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Chikungunya Comeback in Sri Lanka: A Glimpse into its Epidemiology, Socioeconomic Toll, and the Double Trouble with Dengue

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Key points:

- Epidemiological Significance: Chikungunya infection continues to pose a major public health challenge across Southeast Asia, with Sri Lanka among the key affected countries.
- Clinical Burden and economic impact: The disease's disabling, prolonged arthralgia and fatigue lead to significant loss of productivity, particularly in working-age adults, with chronic sequelae driving most of the long-term economic burden.
- Treatment Gaps: The variability across current clinical guidelines is concerning, and management remains largely supportive, highlighting the need for standardised clinical guidelines.
- Double Burden with Dengue: The co-circulation of dengue and chikungunya amplifies the clinical and health system burden, calling for integrated vector and case management strategies.

Chikungunya fever is a debilitating arboviral infection caused by the Chikungunya virus (CHIKV), which belongs to the genus alphavirus and family Togaviridae. First isolated in Tanzania in 1952, it maintains both sylvatic and human transmission cycles. It is primarily transmitted by *Aedes aegypti* and *Aedes albopictus* mosquitoes, which also spread the dengue virus (DENV)[1, 2].

Evidence from the literature indicates that the Chikungunya virus (CHIKV) re-emerged in Sri Lanka in late 2006 after nearly four decades of absence, with the outbreak persisting until 2008[3-5]. The current resurgence, beginning at the end of 2024, therefore represents a re-emergence after 16 years, marking a significant epidemiological milestone for the country [5, 6]. However, a study conducted in Kandy and Negombo hospitals during 2016–2017 to assess serological evidence of CHIKV infection among patients clinically diagnosed with dengue found recent CHIKV infection, defined as IgM or RT-qPCR positivity, in 2.4% of Kandy patients and 7.0% of Negombo patients, indicating the continued low-level circulation of the virus in the country [7]. Similarly, in many regions in the world, CHIKV transmission has been revealed to have cyclical outbreaks interspersed with periods of little to no viral circulation. However, endemic transmission has been documented in several areas, particularly where Aedes mosquito populations remain consistently high[8].

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Disease Burden

Chikungunya continues to pose a substantial global health burden, with widespread transmission across tropical and subtropical regions. Since its re-emergence in the early 2000s, the virus has established local transmission in 119 countries, affecting millions of individuals annually. Globally, the estimated burden of chikungunya is substantial, with approximately 35.3 million infections occurring each year (95% CI: 20.9–56.5 million). The Southeast Asia Region bears the highest burden, followed by the African and American Regions, driven by expanding habitats of Aedes vectors, urbanisation, and climate change [9].

The World Health Organisation has identified CHIKV as a Blueprint priority pathogen due to its rapid and widespread across Asia, Africa, Europe, and the Americas [1].

Over the past seven decades, the chikungunya virus (CHIKV) has progressively expanded across the Asia-Pacific region. Most reports originated from India, Thailand, and Malaysia, with India accounting for nearly half. The Southeast Asian region contributed around two-thirds of all documented outbreaks, underscoring its significant role in regional transmission. Major epidemics were mainly reported from India, Thailand, and Sri Lanka, positioning Sri Lanka as one of the key countries affected in Southeast Asia [3, 10].

According to the Epidemiology Unit, Sri Lanka, as of early March 2025, 173 confirmed cases have been reported from sentinel sites in Colombo, Gampaha, and Kandy districts. This may be a gross underestimation, as in most cases, the confirmatory tests are not carried out. Females accounted for 60.2% of reported cases, and the 41–60-year age group represented 40.5% of infections, suggesting possible occupational or behavioural exposure differences [6].

Key Clinical Features

The incubation period typically ranges from 1 to 12 days, after which patients experience an abrupt onset of high fever, intense polyarthralgia, myalgia, rash, nausea, and conjunctivitis. While most cases are self-limiting, some progress to severe forms with complications such as myocarditis, hepatitis, uveitis, retinitis, acute renal disease, meningoencephalitis, Guillain-Barré syndrome, and cranial nerve palsies. The disease tends to be more severe in neonates exposed intrapartum, the elderly, and individuals with underlying conditions such as diabetes or renal, hepatic, or cardiac disease [1, 6, 11, 12].

Most cases present with mild to moderate symptoms accompanied by swelling in one or two joints. In more severe cases, patients experience intense joint pain that significantly impairs mobility. Additionally, a proportion of infections is asymptomatic but can still contribute to virus transmission. These persistent symptoms, particularly arthralgia and fatigue extending beyond the acute febrile phase, have notable socioeconomic implications, especially for middle-aged adults engaged in income-generating activities. Clinical evidence indicates that the current wave of CHIKV infections has been unusually prolonged in some patients, with patients experiencing a spectrum of symptoms. [6, 11, 12].

The precise mechanisms underlying the persistence of joint pain in chikungunya infection remain unclear. Evidence suggests that viral components may persist within macrophages and joint tissues, triggering ongoing immune activation. Autoimmune mechanisms are also thought to contribute to chronic inflammation. Various joint manifestations have been described across the different phases of chikungunya fever, including arthralgia, inflammatory arthritis, synovitis, enthesitis, tenosynovitis, and bursitis. Viral persistence may play a role in chronic joint disease among a subset of patients, as indicated by the detection of immunoglobulin M (IgM) antibodies several months after acute infection, implying continued antigenic stimulation that perpetuates joint inflammation [13, 14].

A subgroup of patients develops neuropathic-type pain, which arises from lesions or dysfunction within the nervous system. Unlike inflammatory pain, neuropathic pain involves maladaptive changes in central and peripheral nociceptive pathways. Overall, the mechanisms appear multifactorial and may vary between individuals, reflecting a complex interplay between viral persistence, immune dysregulation, and neural sensitisation.

Table 1: Summary of the Phase-wise Clinical Management of CHIKV Infection

Phase	Duration	Clinical Features	Management
Acute Febrile Phase	0–7 days	Fever, headache, myalgia, rash, and initial joint pain	Rest, hydration, paracetamol/acetaminophen (± codeine), avoid NSAIDs, corticosteroids, and antibiotics; monitor for complications
Acute Arthritic Phase	Up to 2 weeks	Abrupt onset of arthritis/arthralgia, small joints of hands, wrists, ankles, feet, swelling, stiffness, pain	Paracetamol (± codeine), gabapentin for neuropathic pain; NSAIDs if afebrile after 7–10 days with dengue ruled out; corticosteroids not recommended
Sub-acute Arthritic Phase	>2 weeks to 3 months	Persistent arthralgia/arthritis, joint stiffness, tenosynovitis, bursitis, fatigue, pigmented rash	NSAIDs for joint pain; corticosteroids (prednisolone 10–15 mg/day) for severe polyarthritis, tapered over 8–12 weeks; intra-articular steroids for resistant localised synovitis/bursitis; physiotherapy; DMARDs not recommended at this stage
Chronic Arthritic Phase	>3 months	Persistent or recurrent arthritis, tendinopathies, enthesopathies, and fatigue may mimic chronic rheumatic diseases.	Referral to rheumatologist for DMARDS; continuation of physiotherapy; individualised pharmacologic therapy as needed

Source: [12]
* DMARDS: Disease-Modifying Antirheumatic Drugs

Phase-wise Clinical Management of Chikungunya Infection

The phase-wise clinical management of CHIKV infection as recommended by the Ministry of Health, Sri Lanka (circular no: EPID/ 379/2006) is summarised in Table 1, outlining the duration, key clinical features, and recommended management strategies for the acute febrile, acute arthritic, sub-acute, and chronic phases [12]. This structured approach provides clinicians with a clear, actionable framework to optimise patient care and ensure timely referral for specialist management when necessary.

Clinicians are encouraged to strengthen their awareness of phase-specific management, standardise protocols across health facilities, ensure timely rheumatology referral for chronic or severe cases, and educate patients on monitoring and follow-up to optimise outcomes.

A systematic review of 28 clinical management guidelines (CMGs) for chikungunya published between 1989 and 2021 revealed substantial variability and overall low quality. Over half of the CMGs (54%; 15/28) were developed years ago, with a median quality score of only 2 out of 7 (range: 1–7). Although 54% (15/28) of the CMGs recommended hospitalisation for severe cases, only 39% (11/28) included detailed protocols for managing severe disease. Furthermore, while 46% (13/28) supported the use of corticosteroids during the chronic phase, 18% (5/28) advised against their use, highlighting the lack of consensus in existing guidelines. The duration of corticosteroids varied across guidelines, ranging from 5 to 21 days [15]. Further, the publication by Vairo et al, the use of corticosteroids is not recommended due to the risk of severe rebound of arthritis and tenosynovitis [1].

Adjuvant Therapy for Chikungunya Infection

Dietary Recommendations

Nutritional and dietary interventions can play a supportive role in reducing inflammation and promoting recovery following Chikungunya virus (CHIKV) infection. Evidence suggests that omega-3 fatty acids, intravenous vitamin C, bromelain, and curcumin possess significant anti-inflammatory properties that may alleviate post-viral inflammatory sequelae. Additionally, incorporating natural anti-inflammatory foods such as green tea, turmeric, grapes, cow's milk, and basil into the diet can further support recovery. Vitamin D3 helps modulate proinflammatory mediators in macrophages and monocytes, while vitamin E, honey, and olive oil can promote skin and overall immune health [14, 16-18].

Exercise and Physiotherapy

Gentle physical activity is recommended to restore joint mobility and minimise stiffness. Non-weight-bearing exercises and physiotherapy are indicated to avoid stiffness of the joints and to improve morning arthralgia [12, 19]. Low-impact aerobic exercises, stretching, and light massage can improve circulation, reduce pain, and enhance muscle function. Practices such as Pilates[14] and resistance exercises using elastic bands [20] have shown benefits in managing chronic pain by strengthening muscles and improving flexibility without overstraining the joints. In contrast, Rodrigo et al concluded that non-pharmacological treatment, like exercises and neuromodulation, cannot be recommended due to a lack of evidence [21]. It is important to begin physical activity gradually, under medical guidance, and to avoid overexertion during active inflammation [14].

Skin Care

Skin manifestations and residual discomfort can be managed with both natural and topical approaches. Apart from lots of fluids, the use of honey and olive oil can soothe dry or inflamed skin. Some traditional remedies, such as applying garlic paste mixed with clove oil or using sunflower seeds soaked in honey, have been reported to help relieve localised pain and inflammation. Warm water baths with Epsom salt may also reduce muscle tension and joint pain. Proper skin hydration and gentle care are essential, especially during the recovery phase, to promote healing and comfort [14].

The Dual Burden of Dengue and Chikungunya in Sri Lanka

Sri Lanka is currently facing a dual public health challenge with the simultaneous circulation of dengue and chikungunya viruses, both transmitted primarily by *Aedes aegypti* mosquitoes. The overlapping clinical presentation, seasonality, and vector ecology of these arboviral infections create significant diagnostic, surveillance, and control challenges for the national health system. While dengue remains hyperendemic with multiple serotypes co-circulating, the re-emergence of chikungunya after 16 years as an outbreak has compounded the strain on healthcare services and intensified the focus on integrated vector control [22, 23].

Epidemiologically, dengue has been a persistent burden in Sri Lanka. The resurgence of CHIKV at the end of 2024 coincided with a surge in dengue activity, with a cumulative total of 39,080 DENV cases reported from the 1st week to the 38th week of 2024 [24], leading to possible diagnostic confusion and potential underreporting of chikungunya cases due to symptom overlap. By the 38th week of the year 2025, a cumulative total of 38,445 cases of DENV were reported (up to September 21st)[24]. Clinical differentiation between the two diseases can be challenging, particularly in the early febrile phase when joint pain and rash are nonspecific. Furthermore, co-infections, though uncommon, have been documented and may exacerbate disease severity and recovery time [3, 23, 25]. As noted by Kabir et al, CHIKV can often be mistaken for dengue, particularly in low- and middle-income countries (LMIC) where DENV diagnosis is frequently made based on clinical presentation alone, without confirmatory laboratory testing. Given that both infections commonly coexist in endemic regions but differ significantly in their complications and disease progression, it is crucial to enhance diagnostic capacity. The development and widespread implementation of affordable, accessible diagnostic tools for both chikungunya and dengue are essential to ensure accurate

differentiation, guide appropriate management, and improve patient outcomes [25].

The current CHIKV outbreak, caused by the IOL strain with E1:K211E/E2:V264A mutations, demonstrates increased vector adaptability, raising concerns of sustained co-transmission with dengue [22]. As both viruses exploit the same mosquito vector and thrive under similar environmental conditions, vector control interventions must be coordinated and intensified.

The dual burden of CHIKV and DENV infections highlights the urgent need for enhanced molecular surveillance, improved diagnostic capacity, and integrated vector management strategies. Cross-sectoral collaboration between entomological surveillance, clinical care, and community engagement remains critical to mitigate the impact of these re-emerging arboviruses on public health and socioeconomic stability.

Economic Toll due to Chikungunya

A study by de Roo et al. estimated that between 2011 and 2020, there were approximately 18.7 million chikungunya cases reported across 110 countries, resulting in a total of 1.95 million disability-adjusted life years (DALYs) lost. The majority of this burden was concentrated in the Latin American and Caribbean region. The global economic impact during this decade was substantial, with total direct healthcare costs estimated at around USD 2.8 billion and indirect costs, mainly due to productivity loss, reaching USD 47.1 billion. Importantly, the long-term chronic manifestations of chikungunya, particularly persistent arthritis and fatigue, accounted for the largest share of both economic costs and DALYs, underscoring the disabling and prolonged nature of the disease [26].

As in many LMICs, chikungunya poses a substantial economic burden to Sri Lanka due to its disabling nature and prolonged recovery period. The disease primarily affects adults in their most economically productive years, leading to significant loss of income through absenteeism and reduced work capacity. During outbreaks, communities face indirect costs such as decreased household productivity, increased healthcare expenditure, and strain on already limited healthcare services. The chronic arthralgia associated with chikungunya, lasting weeks to months, further exacerbates this burden by impeding mobility and daily functioning, particularly among those engaged in manual labour or small-scale livelihoods.

Public Health Challenges

The true scale of the 2024–2025 outbreaks remains uncertain due to limited access to molecular diagnostics and the concurrent dengue epidemic, which complicates clinical differentiation. Both CHIKV and DENV present with fever, rash, and joint pain during the early stages, leading to possible underdiagnoses or misclassification. Chikungunya infection can often be mistaken for dengue, particularly in LMICs where dengue diagnosis is frequently made based on clinical presentation alone, without confirmatory laboratory testing [25]. Strengthening laboratory capacity for specific molecular and serological testing is crucial for accurate case identification and surveillance.

Given that both infections, CHIKV and DENV, commonly coexist in endemic regions but differ significantly in their complications and disease progression, it is crucial to enhance diagnostic capacity. The development and widespread implementation of affordable, accessible diagnostic tools for both chikungunya and dengue are essential to ensure accurate differentiation, guide appropriate management, and improve patient outcomes.

Despite decades with limited preventive measures, recent global efforts have accelerated vaccine development. Substantial investment by the Coalition for Epidemic Preparedness Innovations (CEPI) has resulted in the licensure of a chikungunya vaccine, even in the absence of traditional phase 3 trials, reflecting the unpredictable nature of CHIKV epidemiology and the urgent need for preventive tools. The effectiveness of this vaccine is not yet known [8]. Currently, there is no specific antiviral therapy or effective vaccine for chikungunya. Management is primarily supportive, focusing on symptom relief, hydration, and prevention of complications, emphasising the need for strengthened vector

control and surveillance measures in endemic regions.

Pending the development of a safe and effective vaccine, the prevention of chikungunya relies entirely on individual protection against mosquito bites and comprehensive vector control measures. The strategies for controlling both adult and larval mosquito populations are similar to those used for dengue and have shown relative success in various countries and contexts. Eliminating mosquito breeding sites remains the cornerstone of vector control. These sites must be removed, destroyed, frequently emptied, cleaned, or treated with appropriate larvicides. However, the sustained control of *Aedes aegypti* populations has proven challenging and has never been permanently achieved. Recent evidence highlights increasing insecticide resistance in both *A. albopictus* and *A. aegypti*, complicating control efforts further[14]. Effective vector control is an ongoing, resource-intensive process that requires significant community engagement. Public cooperation is essential for eliminating domestic breeding habitats and ensuring the long-term success of these interventions. Strengthening public education, regular environmental management, and community-based surveillance can substantially enhance the effectiveness and sustainability of vector control programmes.

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