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Acid Fly or Paederus Dermatitis Among Foreign Medical Students Residing in Institutional Hostels in Rangpur, Bangladesh

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Abstract

Background:
Paederus dermatitis is a form of irritant contact dermatitis triggered by pederin, a toxin released when rove beetles are crushed against the skin. Outbreaks of this condition are frequently observed in residential institutions, particularly during rainy seasons.

Objective:
The study utilized line-listing to summarize cases by person, place, and time, supplemented by environmental walk-through assessments to identify risk factors.

Methods:
We performed a descriptive cross-sectional study of an outbreak among foreign medical students residing in three hostels at Rangpur Community Medical College (RCMC) in Bangladesh, covering the period from January to December 2025.

Results:
A total of 76 clinical cases and 79 attack episodes were identified. The majority of affected students were Nepalese (34/76) and Indian (33/76), and female students accounted for 40 of the 76 cases. Clustering was evident at the room level, with 13 rooms reporting two or more cases, and 91.1% (72/79) of attack episodes occurred during the monsoon months of July and August. Among 74 cases with available risk-factor data, the most frequently documented associated factors were seasonal occurrence during the monsoon (72/74, 97.3%), sleeping with windows open (59/74, 79.7%), shared exposure within rooms (49/74, 66.2%), crushing the insect on the skin (48/74, 64.9%), and bed placement near windows (42/74, 56.8%).

Conclusion:
The outbreak demonstrated strong seasonality and room-level clustering. Preventing future occurrences requires synchronized environmental management and student awareness strategies intensified during the monsoon.

Keywords: Paederus dermatitis, foreign medical students, hostel, Bangladesh.

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Introduction:

Paederus dermatitis, also known as "acid fly" dermatitis or dermatitis linearis, is an acute irritant condition resulting from skin contact with pederin, a potent vesicant released when a beetle of the genus Paederus is brushed or crushed on the body. Clinical lesions typically appear within hours of exposure, presenting as vesicles, bullae, or erythematous plaques, often on exposed skin surfaces.[1-4] It's also observed that post-inflammatory hyper-pigmentation following these lesions can persist for several weeks.[4] These beetles are widely distributed across subtropical and tropical regions. Outbreaks are commonly reported during humid, warm, and rainy seasons[5] and are exacerbated by factors such as the insects' attraction to artificial light, the presence of vegetation near sleeping quarters, and high-rise

accommodations.[6-8] While Bangladesh possesses climatic and agricultural conditions that favor Paederus proliferation, peer-reviewed documentation of outbreaks in institutional residential settings remains rare.[6] Reported environmental and behavioral risk factors include bright artificial lights at night, open windows near light sources, defective window or door screens, upper-floor or well-ventilated rooms that permit insect entry, nearby vegetation and agricultural land, damp organic debris around buildings, and crushing the beetle on the skin rather than brushing it away.[6-10,13,15] These factors can substantially increase exposure in residential institutions during the monsoon season. This study investigated a cluster of clinically diagnosed cases among foreign medical students at Rangpur Community Medical College (RCMC) hostels to characterize the outbreak and identify practical preventive strategies.

Methods:

This cross-sectional descriptive study was conducted involving foreign BDS and MBBS students living in three multi-story hostels (Ranga, Hakim, and Shahid) affiliated with Rangpur Community Medical College (RCMC) Hospital, Rangpur, Bangladesh. The study analyzed 76 cases of clinically diagnosed Paederus dermatitis between 1 January and 31 December 2025. The hostels are concrete multi-storey blocks, Corridors and rooms are illuminated with bright fluorescent tube lights and other artificial lighting in the evening and at night, and many windows lack intact insect-proof screening situated near peri-urban and mixed residential areas surrounded by agricultural land and vegetation suitable for Paederus proliferation.[6-10] A case was defined as any foreign medical or dental student residing in the specified hostels during the study period who developed acute irritant dermatitis clinically consistent with Paederus exposure. Clinical consistency included linear or streaky erythema accompanied by pustulation, vesiculation, or a burning sensation, as diagnosed by a dermatologist of Rangpur Community Medical College Hospital. A line list was compiled using clinic documentation, hostel records& structured risk-factor summary sheet. Variables analyzed included sex, nationality, hostel, academic batch, room number, month of onset, and history of recurrence. Associated environmental and behavioral factors available in the raw dataset included seasonal occurrence, bed near window, lack of bed net, sleeping with window open, room facing vegetation or open field, insect crushed on the skin, floor sleeping, and shared exposure. The investigation team performed walk-through inspections of the hostel premises. These assessmentsfocused on night-time lighting in rooms and corridors, the condition of door and window screens, ventilation openings, housekeeping practices, and proximity to drainage or damp organic debris. Informal interviews were conducted with hostel staff and residents regarding insect sightings and lighting habits. One live insect specimen was captured from the environment and presumptively identified as Paederus based on external morphology.[5,13] Descriptive statistics (percentages and counts) were used to summarize cases by person (sex, nationality), place (batch, hostel, room clustering), and time (month of attack)and associated risk factors.

Results:

During the study period, 76 cases of clinically diagnosed Paederus dermatitis were recorded. As shown in Table-1, students from Nepal (44.7%) and India (43.4%) comprised the majority of cases. Females accounted for 52.6% (40/76) of the total cases.

Cases were reported across all three hostels. Batch information was available for 74 cases, with the 14th, 15th, and 16th batches accounting for the majority (89.2%) of affected students. Batch wise distributions are summarized in Table-II. Two cases (2.6%) had missing batch information and are not included in this table.

Clustering at the room level was evident. Out of 48 total rooms affected, 22 rooms reported two or more cases. The highest concentration was in Room 506 of Ranga Hostel, which reported four cases. Room-level clusters are summarized in Table-III.

Table-I: Distribution of cases by nationality and sex (N=76)

Nationality	Male (n)	Female (n)	Total no. (%)
Indian	17	16	33(43.4)
Nepalese	19	15	34(44.7)
Bhutanese	0	9	9(11.8)
Total	36	40	76(100)

Table-II: Distribution of cases by academic batch and hostel (N=74)

Batch	Ranga Hostel (n)	Hakim Hostel (n)	Shahid Hostel (n)	Total no. (%)
11th MBBS	0	3	0	3(3.9)
12th MBBS	6	0	0	6(7.9)
13th MBBS	8	2	0	10(13.2)
14th MBBS	3	2	6	11(14.5)
15th MBBS	8	4	0	12(15.8)
16th MBBS	8	13	0	21(27.6)
17th MBBS	2	4	0	6(7.9)
24th MBBS	1	0	0	1(1.3)
25th MBBS	3	0	0	3(3.9)
BDS	1	0	0	1(1.3)
Total	40	28	6	74(97.4)

Table-III: Rooms with two or more cases and associated batches (N=74)

Hostel	Room Number	Number of Cases	Affected Batches
Ranga	506	4	BDS, 15th, 16th, 24th
Ranga	204	3	12th, 16th
Ranga	405	3	13th, 16th, 17th
Ranga	606	3	25th
Ranga	201	2	13th
Ranga	203	2	15th, 16th
Ranga	404	2	13th, 14th
Ranga	503	2	15th
Ranga	508	2	15th
Hakim	206	2	16th
Hakim	207	2	16th
Hakim	605	2	11th, 16th
Hakim	704	2	16th
Hakim	705	2	16th
Hakim	707	2	16th
Hakim	708	2	16th, 17th
Hakim	801	2	15th, 17th
Hakim	802	2	15th
Hakim	805	2	14th
Hakim	806	2	13th, 17th
Hakim	901	2	16th
Shahid	402	2	14th

Analysis of the timing of attacks revealed a sharp seasonal pattern. A total of 79 attack episodes were recorded (including recurrences). As shown in Table-IV, the outbreak peaked intensely during the monsoon season, with 91.1% (72/79) of episodes occurring in July and August. Dates of first attack were available for 74 of 76 cases. The earliest recorded case occurred on 8 January 2025, followed by sporadic cases in March, May and June. A modest increase was observed in July (13 first attacks), but a pronounced surge occurred in August (59 first attacks).

Table-IV: Month-wise distribution of recorded attack episodes (N=79)

Month	no. (%)
January	1(1.4)
March	1(1.4)
May	1(1.4)
June	1(1.4)
July	13(17.6)
August	59(79.7)
October	1(1.4)
November	1(1.4)
December	1(1.4)
Total	79(100)

During the environmental assessment, one live rove beetle specimen consistent with the genus Paederus was captured inside the hostel premises, supporting the suspected outbreak agent. No laboratory confirmation of pederin exposure was performed.

Risk-factor information was available for 74 cases. Seasonal occurrence during the monsoon was the most frequent associated factor, identified in 72 cases (97.3%). Other commonly reported factors were sleeping with window open in 59 cases (79.7%), shared exposure in 49 cases (66.2%), insect crushed on skin in 48 cases (64.9%), and bed near window in 42 cases (56.8%). Lack of bed net was documented in 29 cases (39.2%), while room facing vegetation/open field and floor sleeping were reported in 18 (24.3%) and 14 (18.9%) cases, respectively. The distribution of associated environmental and behavioral risk factors is shown in Table-V.

Table-V: Distribution of associated risk factors among cases (N=74)

Risk factors	no. (%)
Seasonal Occurrence	72(97.3)
Sleeping with window open	59(79.7)
Shared Exposure	49(66.2)
Insect Crushed on Skin	48(64.9)
Bed near window	42(56.8)
Lack of bed net	29(39.2)
Room facing vegetation/open field	18(24.3)
Floor sleeping	14(18.9)

Note: Multiple responses were possible. Percentages were calculated using 74 cases with available risk-factor data.

Discussion:

This investigation documents an institutional outbreak of clinically diagnosed Paederus dermatitis among foreign medical students in northern Bangladesh. The outbreak showed a clear temporal concentration during the monsoon period and substantial clustering within specific rooms, indicating that both seasonal environmental conditions and localized residential exposure played important roles. These observations are consistent with previous reports from hostels and residential institutions in South Asia and globally. In the present study, the marked concentration of cases and attack episodes during the monsoon supports the established ecological association between rainy humid periods and increased beetle activity around human dwellings.[6,8-10,15,16]

The risk-factor distribution provides a clearer picture of the exposures commonly present among affected students. Seasonal occurrence during the monsoon was the most prominent associated factor, identified in 97.3% of cases. This finding is compatible with the known ecology of Paederus beetles, which proliferate during warm and humid rainy months and are more likely to enter residential buildings during such periods. Sleeping with windows open was reported in 79.7% of cases and bed near window in 56.8%, suggesting that nocturnal beetle entry into sleeping spaces was an important route of exposure. This interpretation is supported by previous studies. In the Kerala hostel outbreak, bright illumination at night, higher floors, open doorways, and unscreened windows were described as important risk factors for insect entry into dwellings.[9] Similarly, the Sikkim case-control study linked the outbreak to heavy rainfall, dense surrounding vegetation, fluorescent lights, and inadequate window screening.[15]

Comparison with published reference values also shows that the behavioral profile of the present outbreak is highly plausible. In our study, 64.9% of affected students reported crushing the insect on the skin. This is very close to the value reported by Toppo et al in central India, where 65.7% of affected hostel residents gave a history of contact in the form of crushing or brushing the insect.[8] The Sikkim case-control study provided even stronger analytic evidence, showing that crushing the insect was independently associated with disease with an adjusted odds ratio of 19.37 (95% CI: 5.72-80.91). The same study found that keeping lights on after 10 pm and not clearing insects from the bed before sleeping were also independently associated with becoming a case.[15]

Shared exposure was documented in 66.2% of cases, reinforcing the room-level clustering demonstrated elsewhere in the Results. This pattern suggests that exposure was not random, but related to common micro-environmental conditions within particular rooms, such as lighting, airflow, window position, and proximity to surrounding vegetation. Similar clustering has been described in hostel-based outbreaks from India and Malaysia, where room location and shared living conditions influenced exposure risk.[8-10,16]

Other associated exposures in the present study, including lack of bed net (39.2%), room facing vegetation or open field (24.3%), and floor sleeping (18.9%), were less frequent but remain epidemiologically relevant. These factors were likely contributory rather than primary, acting in combination with the more dominant drivers of seasonality, window-related exposure, and crushing behavior. In the Sikkim study, non-use of mosquito nets was common in both cases and controls and was not identified as an independent risk factor, suggesting that bed-net status alone may be less important than the broader residential exposure setting.[15]

While no severe systemic outcomes were recorded and most cases were managed clinically, the outbreak affected student well-being and hostel

functioning. The presence of repeat episodes further suggests that exposure risks may persist unless environmental and behavioral drivers are addressed. As this study was descriptive, the identified factors should be interpreted as associated exposures rather than independent predictors; however, their consistency with previous outbreak investigations adds strength to their probable epidemiologic importance.[6,8,9,15,16]

Limitations:

Several limitations must be acknowledged. First, the study was descriptive and lacked a comparison group, so the reported factors should be understood as associated exposures among cases rather than independent causal predictors. Second, risk-factor information was available for 74 cases, not all 76 clinically diagnosed cases. Third, entomological confirmation relied on a single captured specimen without specialist identification or laboratory confirmation. Despite these limitations, the study provides an important operational description of an institutional outbreak and identifies several modifiable environmental and behavioral factors.

Conclusion:

Paederus dermatitis can lead to disruptive outbreaks in educational residential institutions, particularly during the monsoon months. This outbreak among foreign medical students in Rangpur demonstrated strong seasonality, room-level clustering, and frequent exposure to modifiable environmental and behavioral factors such as open windows during sleep, bed placement near windows, shared room exposure, and crushing insects on the skin. Sustainable prevention requires a combination of improved physical barriers, reduced night-time light attraction, student awareness, and routine environmental management around hostel premises. Prevention strategies should focus on reducing insect attraction by using low-attractant lighting and minimizing unnecessary night-time lighting. Physical barriers must be improved by repairing screens and sealing cracks. Environmental management should include trimming vegetation and removing organic debris near buildings. Furthermore, student education is critical; residents should be advised to wash exposed skin immediately if contact occurs and to blow or flick insects away rather than crushing them.

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