

Jigger Infestation in Kenya and Treatment Innovation

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Abstract

Jigger infestation, medically referred to as tungiasis and caused by the sand flea *Tunga penetrans*, is a neglected parasitic disease affecting vulnerable populations in Kenya and other parts of sub-Saharan Africa. The condition is characterised by the penetration of gravid female fleas into the skin, most commonly affecting the feet. The associated morbidity includes pain, inflammation and secondary bacterial infections, as well as social consequences, such as stigma, school absenteeism and reduced economic productivity. Government and civil society estimates suggest that a substantial number of Kenyans are affected, with children, older persons and individuals living in poverty bearing a disproportionate burden.

In response to this public health challenge, the Government of Kenya developed the National Policy Guidelines on the Prevention and Control of Jigger Infestations to provide a coordinated, multi-sectoral framework for prevention and management. This article reviews the epidemiology and public health importance of tungiasis in Kenya and outlines the national policy framework and key implementation strategies. It also discusses emerging programmatic treatment innovations that aim to strengthen safe community-level management in alignment with Sustainable Development Goal 3.3 on neglected tropical diseases.

Introduction

Tungiasis is a parasitic skin disease caused by the sand flea *Tunga penetrans*. The disease predominantly affects populations living in resource-limited environments in which housing conditions, environmental hygiene and access to preventive measures are inadequate. In endemic areas, transmission is strongly associated with poverty, earthen floors, dusty surroundings and limited use of protective footwear.

Although tungiasis rarely causes life-threatening complications, the disease causes substantial suffering due to persistent pain, inflammation, itching and difficulty walking. In chronic or untreated cases, secondary bacterial infections, nail deformation, ulceration and tetanus may occur. Beyond physical morbidity, affected individuals often experience social stigma, exclusion and psychological distress, particularly among school-aged children.

Despite its prevalence in many African settings, tungiasis has historically received limited attention within national health planning and global neglected tropical disease (NTD) frameworks.

Life Cycle and Transmission Dynamics

The life cycle of *Tunga penetrans* includes both parasitic and off-host developmental stages. Once the gravid female flea has penetrated the epidermis of the human host, it enlarges and releases eggs over several days. These eggs fall into dry soil, where larvae and pupae develop under warm environmental conditions.

Human infection occurs primarily through direct contact with contaminated soil, especially when individuals walk barefoot. Transmission is therefore closely linked to environmental exposure, housing quality and socio-economic vulnerability. Domestic animals, such as dogs, cats, pigs and goats, may serve as reservoir hosts, contributing to persistent household transmission in endemic settings.

These characteristics highlight that tungiasis is shaped largely



by environmental and social determinants rather than biological susceptibility.

Burden and Public Health Importance

Tungiasis remains widely prevalent in many parts of Kenya, particularly in rural and marginalised communities. Although comprehensive national prevalence surveys are limited, reports from government agencies, academic studies, and civil society organisations consistently identify the disease as a significant public health concern.

Children are disproportionately affected due to frequent barefoot exposure and prolonged contact with contaminated soil. Recurrent infestation may impair mobility and contribute to school absenteeism and reduced participation in learning activities. In adults, tungiasis can limit physical productivity and contribute to household economic strain.

The disease also increases vulnerability to secondary infections in communities where access to health services is limited. Despite these impacts, tungiasis is underreported in routine health information systems, complicating accurate disease mapping and resource allocation.

National Policy Guidelines on the Prevention and Control of Jigger Infestations

In recognition of the public health burden of tungiasis, the Government of Kenya developed the **National Policy Guidelines on the Prevention and Control of Jigger Infestations** in 2014 through the Ministry of Health's Division of Environmental Health. The guidelines were developed through consultation with county governments, researchers and civil society partners.

The policy provides a framework for coordinated prevention and control efforts at the national and county levels. It promotes the integration of tungiasis interventions into existing community health strategies, school health programmes, environmental sanitation initiatives and broader NTD control efforts.

Importantly, the policy recognises tungiasis as a disease influenced by social, environmental and economic determinants, necessitating multi-sectoral collaboration beyond the health sector alone.

Policy Objectives

The guidelines aim to achieve the following:

- Reduce the occurrence of jigger infestation
- Promote safe and appropriate prevention and management practices
- Strengthen community awareness and participation
- Improve surveillance and reporting mechanisms
- Enhance collaboration across the health, education, water, sanitation, housing and community development sectors

These objectives situate tungiasis within both public health and development agendas.

Strategic Interventions for Prevention and Control

Environmental Hygiene and Housing Improvement

Environmental management remains a cornerstone of prevention. Regular cleaning of living spaces, proper waste disposal and improvement of housing conditions reduce flea breeding sites.

Replacement of earthen floors with finished surfaces has been associated with a lower infestation risk in endemic areas. The separation of animal shelters from human dwellings is also recommended.

Personal Protective Practices

The consistent use of footwear, routine bathing and regular inspection of feet are promoted as key preventive behaviours, particularly among children.

Health Education and Behaviour Change Communication

Community education initiatives address misconceptions associating jigger infestation with superstition or moral judgment. Behaviour change communication promotes an accurate understanding of transmission, prevention and safe treatment options, supporting early care-seeking and stigma reduction.

Clinical Management and Safe Treatment

The national guidelines discourage the mechanical extraction of jiggers using unsterilised instruments due to the increased risk of infection and tetanus. Instead, the guidelines emphasise safe wound care, topical antiseptic use and management under the guidance of trained health workers where possible.

Surveillance and Health Information Systems

The policy recommends the incorporation of tungiasis reporting into routine health information systems. However, implementation remains inconsistent, highlighting the need for strengthened surveillance and monitoring mechanisms.

Multi-sectoral Coordination

Effective control requires collaboration among the health, education, water and sanitation, housing and community development sectors. School-based screening and community mobilisation remain important components of integrated prevention strategies.

Community Engagement and Programmatic Treatment Innovation

Community-based interventions play a central role in tungiasis management in Kenya. Civil society organisations, county governments and community health volunteers have implemented prevention and treatment campaigns that emphasise hygiene, education and safe care practices.

Within this context, programmatic treatment innovations have emerged to support safer community-level management. Partnerships between private sector actors and civil society organisations, such as the collaboration between SARAYA and Ahadi Kenya Trust, have focused on developing standardised topical formulations intended to simplify application and reduce reliance on unsafe extraction methods.

While large-scale clinical trials remain limited, such innovations strengthen the operational components of Kenya's national policy framework by promoting safer, more practical approaches in community settings.

These efforts align with Sustainable Development Goal 3.3, which calls for strengthened responses to NTDs through improved access to prevention and care.

Challenges and Remaining Gaps

Despite policy and programmatic progress, several challenges persist. These include limited routine surveillance data, ongoing stigma, variable county-level resource allocation and incomplete integration of tungiasis into primary healthcare and NTD programmes. Addressing these gaps requires sustained investment, improved monitoring systems and long-term community engagement.

Conclusion

Tungiasis remains a significant yet preventable public health challenge in Kenya. The disease is closely linked to poverty, environmental exposure and limited access to basic services. Kenya's

National Policy Guidelines on the Prevention and Control of Jigger Infestations provide a strong foundation for coordinated action. With community engagement, improved surveillance and safe programmatic innovations, progress towards disease reduction and improved quality of life for affected populations is achievable. Strengthening implementation will contribute to health equity, social dignity and broader sustainable development outcomes.

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日本語要約

スナノミ症は *Tunga penetrans* (スナノミ) によって引き起こされる寄生性皮膚疾患で、床材のない未舗装の住居や衛生環境の不備、裸足での生活が感染リスクを高め、主に貧困環境に暮らす人々に深刻な影響を及ぼす。命に関わることは少ないものの、強い痛み、炎症、かゆみ、歩行障害を引き起こし、慢性化すれば二次感染や爪の変形、潰瘍を伴うこともある。子どもには学業への影響や偏見による心理的負担も生じる。

スナノミ症は皮膚に侵入したスナノミの雌が卵を産み、これが乾燥した土壌で発育し、裸足での接触によって再感染が続く。犬や猫、豚などの家畜が家庭内の感染源となる例も多く、生活環境と社会経済状況が発生の中心的要因となっている。

ケニア政府は2014年に国家政策ガイドラインを策定し、環境衛生、学校保健、コミュニティの保健政策などとの統合的対策を推進している。住居の床の改善や家畜との生活空間の分離、履物着用の促進、健康教育による迷信や偏見の解消、安全な創傷ケアなどが主要な戦略である。また、地域団体や民間企業による外用剤の開発など、コミュニティで実施しやすい新たな取り組みも進んでいる。

依然としてモニタリング不足やサポートの地域間格差といった課題は残るが、継続的なコミュニティ支援と安全な治療法の普及等により、スナノミ症に苦しむ人を減らし、生活の質を向上させることは可能と考える。

SARAYA Jigger Lotion



東アフリカのケニアやウガンダに拠点を持つサラヤは、深刻な社会課題となっているスナノミ症に苦しむ人々を支援するため、2018年より治療薬の開発に取り組み、2021年5月にSARAYA Jigger Lotionの販売認可を取得しました。現在では、東アフリカ地域におけるスナノミ症対策の一助となることを目指し、様々なステイクホルダーと協力しつつ普及活動を進めています。