

# Nairobi Eye: A Clinico-epidemiological Study from A Tertiary Care Center of Central Nepal

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## ABSTRACT:

**Introduction:** Periocular paederus dermatitis (Nairobi eye) is characterized by erythematous vesiculo-bullous linear plaque with stinging sensation. It commonly occurs during rainy season. It has been described in people living near agricultural fields due to the potential toxin pederin. This study aims to evaluate the demographic profile and clinical presentation of patients with periocular paederus dermatitis in a tertiary care center. **Methods:** This was a descriptive, cross-sectional study evaluating patients attending dermatology and/or ophthalmology department with features consistent with paederus dermatitis involving periocular area from June to August, 2019. Relevant demographic and clinical data were obtained; clinical photographs were taken and histopathology performed among selected patients. **Results:** A total of 24 (14.8%) patients had features of Nairobi eye among 162 patients of paederus dermatitis. Majority of the patients were males (1.4:1) with mean age  $29.08 \pm 13.38$  years. The peak time of presentation was the first week of July (37.5%). Mean time period between onset of symptoms and presentation was  $3.41 \pm 2.01$  days. The lesions were unilateral in all cases, with predominant involvement of the right eye (62%). Burning sensation (80%) and itching (60%) were the predominant symptoms while conjunctival hyperemia (41.6%), seropurulent discharge (20.8%) and chemosis (16.6%) were the ocular findings. Most of the patients ( $n=17$ , 70.8%) noticed the lesion while waking up in the morning. **Conclusion:** The finding of the present study has shown that Nairobi eye is a common presentation during rainy season. Periocular findings with significant intraocular signs were documented to be presenting features among patients with periocular paederus dermatitis.

**Keywords:** Dermatology, Nairobi eye, Paederus dermatitis, Pederin

## INTRODUCTION

Paederus dermatitis (PD), also known as “rove beetle dermatitis”, “dermatitis linearis” or “whiplash dermatitis” is an acute irritant contact dermatitis to a toxin called pederin found in the insects of family *Paederus*.<sup>[1,2]</sup> It presents with linear erythematous, vesiculo-bullous lesions involving the exposed areas with stinging or burning sensation.<sup>[3]</sup> One of its common presentations is periorbital dermatitis

or related ocular findings; also known as “Nairobi Eye”.<sup>[4]</sup>

There are more than 600 species of *Paederus* beetle worldwide.<sup>[5]</sup> These insects commonly live in agricultural fields and grow in wet rotting leaves so that its population increases more during rainy and harvesting seasons. They are attracted to artificial lights which bring them to household.<sup>[6,7]</sup> Humans are exposed to toxin pederin when beetle are crushed or smeared across the skin.<sup>[8]</sup> Secondary lesions on eyes are usually produced by the individual touching these areas after crushing the insect.<sup>[5,9]</sup>

PD involving periorbital region (Nairobi

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eye) is fairly common in subtropical region like ours. There are limited data regarding periocular-PD or its clinical patterns from Nepal. The objective of this study was to evaluate the demographic profile and various clinical presentations of PD involving the periocular region.

**METHODS:**

This was a descriptive, cross-sectional study involving the patients presenting with clinical findings suggestive of periorbital PD attending the department of Dermatology and/or Ophthalmology of Dhulikhel Hospital Kathmandu University Hospital, from June to August 2019. A total of 162 patients with clinical features of PD including 24 patients of periocular PD was included in the study using purposive sampling method. Patients with chronic history of allergy/atopic eczema with periocular involvement were excluded from the study. After approval from the institutional review board (IRB: 43/19) and with informed consent from patients or their guardian, demographic data were recorded. Detailed cutaneous and ophthalmological examinations were done and clinical photographs were documented. Furthermore, selected cases of PD providing consent for biopsy were subjected to biopsy from trunk area (extraocular PD lesions) and histopathological evaluation was performed for academic interest. For all statistical analyses, the Statistical Package for Social Sciences (SPSS™) version 20.0 statistical software package (SPSS Inc, Chicago, IL, USA) was used.

**RESULTS:**

During the study period, a total of 162 patients presented with clinical features suggestive of PD. A total of 24 (14.81%) patients clinically diagnosed with PD had periocular features. Regarding periocular PD, majority of patients were male (1.4:1). The age range was 12-59 years with mean age of presentation 29.08±13.38 years (Figure 1). Most of the patients were students (42%) followed by farmers (25%) and servicemen (17%).

The peak time of presentation between the time period of June to August was the first week of July (37.5%). The mean time period between onset of symptoms and presentation was 3.41±2.01 days (range: 1-7 days). Seventeen patients (70.8%) noticed the lesion involving periocular area while waking up in the morning (Figure 2).

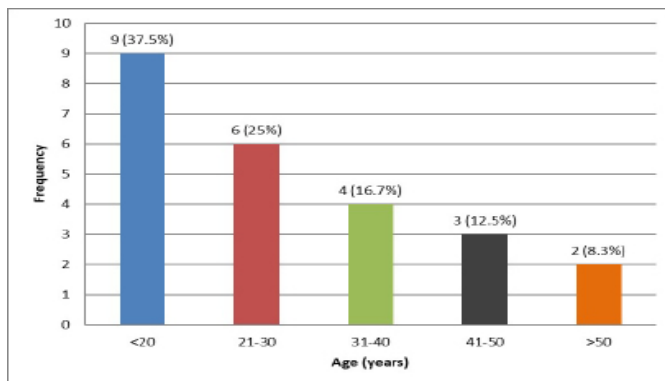


Figure 1: Age Distribution of Patients with Periocular Paederus Dermatitis.

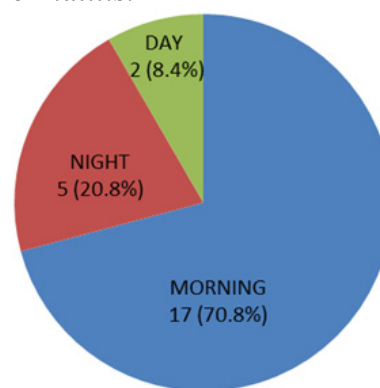


Figure 2: Time of Noticing Skin Lesions.

In the present study, lesions of periocular PD were unilateral in all cases, predominantly involving the right eye (62%). Burning sensation (83.3%), itching (58.3%) and foreign body sensation in eye (33.3%) were the predominant symptoms (Figure3).

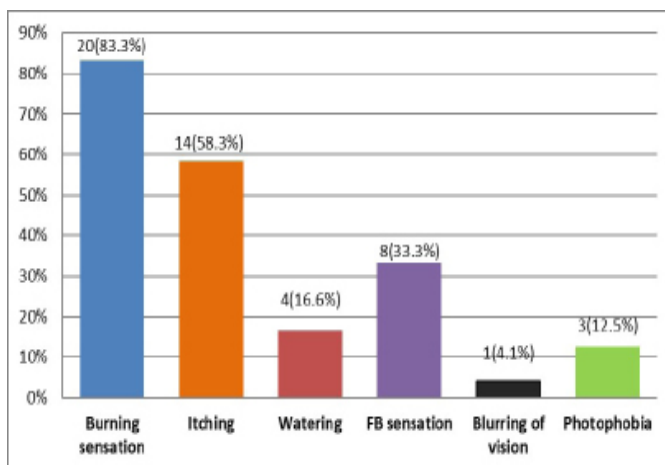


Figure 3: Frequency of Symptoms of Periocular Paederus Dermatitis (multiple response).

Common periocular examination findings were linear erythematous plaques with eyelid swelling (66%), vesicles (50%) and pustules (41.6%) (Figure-4). Table 1 represents the variety of periocular clinical findings. On intraocular examination, ten patients (41.6%) had conjunctival

hyperemia, five (20.8%) had discharge and four (16.6%) had conjunctival chemosis (Table 2). A total of 20 (83.33%) patients had significant intraocular signs.



Figure 4: Clinical Images of Patients with Nairobi Eye, Showing Linear Erythematous Papulo-Vesicular Plaques.

Table 1. Periocular Clinical Features and Their Frequency (n=24) (multiple response).

Periocular clinical features	Frequency (%)
Erythema	22(91.6%)
Lid swelling	16(66%)
Vesicles	12(50%)
Crusts	11(45.8%)
Pustules	10(41.6%)
Skin erosion	8(33.3%)
Matting of eye-lashes	6(25%)

Table 2. Intraocular Findings and Their Frequency (n=24).

Intraocular findings	Frequency (%)
Conjunctival hyperemia	10 (41.6%)
Discharge	5 (20.8%)
Conjunctival chemosis	4 (16.6%)
Corneal epithelial defect	1 (4.1%)
Anterior chamber reaction	0 (0%)

Biopsy was performed from a clinical lesion of PD from the interscapular area which showed non-specific findings of spongiosis, foci of vacuolar degeneration of basal layer, exocytosis of neutrophils in epidermis with dense perivascular neutrophilic and lymphocytic infiltrate with inflammation in the interstitium (Figure 5). Species identification of the beetle could not be done.

**DISCUSSION:**

The clinical presentation of PD usually depends on the area of residence as proximity of nearby farming areas. It also depends on the health care seeking behavior of the patients. It can affect population of any age group. The present study has shown slight male predominance. Similar to the study by Prasher P et al., all of the cases in this study presented during the monsoon season, during which the beetle gets dispersed from agricultural fields. [8]The beetles are then attracted by the fluorescent light inside the houses and patients wake up at night with unexplained lesion when the beetles are crushed reflexly during the sleep or position change as they come in contact with its toxic hemolymph.

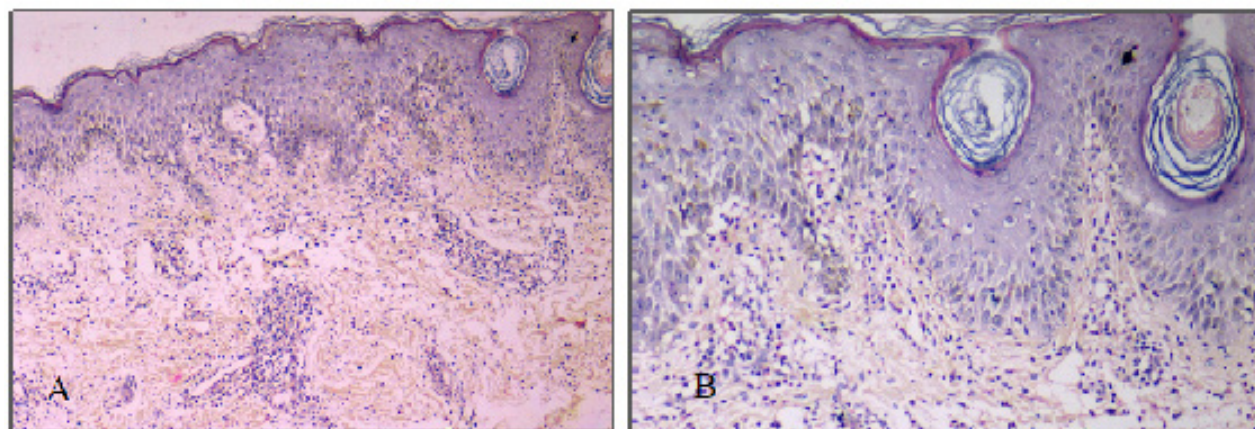


Figure 5: Histopathological Images Showing Orthokeratosis, Mild Spongiosis, Follicular Plugging, Foci of Vacuolar Degeneration of Basal Layer, Exocytosis of Neutrophil in Epidermis with Dense Perivascular Neutrophilic and Lymphocytic Infiltrate with Inflammation in the Interstitium (Hematoxylin and Eosin Staining; Figure 5A: 10X Magnification, Figure 5B: 40X Magnification).

[10] Moisture during rainy season remains a key factor for the survival of the beetle and poses significant threat to farm related occupations.[11] Possibly for this reason, 71% of the patients in the present study noticed the periocular findings during the morning time. For this reason it is also known with eponymous names like “wake and see disease”, “rove beetle blistering” and “night burn”.[2,10]

Characteristic clinical manifestation is linear erythematous plaque with overlying papulo-vesicular eruptions associated with itching and burning sensation frequently involving the exposed part of the body.[12,13,14] Most of the patients in the current study presented with similar findings involving the periorbital area. As periorbital area is a common exposed part during sleep and has multiple rugosities, it is a common area for deposition of the toxin, pederin.[8] In a case report from Nepal, one of the authors deliberately rubbed the pederin beetle into his forearm and observed series of changes ranging from erythematous papule with slight itching after 12 hours later progressing to form vesicle on the third day and subsequently pustule on the fourth day.[14] Concomitant similar lesions on other body parts, linear vesicles containing pus or affected family members of same duration could support the diagnosis of PD.[15]

Ocular involvement in Nairobi eye occurs due to transfer of toxin pederin to eyes and may mimic preseptal cellulitis.[16] It commonly causes keratoconjunctivitis with unilateral involvement and presents frequently with redness, eyelid swelling, discharge, foreign body sensation and watering.[8,16] The toxin pederin cannot penetrate cornea and conjunctiva hence the damage is limited to these structures only.[12] The most frequent findings in this study were conjunctival hyperemia, eyelid swelling and discharge which were consistent with the findings of study by Prasher P et al.[8]

The diagnosis of Nairobi eye is straightforward due to its typical presentation. However in some cases it may be confused with various other dermatological conditions like herpes zoster and simplex, phytophotodermatitis, impetigo, millipede dermatitis, dermatitis artefacta, preseptal cellulitis or infective conjunctivitis.[5,9,12] Histopathology is performed less frequently due to typical clinical presentation and involvement of site of cosmetic concern but in the cases of diagnostic confusion, it can aid in the diagnosis. Typically described

histopathological findings include spongiosis with neutrophilic infiltrate progressing to confluent necrosis of epidermis and dermal perivascular infiltrates consisting mainly mononuclear cells.[9,12]

A single center study for a limited period of time are possible limitations of this study. Further, observer bias could have been a confounding factor.

#### CONCLUSION:

Periocular findings were documented to be a significant presenting feature among patients with pederin dermatitis. Significant intraocular findings were also documented among this subset of patients. Complications and improper management may ultimately lead to blindness. Thus awareness among health care professionals especially ophthalmologists and dermatologists may lead to timely diagnosis, screening of complications and effective management.

**Conflict of Interest:** The authors declare that no competing interests exist.

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