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Chikungunya Fever: An Emerging Public Health Problem in Bangladesh

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Authors' contributions

This work was carried out in collaboration between all authors. Authors RK and SR drafted the manuscript. Authors TK and SMYA managed the literature searches. All authors read and approved the final manuscript.

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Commentary

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ABSTRACT

Chikungunya virus (CHIKV) is an emerging epidemic-prone and mosquito-transmitted causative agent of chikungunya fever accompanied by severe joint and muscle pain, headache, fatigue and rashes. In recent years, some diseases are emerging such as dengue fever due to climate change and global warming in Bangladesh. [12] it has been observed that during the period of monsoon and post-monsoon there is an increase activity of the vectors with rainfall and their life span is influenced by temperature and humidity. Post monsoon period increases virus transmission due to high vector density and *Aedes aegypti* is the main the vector responsible for CHIV in Bangladesh. Dhaka, the capital city of Bangladesh, recently swayed with a severe outbreak of chikungunya and

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there are so far 3,000 cases have been reported in different hospitals and clinics of Dhaka from May to July 2017. It is normally advised that patients with chikungunya should be managed as dengue until dengue fever has been ruled out [13]. Chikungunya infections are confirmed by the detection of the virus, viral RNA or CHIKV specific antibodies in patient sample using serological process but viral RNA can easily be detected by reverse transcriptase-polymerase chain reaction. There is no vaccine for this infection as well as no specific antiviral treatment for Chikungunya fever as it is poorly responsive to analgesia in its acute and chronic phase of the disease. To control the spread of the infection government, non-government officials should come forward and take necessary steps to aware and educate people about the infection so that people can avoid contact with mosquitoes. National surveillance can be run along with active community participation is required to eradicate the mosquitoes the environment.

Keywords: Chikungunya; Dhaka; Bangladesh; public health; emerging.

1. INTRODUCTION

Chikungunya virus (CHIKV) is an emerging epidemic-prone and mosquito-transmitted causative agent of chikungunya fever accompanied by severe joint and muscle pain, headache, fatigue, rashes [1]. The word Chikungunya means 'that bends up' demonstrates the contorted posture of patients with severe joint pain and arthritic symptoms [2]. The disease is recently emerged as a major public health problem in most of the Asian countries [3,4]. Over the past few years the prevalence of mosquito-borne infections are rising rapidly in South East Asia and large numbers of Chikungunya cases were reported in Malaysia, Singapore, Thailand, India, Indonesia, Maldives, and Bangladesh [3,4,5,6]. In this region, CHIKV is maintained in the human population by a human-to-mosquito-to-human transmission cycle [7]. CHIKV is a type of alphavirus and *Aedes aegypti* and *Aedes albopictus* mosquitoes are the responsible vectors chikungunya virus in Asia and the Indian Ocean islands [8]. The first case CHIKV was found in 1952 in Tanzania [9]. In Asia, CHIKV was first isolated in Thailand in 1960s; India in 1964; Sri Lanka in 1969; Vietnam in 1975; Myanmar in 1975, and Indonesia in 1982 [6,10]. The mosquitoes normally bite during the daylight hours and it has also been found stinging in the early morning and later afternoon also, both species are found biting outdoors when only *Aedes aegypti* generally feed indoors [11].

In recent years, some diseases are emerging such as dengue fever due to climate change and global warming in Bangladesh. [12] it has been observed that during the period of monsoon and post-monsoon there is an increase activity of the vectors with rainfall and their life span is influenced by temperature and humidity. Post monsoon period increases virus transmission due to high vector density and *Aedes aegypti* is the main the vector responsible for CHIV in Bangladesh [13]. In Bangladesh, the first case was reported in 2008 in northern Rajshahi and Chapainnawabganj districts by a study conducted by a team from the Institute of Epidemiology, Disease Control and Research (IEDCR) and ICDDR,B (International Centre for Diarrhoeal Disease Research, Bangladesh) [14]. Another study conducted by Faruque et al. to identify Rickettsia, Coxiella, Leptospira, Bartonella, and Chikungunya virus infections among febrile patients at six tertiary hospitals in Bangladesh from December 2008 to November 2009 and diagnosed 10% patients with chikungunya [15]. In 2014, Hassan *et al*. labelled chikungunya as an emerging disease in Bangladesh by analysing the chikungunya cases in a tertiary teaching hospital in Dhaka city [16]. In August 2011, suspected chikungunya fever outbreaks were detected in Dohar upazila of Dhaka district and Shibganj upazila of Chapainawabganj district. Limited antibody testing for dengue and blood smears for malaria conducted at the local health clinic suggested that the illnesses were not caused by dengue or malaria. In Dohar upazila of Dhaka, the attack rate was 29% and almost one-third households had at least one suspected case and the village Breteau index was noted as 35/100 and 89% of hatched mosquitoes were *Aedes albopictus* [3].

Dhaka, the capital city of Bangladesh, recently swayed with a severe outbreak of chikungunya and there are so far 3,000 cases have been reported in different hospitals and clinics of Dhaka from May to July 2017 [5]. The risky areas are: Uttara-4, Uttara-9, Middle Badda, Gulshan-1, Lalmatia, Pallabi, Maghbazar, Malibagh, Rampura, Tejgaon, Banani, Nayatola, Kuril, Pirerbagh, Rayer Bazar, Shyamoli, Monipuripara,

Mohammadpur, Mohakhali, Mirpur-1 and Korail Slums [17]. The general populations of Bangladesh unexpectedly became panic as so many people were hospitalised with viral diseases. A research by ICDDR, B revealed that women were more likely to suffer from this infection as they spent more time at home and the spread of infection was typically centred on individual homes, more than a quarter of infections spreaded within the same household [17].

Chikungunya is characterised by an abrupt onset of fever with some reaching 39° to 40° Celsius and having chills and rigour frequently accompanied by joint pain (Table 1) [1,13]. Although morbidity and mortality is not that high, patient suffers a lot from high fever and severe pain of the body, particularly the joints pain. In fact, patients may suffer with the joint pain for weeks or months which has a social and economic implications. During this period, they cannot work properly and thus causing severe economic loss [18]. Most patients recover fully within 7 to 10 days. It is rarely fatal, although symptoms can be severe, long-lasting and debilitating. Once infected, the person is likely to be protected from future infections [19]. Khatun et al. (2015) identified a number of clinical symptoms of patients who self-selected for laboratory testing and had IgM antibodies against Chikungunya virus in serum in Char Kushai, Dohar, Bangladesh (Table 2) [3].

It is hard to distinguish between chikungunya and dengue fever based on the clinical symptoms as both of them are transmitted by the same mosquito (Table 3). Chikungunya is more likely to cause high fever, associated with severe polyarthralgia, arthritis and lymphopenia whereas dengue fever causes neutropenia, thrombocytopenia, haemorrhage, shock and death. Researchers found that in the acute phase of Chikungunya fever the associated pain and inflammation is caused due to some specific inflammatory markers and cytokines (interferon-alpha and interleukin-6) secreted by immune system [20]. In its chronic phase, additional proinflammatory markers (interleukin-17) play an important role in bone tissue inflammation and destruction [20]. It is normally advised that patients with chikungunya should be managed as dengue until dengue fever has been ruled out [13]. Chikungunya infections are confirmed by the detection of the virus, viral RNA or CHIKV specific antibodies in patient sample using serological process but viral RNA can easily be detected by reverse transcriptase-polymerase chain reaction. There is no vaccine for this infection as well as no specific antiviral treatment for Chikungunya fever as it is poorly responsive to analgesia in its acute and chronic phase of the disease [21]. However, pharmacological (analgesics, NSAIDs, anti-convulsant and anti-depressant drugs) and non-pharmacologic treatment (physiotherapy) could be offered in all phases of the disease including sub-acute and chronic stages [22]. Chikungunya fever is usually treated by supportive care such as complete rest, plenty of fluid intake, medications like antipyretics and analgesics [23].

Climate change and associated diseases are presenting new threats to public health in Bangladesh. One of the examples is the explosive outbreaks of chikungunya fever in Bangladesh [5]. The emergence and spread of Chikungunya has multifactorial and interrelated factors and climate change plays an important role [25]. Unplanned urbanization and overpopulation in the big cities in the developing world pose spread of vector-borne diseases [26]. In Bangladesh where the population density is very high, mosquito control is an important strategy to stop the spread of the infection. It is advisable that people with suspected Chikungunya fever should avoid further mosquito exposure in the first week of viremia to prevent local transmission of the disease [22]. It is also challenging to control the growth of mosquitoes in Bangladesh because Aedes *albopictus* mosquitoes have developed resistance against insecticides [14]. World Health Organization (WHO) also addressed that environmental

Table 1. Clinical features of Chikungunya fever [13]

Common	Infrequent	Rare in adults but seen in children
Fever	Stomatitis	Photophobia
Arthritis	Oral ulcers	Retro-orbital pain
Backache	Exfoliative dermatitis	Vomiting
Headache	Photosensitive	Diarrhoea
Rash	Hyperpigmentation	Mental confusion
		Signs of meningeal irritation

interventions, such as destroying natural and human-made mosquito breeding sites in and around homes, may be more cost-effective than chemical methods to kill larva and adult mosquitoes [27].

Table 2. Clinical symptoms of Chikungunya patients in Dohar, Bangladesh, 2011 [3]

Symptoms	Respondents (%) (N = 196)
Fever	196 (100%)
Joint pain	196 (100%)
Rash	148 (76%)
Itching	97 (50%)
Joint pain lasting >1 month	75 (38%)
Joint swelling	56 (29%)
Headache	23 (12%)
Weakness	12 (6%)

Table 3. Clinical features of Chikungunya and Dengue fever [24]

Features	CHIK	Dengue
Fever	+++	++++
Myalgia/Arthralgia	++++	+++
Meculopapular exanthema	++	++
Retro-orbital pain	+	++
Conjunctivitis	+	-
Lymphadenopathy	++	++++
Hepatomegaly	+++	-
Bleeding	++++	+

2. CONCLUSION

To control the spread of the infection government, non-government officials should come forward and take necessary steps to aware and educate people about the infection so that people can avoid contact with mosquitoes. National surveillance can be run along with active community participation is required to eradicate the mosquitoes the environment. The production of knowledge about spread of infection has a strong political content. It is expected from the government specific strategic attitudes to form a critical awareness of citizens regarding public health so that society reaches a core of dignity of the individual.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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