SHORT COMMUNICATION

OUTBREAK OF CHIKUNGUNYA VIRUS IN KARACHI, PAKISTAN

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In this report, aim is to highlight the recent outbreak of Chikungunya virus in Karachi, the largest city of Pakistan. Chikungunya virus is transmitted by infected *Aedes* mosquitoes. Firstly, described as an outbreak in southern Tanzania in 1952 and later spread in Africa, Asia, Europe, and Pacific and Indian Oceans. In late 2016, the virus has been reported to cause severe morbidity and fatality among patients reporting to the local government hospital in Malir region of Karachi. Patients came to emergency ward with complaints of fever, skin rashes, fatigue and joint pain. To improve the existing knowledge and current epidemic in this area we reported the causes, sign & symptoms, precautions and treatment measures for the control from this virus spreading in mass gatherings. In addition, self-awareness, preventive measures implementation by public health officials in response to reports of Chikungunya virus will help to evaluate the outbreak settings.

Keywords: Chikungunya virus; Fever; Skin rashes; Joint pain; Headache

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INTRODUCTION

"Chikungunya" a word derived from the "*Kimakonde*" language. This in literal terms would mean to become stooped (bend) in appearance. It was first isolated in 1952 in southern province of Tanzania and stayed endemic from Asia to Africa. Explosive epidemics in Indian Ocean islands and India occurred around 2005 where more expansion was facilitated by increase in travelling worldwide. The circulation of virus initiated and spread in various geographical areas all around the world.[1] This is caused by a virus belonging to the alpha virus in the family Togaviridae, which is a single stranded RNA virus, sensitive to higher temperature. It is caused in endemics in humans by vector mosquitoes (*Aedes aegypti* and *Aedes albopictus*) which are the same female carrier mosquito for dengue fever.[2,3] Only female mosquitoes can transfer the virus as it requires a blood meal for the complete formation of the egg. The virus is found to replicate several folds within the salivary glands of these mosquitoes.[4] From this we comprehend that the virions transferred from the bite of the mosquitoes is the determining factor of the viral disease along with external incubation time and delay between bite and being infectious.[5] These mosquitoes are active throughout day-time up to late afternoon with peak activities seen during early morning and late afternoon. Rarely vertical transmission (mother to child) has also been observed. Currently, over 60 countries have been identified with outbursts of this infection[6] whereas in Asia, the virus broke out in 1950's– 1960's.[7] In order to improve the existing knowledge and current epidemic in this area, this article is updating the causes, sign & symptoms, precautions and treatment measures to control the virus spreading in mass gatherings. In addition, self-awareness, preventive measures implementation by public health officials in response to reports of Chikungunya virus will help to evaluate the outbreak settings.

Outbreak in Pakistan

The importance of this disease in Pakistan are two folds; firstly, the fact that it clinically presents similar to dengue fever of which numerous outbreaks have been noted all around Pakistan, hence misdiagnosis can follow.[8] Secondly, India has had one of the worst outbreaks of this mosquito borne viral disease in the metropolitan cities such as Delhi with over 1000 confirmed cases and nearly 10 deaths. Hence, a warning was issued to Pakistan by the National Institute of Health (NIH) regarding the risk of being infected with chikungunya disease. Ultimately due to carelessness this has led to hundreds being infected in the populated areas of Pakistan such as Malir, Shah Faisal, Saudabad and neighbourhoods of the city reported by The Express Tribune on 16th Sep 2016 (http://tribune.com.pk/story/1182403/preventive-steps-pakistan-risk-chikungunya-spurt/#).

Reported sign and symptoms

Once the patient is bitten, it takes between 4-7 days for the symptoms to be observed. Amongst them joint pain accompanied by joint swelling are the distinctive and most prominent of all the features. Joint pain can

be observed in ankle, knee, lower back, wrist and phalanges as shown in figure-1. Fever accompanied by rigors and chills, with a characteristic biphasic trend (subsiding in two-three days then coming back after a day). Other vague symptoms may include muscle pains, headaches, rash, fatigue, ocular symptoms (uveitis) and nausea.[9] The symptoms are self- limiting and the disease subsides within one week's time however may be prolonged for weeks and months before it subsides. This would confer the individual with lifelong immunity. However, the patient will be at risk of infecting the other mosquitoes feeding on the infected individuals for a period of 5–7 days, becoming a source of infection further on. It is advisable to further avoid insect bites by isolating such patients especially during first week of illness. Based on these findings, WHO is predicting an epidemic in Pakistan. In table-1 frequency of similar observations of outbreak seen in recent years in the population of outbreak in India (2006–2007) Reunion Island (regions of France in Indian Ocean, east of Madagascar and southwest of Mauritius) 2005–2006 and in Italy in 2007.[10,11]

Table-1: Recent major clinical manifestations of chikungunya in different succession around the world.

Symptoms	Outbreak in India (2006-2007) (%)	Reunion Island (region of France in Indian Ocean, east of Madagascar and southwest of Mauritius) 2005–2006 (%)	Outbreak in Italy (2007) (%)
Fever	100	100	94
Arthritis	98	100	93
Headache, nausea, fatigue, rash	Frequency unreported	70	50
Muscle pain	Frequency unreported	60	49
Diarrhoea and vomits	Frequency unreported	Frequency unreported	19-23
Total number of cases	1500000	272000	197

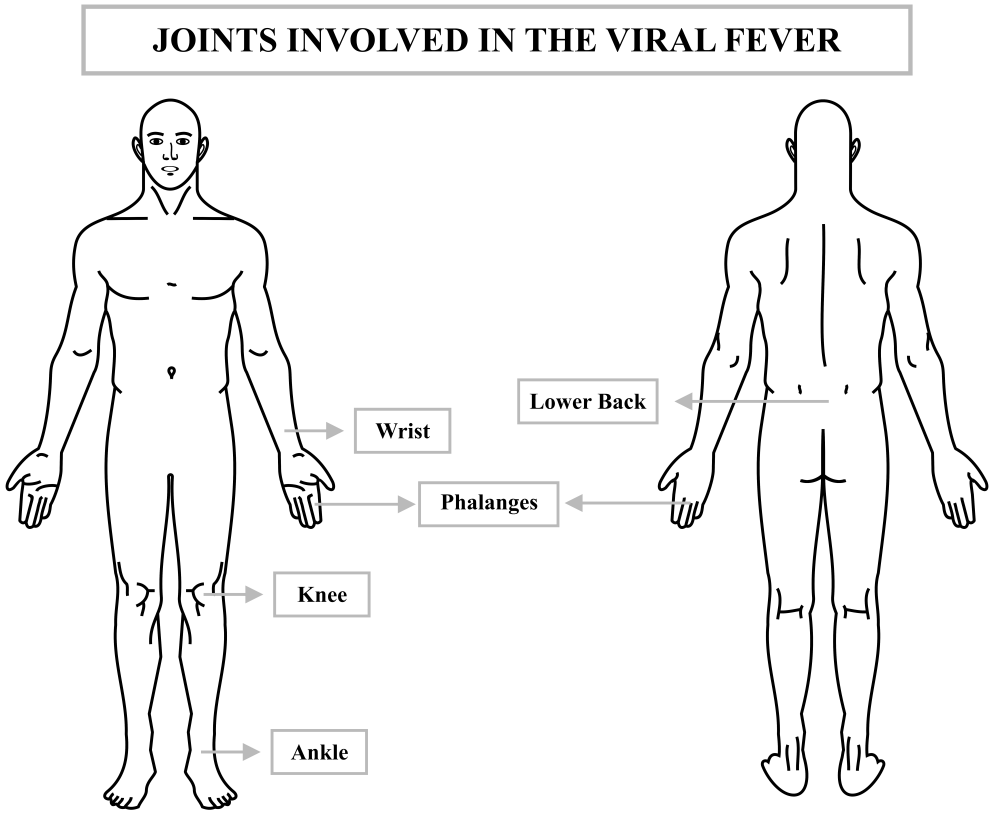

Figure-1: Prevalence of musculoskeletal complaints among various anatomical sites; (data presented as percentages).

Complications

Complications may include the persistence of the joint pain for many months before it subsides spontaneously. Occasionally eye, GIT, heart, bleeding disorders, kidney, cranial nerve palsies, hepatitis and neurological complications may be noted. It has been linked to and nasal (skin) necrosis. In severe cases septic shock, multiple organ failure and death but are extremely rare outcomes.[12,13] If the virus is transferred via vertical route of transmission it may lead to neuro-disability due to severe encephalopathy.[14]

Treatment

Currently, there is no specific treatment for this infectious disease. Primary aim of the treatment would include managing the symptoms and supportive therapy. These include rest, using plenty of water/juices and pain-killers (acetaminophen, paracetamol).

In certain cases chloroquine phosphate (broad spectrum antiviral and anti-inflammatory) and arbidol have been used to prevent viral entry but with no standards results.[15-17] Corticosteroids and physiotherapy may help the individuals to regain movement from the stiffened joint at later stages.[9]

Diagnostic tests

For the diagnosis, serological tests can be used. This is critically important to differentiate between dengue and chikungunya for better patient care and timely control measures.[18] The virus has been isolated from serum, saliva, urine, synovium and cerebrospinal fluid (CSF). Currently investigators are analysing the sensitivity and specificity of the virus in saliva, but the results can only be valuable if large scale studies are carried out.[19, 20] Blood still remains as the prime source of detection via RT-PCR.

Preventive measures:

As neither vaccine nor treatment is available stress is laid upon the preventive measures.[10] The preventive measures include measures to avoid any mosquito bites. These can be carried out at different levels which would include the following;

1. **At government level**
   - For precaution sake testing of the individuals travelling from high incidence rate areas prior to entering non-infected areas.
   - Visual media and printing posters/banners serve as a positive way to help.
2. **At community level**
   - Reducing the number of stagnant artificial and natural water filled containers drastically diminishes the habitant of the mosquitoes as they breed in such environments especially after the monsoon months. If the water containers cannot be removed they should be treated (inside and around) with insecticides or larvicides or treatment of this water should be carried out. Scrubbing of the interior of the containers is another alternative.
   - Spraying insecticides in areas where the mosquitoes sit is also one of the precautionary techniques.
   - Removal of unused cans, jars, bottles, or any other object which has a potential to collect water should be removed (buried, disposed, or burnt) or protected under shelter. For tyres either puncture holes or shred them to avoid water stagnation.
   - Arranging camps to promote the removal of breeding sites on regular basis.
3. **At individual level**
   - Clothing e.g., long sleeved shirts and long trousers, would minimize the exposure of the skin especially during day time.
   - Sleeping within nets can also provide great prevention.
   - Use of air conditioning or window/door screens to keep mosquitoes outside.
   - Repellents applied to skin according to the manufactures instructions.
   - Indoor use of sprays, electro-vapor mats and coils are also recommended.
   - Flowerpots, buckets or any other such water containers should be drained regularly.

CONCLUSIONS

As an emerging outbreak within Pakistan notable immediate steps need to be taken for prevention against the virus at all levels (government, community and individual). Although in majority of cases the virus causes mild signs and symptoms but life-threatening conditions and even death should be prepared for which is contrary to the previously recorded outbreaks. Proper investigations will lead in identification of new anti-viral candidates. Cost effective and simple diagnostic tests should be available within the victimized urban and rural areas.

Newer diagnostic modalities should be indulged in, focusing on non-invasive techniques e.g., saliva as a tool for detection and diagnosis. Through which, specialists should learn more about chikungunya virus and therapeutic protocols for this virus can be established.

Conflict of interest: The authors declared no conflicts of interest.

AUTHORS CONTRIBUTION

HAS and ZK: Concept, research proposal and wrote part of the manuscript; RK: literature search, analysed and interpreted the data; MSZ: Critically reviewed the manuscript and correspondence; KMS: Literature search and wrote part of the manuscript.

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