

## CASE REPORT



# Tungiasis in a Boarding School Adolescent: A Case Report and School Health Response in Makurdi, Nigeria.

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## Abstract

**Background:** Tungiasis is a parasitic skin infestation caused by *Tunga penetrans*. Though self-limiting, it is painful, disfiguring, and may result in complications such as bacterial infection, cellulitis, or tetanus. It mostly affects school-aged children, especially those in resource-poor settings. Addressing tungiasis through prevention, early detection, and appropriate treatment is therefore needed to reduce morbidity, prevent avoidable complications, and improve health and well-being.

**Case Presentation:** A 15-year-old boarding student presented with recurrent tungiasis affecting the plantar surface of his right foot. He had a previous history of having walked on barefoot and the presence of dusty hostel floors in his boarding school. Examination showed he had six burrows on the plantar surface of his right foot. Non-surgical management with topical potassium permanganate and loratadine provided symptomatic relief. A school-health intervention was done at his boarding school, where other students were screened, and those who had similar lesions were treated. The staff and students were given health education, and environmental changes were recommended.

**Discussion:** This case illustrates tungiasis in Nigerian adolescents and highlights risk factors such as dusty hostel floor and barefoot exposure. It also emphasises the role of integrated individual treatment and community-level interventions, including school health programs and environmental sanitation.

**Conclusion:** Tungiasis is a neglected but poorly recognised and under-reported tropical disease in Nigeria. Effective prevention requires coordinated clinical management, health education, footwear promotion, and structural improvements in the environments.

**Keywords:** Tungiasis, Adolescents, Boarding schools, Neglected tropical diseases, School health

## Introduction

Tungiasis, caused by the sand flea *Tunga penetrans*, is a neglected tropical skin disease of public health importance in endemic areas, including Nigeria, which is largely unrecognised and underreported. It mostly affects school-aged children, causing school absenteeism and reduced quality of life. The flea penetrates the epidermis, enlarges as it feeds on blood, and lays eggs before dying in situ.<sup>1,2</sup>

Lesions are typically painful and pruritic, and repeated infestations may lead to chronic morbidity. Although the disease is self-limiting, severe complications such as bacterial superinfection, cellulitis, tetanus, and gangrene may occur.<sup>3,4</sup>

The burden is highest among the poor, children living in rural or peri-urban communities with sandy soils, dusty house

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floors, poor sanitation, and animal reservoirs.<sup>5-7</sup> Boarding schools in endemic regions are particularly vulnerable because of overcrowding, dusty floors, and limited student autonomy over hygiene.<sup>8,9</sup> Despite this, tungiasis is under-reported and rarely included in neglected tropical disease (NTD) control programs.

This case describes tungiasis in a boarding school adolescent in Makurdi, Nigeria, and illustrates the school-health response implemented after the index case.

### Case Presentation

A 15-year-old male presented to a private hospital, Makurdi, with a two-week history of painful, itchy burrows beneath his right foot. He frequently walked barefoot within his hostel and on sandy playgrounds. Hostel floors were dusty and not cemented. He reported a similar episode one year earlier, and his skin lesions were treated surgically with a good outcome. He reported that several of his classmates had similar lesions. His family lived in a three-bedroom apartment with a tiled floor and concrete-paved surroundings. There were no similar lesions in his siblings.

On examination, the patient was clinically stable and appeared well nourished. Inspection of the right plantar surface revealed six discrete burrows characterised by hyperkeratotic margins and central dark points. There were no signs of secondary bacterial infection, including pus formation, surrounding cellulitis, or regional lymphadenopathy. Based on these findings, a provisional diagnosis of tungiasis was made, while plantar warts and cutaneous larva migrans were considered as differential diagnoses.

The patient was counselled on the nature of the condition and the available treatment options, including surgical extraction and non-surgical approaches such as topical applications. He opted for non-surgical management and was treated with topical potassium permanganate applied twice daily for one week, alongside loratadine 10 mg daily for five days to alleviate pruritus. He was also advised on the importance of good foot hygiene and consistent use of footwear, and a follow-up visit was scheduled one week later. At follow-up, the patient was well, with complete resolution of itching. Examination of the right plantar surface showed good healing at the sites of the previous lesions, absence of dark points, and mild desquamation of the surrounding skin. The patient expressed satisfaction with the non-surgical treatment. He acknowledged that he and his peers frequently walked barefoot due to dusty hostel conditions and discomfort with shoes. In addition, the patient's school principal was contacted, informed of the diagnosis and the need for a school health visit; consent was obtained, and the visit was scheduled for two weeks thereafter.

A medical team comprising a medical doctor and two nurses conducted a school health visit to the boarding school. During the visit, 1,300 students were screened for tungiasis and other skin lesions; 400 had skin lesions, of which 350 were tungiasis. Of the 350 cases with tungiasis, 300 were placed on topical treatment and oral loratadine, while 50 opted for referral to their primary care providers. The 50 students out of 400 with uncertain skin lesion diagnoses were referred to the dermatologist. In addition, students and staff were educated on hygiene, footwear, and regular foot inspection. Furthermore, the school authorities were tasked

with implementing sustained preventive measures, including cementing hostel floors, instituting routine cleaning, covering sandy playgrounds with grass, limiting barefoot exposure, and incorporating tungiasis awareness into the health curriculum.

### Discussion

This case demonstrates both the clinical burden and environmental determinants of tungiasis among adolescents in low-resource settings. The repeat infection in the same student suggests ongoing environmental exposure and underlines the importance of preventive strategies, as was executed in the care of the patient. The clustering of the disease among other students is consistent with reports of small outbreaks of tungiasis in school adolescents.<sup>5,8</sup> Barefoot walking, dusty floors, and sandy playgrounds, as seen in this case, are the key risk factors for tungiasis<sup>6,7</sup> underscoring this condition as a disease of low socio-economic settings. Although not implicated in this case, animal reservoirs such as dogs and pigs are well-documented as reservoirs.<sup>8</sup>

The differential diagnoses considered in the index patient included plantar warts and cutaneous larva migrans. However, the presence of characteristic burrows with central black dots and environmental history supported tungiasis. In addition, the patient had a previous skin lesion in which the causative organism was surgically extracted.

Surgical extraction is definitive but carries the risk of secondary infection if performed in non-sterile conditions.<sup>10</sup> Although the patient received surgical extraction during the previous presentation, he declined it because he was afraid of surgery despite reassurance that the procedure was safe. Non-surgical treatment with potassium permanganate, neem oil, and dimeticone, are safe, affordable, and effective alternative in low-resource contexts, as was seen in this case.<sup>11,12</sup> This is in line with the patient-centred care approach. Given ongoing environmental exposure and the presence of tungiasis among other students, a holistic and patient-centred care approach requires more than clinical treatment. School-based health interventions such as cement flooring of hostels, routine screening, and footwear promotion would reduce transmission substantially.<sup>13</sup> Additionally, incorporating tungiasis education into broader school health curricula in the affected schools will enhance long-term prevention. These were highlighted during the school-based health interventions.

In spite of recognition as a neglected tropical skin disease (NTD) by the WHO<sup>14</sup>, tungiasis is often overlooked by national NTD programs. This omission perpetuates its burden among vulnerable groups like school children.

Aside from individual case management, physicians need to recognise tungiasis as a disease that points to the existence of environmental neglect and socio-economic deprivation. They should advocate for control measures in schools and communities, insisting that interventions address the root causes of recurrence, and not just render clinical treatment alone.

### Conclusion

This case highlights the importance of combining individual case treatment with preventive community-level measures. Effective prevention requires synergy among all

stakeholders, such as healthcare providers, educators, and policymakers, to ensure that footwear promotion, environmental sanitation, and health education are prioritised. The role of the primary care physician as a clinician and an advocate was well demonstrated.

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## Authors' contribution

MSC, OBO, and OMN jointly managed the patient. MSC wrote the initial draft of the manuscript. OBO conducted the school health response, while all authors contributed to the literature search, refining the manuscript, and participating in discussions and overall revision for academic content. OMN supervised the management and provided overall guidance. All authors critically reviewed and approved the final version of the manuscript. All authors had final responsibility for the decision to submit the manuscript for publication.