagnosed with PD at a tertiary care hospital between March 2024 and February 2025. Data on demographics, symptoms, exposure history, and clinical examination were collected.***Results*** PD predominantly affected males (65.3%) aged 21–25 years (41.5%), with 65.3% residing in rural areas. Lesions were most often noticed in the morning (72.03%), with burning sensation as the predominant symptom (81.35%). The face was the most commonly involved site (68.6%). Seasonal distribution showed cases peaked in June (22.8%).Occupational analysis revealed that farmers and agricultural workers were the most affected group (36.44%). Key risk factors included sleeping on the floor (75%). Clinically, the most common features included vesicles (96.6%), erythema (93.2%), and plaques (92.4%). ***Conclusion*** PD is a preventable skin condition commonly seen in rural and agricultural communities, often triggered by environmental and behavioral risk factors. Simple measures such as using bed nets, closing windows at night, and reducing nearby vegetation can significantly lower exposure. Community education on identifying Paederus beetles and adopting protective habits is crucial. Integrating these strategies into public health efforts can effectively reduce the incidence and impact of PD.

Keywords: Paederus dermatitis, Pederin, Erythema, Plaques, Seasonal distribution.

INTRODUCTION

Paederus dermatitis (PD) is an acute irritant contact dermatitis induced by Paederus beetles (Order: Coleoptera, Family: Staphylinidae), frequently observed in tropical and subtropical areas characterized by hot, humid temperatures.Paederus beetles secrete paederin, a powerful toxin generated by symbiotic Pseudomonas bacteria. Paederin interferes with protein and DNA synthesis, resulting in erythematous, vesicular lesions accompanied by a burning sensation, typically caused by epidermal damage and acantholysis. Paederus beetles, also referred to as rove beetles or "acid puchi," are diminutive in size (7–10 mm) and exhibit prominent red and black coloration. They are nocturnal, phototropic, and typically located in humid environments. Their inclination to run instead of fly and to curl their abdomens when agitated facilitates their identification.A dedicated study on PD is essential to understand its epidemiology, clinical manifestations, and effective preventive strategies, particularly in regions where outbreaks are common. Such research can inform public health policies and contribute to reducing the burden of this preventable skin condition.

MATERIAL AND METHODS

An observational study was performed in the Department of Dermatology at a tertiary care hospital in Chengalpattu District for a one-year duration, from March 2024 to February 2025. All patients presenting to the Dermatology Outpatient Department during the study period with a clinical diagnosis of PD and who provided written informed consent were included in the study. Patients with lesions due to other identifiable causes—such as fungal infections, contact allergies, or atopic dermatitis—were excluded. Furthermore, people with ambiguous diagnoses, those who had undergone treatment at other facilities, applied irritants, or refused to give consent were excluded to preserve the accuracy and reliability of the study results.

Informed consent, both verbal and written, was acquired from all participants. A comprehensive history was obtained, including patient demographics, primary complaints, symptom onset and duration, and any relevant medical or dermatological disorders. Data pertinent to the diagnosis of PD including a history of analogous episodes, occupational exposure, and personal habits, was also documented. Every patient had a comprehensive clinical and dermatological evaluation to validate the diagnosis and evaluate the degree of skin involvement.

RESULTS AND OBSERVATIONS:

1) DISTRIBUTION BASED ON AGE, GENDER , AREA OF RESIDENCE, SOCIO ECONOMIC STATUS

Our analysis indicated that the majority of cases were found in younger individuals, with 41.5% in the 21–25 age bracket and 32.2% in persons below 20 years of age. Only 2.5% of occurrences were documented among adults over the age of 30. A male predominance was seen, with 65.3% of males and 34.7% as female. The predominant area of living was rural (65.3%), as compared to urban areas (34.7%)(table 1).

The majority of patients, according to socioeconomic level, were classified as lower class (52.5%), followed by lower-middle class (38.1%), with 7.6% and 1.7% of the population belonging to upper middle class and upper class, respectively, based on the modified Kuppuswamy scale (table 1).

Table 1: Distribution of Patients According to Age, Gender, Area, and Socio-economic Status

Category	Subcategory	No. of Cases	Percentage
Age Group	< 20	38	32.2%
	21-25	49	41.5%
	26-30	28	23.7%
	> 30	3	2.5%
	Total	**118**	**100.0%**
Gender	Female	41	34.7%
	Male	77	65.3%
	Total	**118**	**100.0%**
Area of residence	Rural	77	65.3%
	Urban	41	34.7%
	Total	**118**	**100.0%**
Socio-economic Status (Kuppuswamy Scale)	Lower Middle Class / III	45	38.1%
	Lower / IV	62	52.5%
	Upper Class / I	2	1.7%
	Upper Middle Class / II	9	7.6%
	Total	**118**	**100.0%**

2) DISTRIBUTION BASED ON SYMPTOMS

The majority of patients (72.03%) reported the emergence of lesions in the morning, while 17.79% noted their appearance at night. The primary symptom was a burning sensation (81.35%), followed by itching (11.0%) and pain (7.62%). The face was the most commonly affected area (68.6%), followed by the trunk (15%), neck (7.6%), shoulders and upper extremities (4.2%), hips, and lower limbs (4.23%), in descending order of prevalence(table 2)

Table 2: Distribution based on symptoms

SYMPTOMS	Frequency (n)	Percentage(%)
Time of Noticing the Lesions		
Morning	85	72.03
Afternoon	12	10.17
Night	21	17.79
Primary complaint		
Burning sensation	96	81.35
Itching	13	11.01
Pain	9	7.62
Sites of Involvement		
Face	81	68.64
Neck	9	7.62
Shoulder and upper extremities	5	4.23
Trunk	18	15.25
Hip and lower extremities	5	4.23

3. **BASED ON SEASONAL VARIATION**

Our analysis of 118 patients with PD revealed the following monthly distribution: January (6 cases, 5.08%), February (4 cases, 3.3%), March (6 cases, 5.08%), April (2 cases, 1.6%), May (9 cases, 7.6%), June (27 cases, 22.8%), July (10 cases, 8.4%), August (6 cases, 5.08%), September (6 cases, 5.0%), October (15 cases, 12.7%), November (20 cases, 16.9%), December (7 cases, 5.9%)(table 3).

Table 3: Based on Seasonal variation

MONTH	NUMBER OF PATIENTS\ Total number: 118	PERCENTAGE (%)
JANUARY	6	5.0%
FEBRUARY	4	3.3%
MARCH	6	5.0%
APRIL	2	1.6%
MAY	9	7.6%
JUNE	27	22.8%
JULY	10	8.4%
AUGUST	6	5.0%
SEPTEMBER	6	5.0%
OCTOBER	15	12.7%
NOVEMBER	20	16.9%
DECEMBER	7	5.9%

3) BASED ON POPULATION GROUP

The largest number of cases was observed among farmers and agricultural workers, with 43 individuals impacted, representing 36.44% of the total. Shopkeepers constituted the subsequent most impacted category, with 17 cases (14.4%), followed by salesmen with 15 cases (12.7%). Students living in hostels reported 16 cases (13.5%), whereas 6 cases (5.08%) were documented among day scholars. Technicians comprised 9 cases (7.6%), and 12 unemployed people were also impacted, constituting 10.1% of the total cases. These data indicate a possible association between occupational exposure and environmental factors, including proximity to dense vegetation(table 4).

Table 4: Based on population group

BASED ON OCCUPATION	NUMBER OF PATIENTS Total number: 118	PERCENTAGE
Students staying in hostel	16	13.5%
Students as day scholars	6	5.08%
Farmers/ agricultural workers	43	36.44%
Salesman	15	12.7%
Shopkeeper	17	14.4%
Technicians	9	7.6%
Unemployed	12	10.1%

4) BASED ON FACTORS INFLUENCING OCCURANCE

The study revealed that 75% of the population reported sleeping on the floor, 69% had a history of residing near dense vegetation, 50% of the participants left windows open at night, and 10% slept with the lights on(table 5). It was shown that 12% of the population was influenced by the use of repellent (figure 8).

Table 5: Based on factors influencing occurrence

Factor	Number of patients	(%of population)
Dense vegetation	76	69%
Sleeping on the floor	89	75%
Windows open at night	59	50%
Sleeping with lights on	12	10%
Repellent use	14	12%

6) DISTRIBUTION BASED ON CLINICAL SIGNS

Our analysis revealed that the predominant findings were vesicles (96.6%), erythema (93.2%), and plaques (92.4%) (figure 2). Additional significant features comprised post-inflammatory hyperpigmentation (90.7%), papules (67.8%), and crusting (66.9%) (figure 5). Kissing lesions were detected in 27.1% of cases (figure 3), whereas pustules were noted in 23.7% (figure 1). A considerable proportion of patients exhibited excoriation (42.4%), ulceration (40.7%), and oozing (43.2%). Added observations, including macules (48.3%) and bullae (figure 4)(8.5%), underscored the diversity in clinical presentation.(figure 7)(table 6)

Table 6: Distribution based on Clinical Signs

Clinical presentaion	No. of Cases (Y)	Percentage (%)
Erythema	110	93.2%
Plaque	109	92.4%
Kissing lesions	33	27.1%
Excoriation	50	42.4%
Vesicle	114	96.6%
Pustule	28	23.7%
Crusting	79	66.9%
Ulceration	48	40.7%
Papule	80	67.8%
Macule	57	48.3%
Bullae	10	8.5%
Oozing	51	43.2%
Post-inflammatory hyperpigmentation	107	90.7%

TABLE LEGENDS:

Table 1: Distribution of Patients According to Age, Gender, Area, and Socio-economic Status
Table 2: Distribution based on symptoms
Table 3: Based on Seasonal variation
Table 4: Based on population group
Table 5: Based on factors influencing occurrence
Table 6: Distribution based on Clinical Signs

FIGURE LEGENDS

Figure 1:Pustular lesions

Figure 2:Plaque lesions with excoriation

Figure 3: Kissing lesions

Figure 4:Vesicular and bullous lesions

Figure 5: crusts with erythema

Figure 6 :graph based on factors influencing occurrence

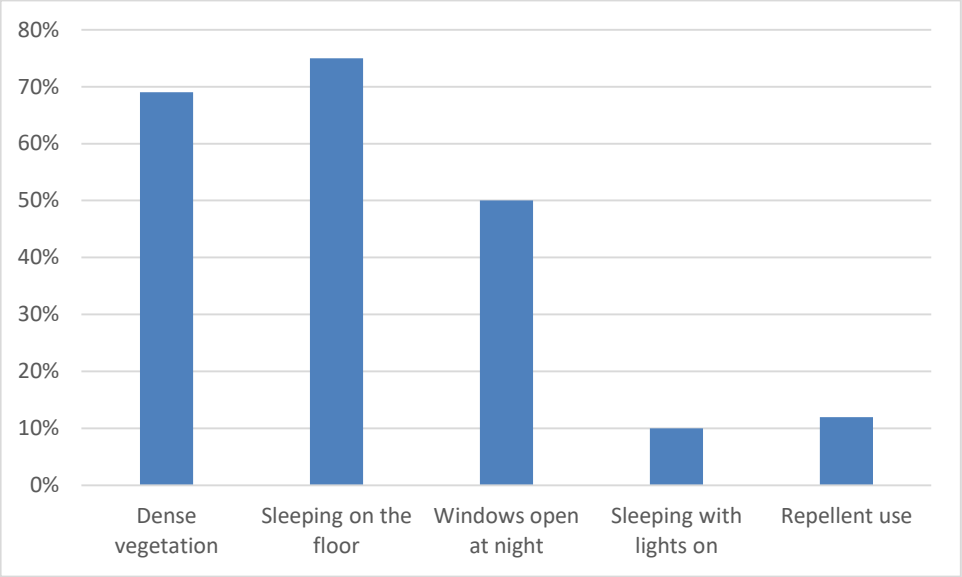
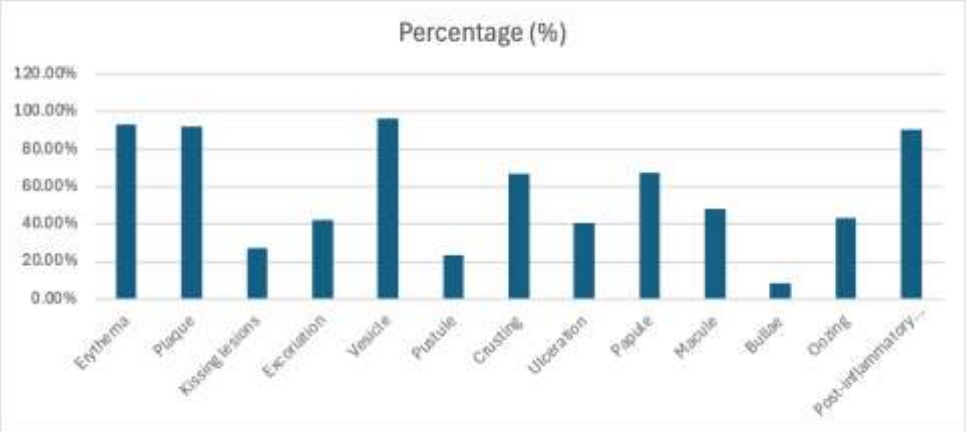


Figure 7: graph on distribution of Clinical Signs among patients



DISCUSSION

This descriptive study was conducted in the Dermatology OPD of a teaching hospital in Chengalpattu District from March 2024 to February 2025. It aimed to analyse the clinical characteristics and treatment outcomes of patients with PD.

Based on Distribution of Patients According to Age, Gender, Area, and Socio-economic Status

The most commonly affected age group in our study was 21–25 years, with a notable male predominance (63.3%). These findings are consistent with those reported by Pushpa Gnanaraj,[2] et al who observed a mean patient age of 23.4 years and a similar gender distribution (65% male, 35% female). Similarly, a study by P. Mohan [3]et al documented 56 confirmed cases of PD, comprising 32 males and 24 females. The majority of those patients (39 out of 56) fell within the 11–20 and 21–30 age groups, supporting existing literature that highlights increased prevalence of PD among younger individuals. This trend is likely attributed to greater outdoor activity and heightened exposure to beetle habitats during specific seasons .[3]

Residential distribution of cases in our study further reinforces environmental and epidemiological patterns, with 65.3% of cases reported from rural areas. This suggests a strong association between rural living—particularly in proximity to agricultural fields and dense vegetation—and increased risk of exposure to Paederus beetles. Such environments may provide optimal conditions for beetle breeding and thereby elevate the likelihood of human contact and subsequent dermatitis.

Based on symptoms of Paederus dermatitis

In our study, the majority of patients (72.03%) noticed lesions in the morning, with a burning sensation being the most common symptom (81.35%). The face was the most frequently affected site (68.6%). These findings align with Dr. P. Mohan's study[3]et al, which reported burning sensation and itching in 58.93% of cases, with the neck being the most commonly involved site (64.29%). In contrast, other studies observed the face as the most frequent site. Variations in clinical presentation may reflect differences in regional exposure patterns, behavioral factors, or local Paederus species distribution.

Based on seasonal variation

Our analysis of 118 patients with PD revealed a clear seasonal trend, with the highest number of cases occurring during the rainy months in Tamil Nadu. The peak incidence was observed in June (22.8%), followed by November (16.9%) and October (12.7%)—periods that align with the southwest and northeast monsoon seasons, respectively. This pattern suggests a strong correlation between increased humidity, rainfall, and the activity of Paederus beetles, which are known to thrive in moist environments. Moderate numbers of cases were seen in May (7.6%), July (8.4%), and December (5.9%), further supporting the association with the monsoon transition period. Fewer cases were reported during the drier months, particularly April (1.6%) and February (3.3%), indicating a seasonal influence on disease occurrence. These findings contrast with Dr. P. Mohan's study[3] et al, which reported 73.21% of cases between August and December, aligning with the post-rainfall period. .Chintagunta's[5] et al study reported recurrent outbreaks in November and December over three consecutive years, coinciding with the harvesting season—suggesting that agricultural activity and habitat specificity may influence disease incidence.Other regional studies have reported variable patterns: March to July in Orissa, April in South India, the post-monsoon season in Rajasthan, and July in Punjab[4]. These variations highlight the influence of geographic and climatic factors on the temporal distribution PD across different parts of India.

Based on population group

In our study, the highest number of PD cases occurred among farmers and agricultural workers, accounting for 43 cases (36.44%). This was followed by shopkeepers (17 cases, 14.4%) and salesmen (15 cases, 12.7%). Students residing in hostels represented 16 cases (13.5%), while day scholars had 6 cases (5.08%). Technicians comprised 7.6% of the cases, and 12 unemployed individuals were affected (10.1%). These findings suggest a potential association between occupation and environmental exposure, particularly in areas near dense vegetation.

This pattern aligns with the study by Pushpa Gnanaraj[2]et al, which found that the majority of cases were among students residing in hostels within 1 km of rice fields in Tamil Nadu, highlighting the role of environmental factors in the incidence of PD. Similarly, a study conducted in Sri Lanka by Muthuladchumy Vinobaba[9]et al reported that most affected individuals were students living in university hostels near paddy fields, further emphasizing the environmental exposure linked to the occurrence of PD.[7]

Based on factors influencing occurrence

The study revealed that 75% of participants slept on the floor, 69% lived near dense vegetation, and 50% left windows open at night. Additionally, 10% slept with lights on, and 12% reported being affected despite using repellents. These findings align with a study by Neelam Anupama[10] et al, which identified living in rooms with windows facing agricultural fields and the use of fluorescent lighting as significant risk factors for developing PD. In comparison, a study by Vijaysankar Palaniappan[8] et al involving 320 patients found that 34.3% of patients slept with windows open at night, while 60.6% slept on the floor prior to developing Paederus dermatitis. In contrast, only 1.5% of our patients used mosquito bed nets at night, and just 0.6% used insect-repellent creams.

Based on the clinical signs

Our study found vesicles (96.6%), erythema (93.2%), and plaques (92.4%) as the most common clinical features of PD along with post-inflammatory hyperpigmentation (90.7%), papules (67.8%), and crusting (66.9%). Less frequent findings included kissing lesions (27.1%), pustules (23.7%), excoriation (42.4%), ulceration (40.7%), oozing (43.2%), macules (48.3%), and bullae (8.5%). These results align with Akhila Kumaraguru's [6] et al study reporting erythema (100%), plaques (80%), and post-inflammatory pigmentation (92.1%), with burning sensation in 82% of patients. P. Mohan[3] et al noted erythematous linear plaques with or without vesicles (89.28%), while Pushpa Gnanaraj[2] et al described linear, geographic erythematous plaques with a "burnt" look, vesicles in 33.3%, pustules in 4.9%, and kissing lesions in 1.6%. Our findings underscore the varied clinical presentations of PD, emphasizing early diagnosis and management. The study from Chengalpattu highlights seasonal peaks during monsoon, higher rural prevalence, and environmental influences, confirming the importance of recognizing PD's distinct features in tropical regions.

LIMITATIONS:

Histopathology was not done.

CONCLUSION

PD remains a significant seasonal dermatological concern. The disease typically presents with acute-onset skin lesions accompanied by burning sensations, most commonly affecting exposed areas such as the face. Several modifiable risk factors—such as sleeping on the floor, open windows at night, and proximity to dense vegetation—contribute to increased exposure to Paederus beetles.

Preventive strategies play a critical role in reducing disease incidence. Simple measures like using bed nets, installing window screens, reducing vegetation near homes, and minimizing bright indoor lighting at night can effectively limit beetle entry and contact. Community education, especially in rural areas, is essential. Raising awareness about the identification of Paederus beetles, understanding their behavioral

patterns, and promoting basic protective habits can significantly mitigate the risk of exposure. Integrating these strategies into local public health initiatives and empowering community health workers to educate at-risk populations will be vital in reducing the burden of PD and improving overall skin health in vulnerable communities.

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