Bangladesh J Med Microbiol 2016; 10 (02): 14-17
Bangladesh Society of Medical Microbiologists

Chikungunya infection in Holy Family Red Crescent Medical College and Hospital during Rainy season

Taslima Akter[1], Taslima Begum[1], Jannatul Ferdous[1], Sarmin Sultana[2], Sharmeen Rashid[3], Sabeena Shahnaz[1]

[1]*Department of Microbiology, Holy Family Red Crescent Medical College,* [2]*Department of Virology, Bangabandhu Sheik Mujib Medical University,* [3]*Department of Biochemistry (former), Holy Family Red Crescent Medical College.*

ABSTRACT

Recently, in Bangladesh, Chikungunya (CHIK) infection emerged as an important public health issue. Previously, it was not routinely tested by the physician, thus it might remain undiagnosed. Therefore, the present study was undertaken to find out Chikungunya infection in Holy Family Hospital, Dhaka among clinically suspected cases who were sent by the clinicians during rainy season. For detection of Chikungunya infection, a total of 147 serum samples were tested for IgM and IgG of Chikungunya virus (CHIKV) by Immuno chromatographic test (ICT). Out of which 64 (43.5%) samples were positive for Chikungunya infection (positive defined as a person with IgM and or IgG antibody). Of the 64 sero-positive cases, 34 (53.1%), 6 (9.4%) and 24 (37.5%) were positive for only IgM, only IgG and both IgM & IgG antibody respectively. Male were affected higher (51.56%) than female (48.44%). The infection was more common in 31-45 years, 46-60 years and more than 60 years of age groups which was 26.6%, 25% and 26.6% respectively In this study, it was found that among suspected cases of Chikungunya, sero positive cases were 43.5% which was about half of the suspected cases. This finding suggests that, there is need of screening of chikungunya virus and also need of appropriate strategies to control the disease as early as possible.

Key word: Chikungunya, IgM, IgG.

INTRODUCTION

Chikungunya fever is a mosquito-borne illness of humans caused by the chikungunya virus, a type of alphavirus. Aedes aegypti and Aedes albopticus mosquitoes are the main vectors of Chikungunya in Asia and the Indian Ocean islands. Chikungunya infection is characterized by sudden onset of fever, incapacitating multiple joint pain involving mainly the ankle, wrist and phalanges but may also involve large joints. Maculopapular skin rash or localized petechiae is also seen in 40-50% of patients.[1] The word Chikungunya means to walk bent over which is due to severe arthralgia which renders the patients unable to walk upright.[2]

Laboratory diagnosis is essential to distinguish chikungunya virus infection from other infection with similar clinical features such as dengue and other bacterial infection. The laboratory diagnosis is based on the detection of IgM and IgG in serum by ELISA or ICT. IgM antibodies normally develop towards the end of first week of illness and may persist for 3-4 months.[3] On the other hand, the IgG antibodies developed in the convalescence phase, and are reported to be found after several months or even years following recovery.[4] Confirmatory diagnosis of chikungunya virus at molecular level is done on detection of its genome by RT-PCR and real time RT-PCR.[5]

The virus was first reported in 1952 in Tanzania.[6] Since then several outbreaks of disease occurred in Africa & Asia between 1960s to the 1980. But global emergence of chikungunya actually started in 2004. In addition to Africa and south-East Asia where it is endemic, sporadic cases are regularly reported from different part of the world region.[2]

The first outbreak of chikungunia fever was observed in Bangladesh in December 2008 in Rajshahi and Chapainawabganj.[7] Since then, from time to time cases of chikungunya were reported from different parts of Bangladesh.[8, 9] Recently in Bangladesh it has emerged as an important public health issue[10] and there is no clear data regarding the proportion of the population of Dhaka city in Bangladesh which is susceptible to infection. Hence, the present study was undertaken to detect chikungunya infection in our Holy Family Hospital among clinically suspected patient of

✉ ***Correspondence:***
Dr. Taslima Akter
Assistant professor, Holy Family Red Crescent Medical College,
1, Eskaton Garden Road, Dhaka-1000
Email: doctor_taslima11@yahoo.com
Phone: 01712138461, 01786491325.

different age group of both sex. For detection of Chikungunya infection ICT for IgM & IgG antibodies against Chikungunya was done which is easy to perform and cost-effective.

Material and methods:

A total of 147 clinically suspected cases of Chikungunya sent by the physician during the rainy season (July - September) were enrolled in this study. About 3 ml blood was collected from each patient by using strict aseptic precautions in Holy Family Hospital Microbiology & Immunology laboratory. Serum was separated by standard methods and was tested for IgM and IgG antibody by Immuno chromatographic test (ICT) (IgM & IgG for human Chikungunya) manufactured by SD Biosensor in Korea (Lot No: QCH 2017004-3). The person who had only IgM positive or only IgG positive, indicate suffering from recent or past infection respectively and who had both IgM & IgG positive indicate recent or past infection. Repeat testing of only IgM positive samples were not done to confirm the current infection. Again the person who had no antibody for chikungunya are suppose to be negative cases and repeat testing of negative samples were not done. As, clinical presentations of chikungunya seropositive patients were not collected, thus it was not correlated with other findings.

Results

During the study period 147 serum samples were analyzed. Out of these 64 (43.5%) samples were positive for Chikungunya antidbody while 83 (56.5%) were negative.

In this study it was found that, out of 64 sero positive cases, only IgM antibody were positive in 34 (53.1%) samples, only IgG antibody were positive in 6 (9.4%) and both IgM & IgG were positive in 24 (37.5%) sample (Table-1).

Among seropositive cases 33 (51.56%) were male and 31 (48.44%) were females (Figure-1). Age wise distribution of sero positive cases of chikungunya showed that the infection was more common in 31-45 years, 46-60 years and more than 60 years of age group which was 26.6%, 25% and 26.6% respectively. The infection was less common in 15 years and 16-31 years age group which was 12.5% & 9.4% (Figure-2.)

Table-1 Distribution of serologically positive chikungunya cases (n=64)

	No of cases	Percentage
Antichikungunya IgM positive	34	53.1
Antichikungunya IgG positive	06	9.4
Both IgM & IgG positive	24	37.5
Total	64	100

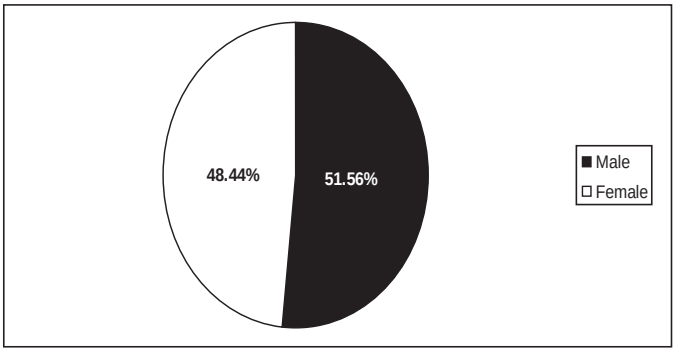

Figure-1: Sex distribution of chikungunya sero positive case

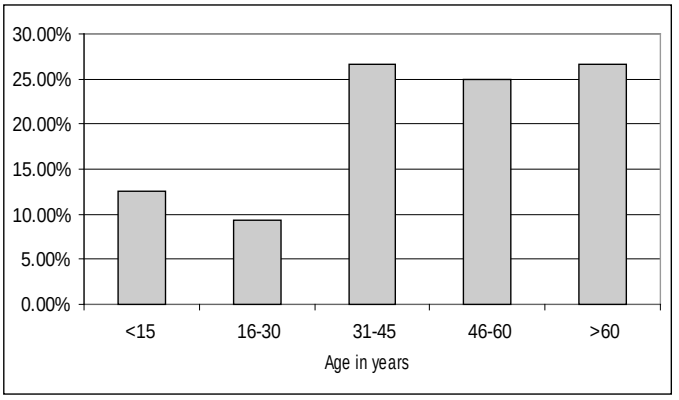

Figure 2 : Age wise distribution of chikungunya seropositive cases

Discussion:

The chikungunya, an emerging arthropod born virus is wide spread in tropical regions (Africa and Asia) and is spreading rapidly to temperate climates with recent outbreaks in Europe and the Americas. The virus has increasingly great impact on man with potentially life-threating and debilitating arthritis.[11]

In our study, 43.5% cases were positive for Chikungunya infection during the study period of July - September (during rainy season) and it was very high. Similar finding correlate with the different studies carried out in India (Tamil Nadu) by a Bharty et al, in India (Mumbai) by Tomar et al & in India (chennai) by Balasubramanimum et al.[12-14] They were reported seasonal peak of chikungunya in month of July to September.This is because of high vector density during the rainy season. As, we collected samples only during rainy season, thus we were not correlate our findings with other seasons.

In our study, it was observed that 53.1% sera were positive for IgM only, 37.5% were positive for both IgG & IgM and 9.4% sera were positive for IgG antibody only. The high prevalence of IgM observed in this study could be an indication of the sporadic nature of chikungunya virus infection in the study area during the study period. The

presence of Chikungunya IgG only is an indication that the chikungunya infection is endemic during the study period. This observation correlated with other studies.[15-17]

A difference in gender distribution of chikungunya infection was observed in different study. In a study of Tomar et al[13] Kumar et al[16] and Akinola et al[18] found that male showing higher prevalence rate than the female and in a study of Balasubramaniam et al,[14] Mohanty et al[17] and Sakhiya et al[19] found that female showing higher prevalence rate than the male. The difference may probably as a result of difference in geographical location and presence of socio-economic factors that facilitated the breeding of Aedes vector in their study area. However, in our study male positive cases is slightly higher than female which was 51.56 % and 48.44% respectively.

The majority of the patients in this study were 31-45 years, 46-60 years and more than 60 years of age group and which was 26.6%, 25% and 26.6% respectively. Lower percentage was showing 15 years and 16-31 years of age group and which was 12.5% & 9.4%. This difference in the clinical spectrum with respect to age group has been documented in Sissoko et al[20] and Moro et al.[21] and they showed that prevalence of infection increased with age. Some of the reasons for different susceptibility to chikungunya infection in different age group may be immunological or socio-cultural. Factors including occupation and lesser personal protection may have an influence on the disease pattern.[22]

Conclusion :

Low socio-economic condition, overcrowding and poor sanitary conditions of our country facilitate the presence of Aedes vector species and contribute to the spread of the chikungunya to wider area. Therefore, it is necessary to institute specific chikungunya antibody surveillance and routine screening of chikungunya to prevent the complication as early as possible.

REFERENCES:

1. Pialoux G, Gauzere BA, Jaureguiberry S, Strobel M. Chikungunya, an epidemic arbovirus. Lancet Infect Dis 2007; 7: 319-327.
2. Enserink M. Massive outbreak draws fresh attention to little-known virus. Science 2006; 311:1085.
3. Malvy D, Ezzedine K, Mamani-Matsuda M, Autran B, Tolou H, Receveur M et al. Destructive arthritis in a patient with chikungunya virus infection with persistent specific IgM antibodies. BMC Infectious Diseases 2009; 9:200.
4. Cavrini F, Gaibani P, Pierro AM, Rossini G, Landini MP, Sambri V. Chikungunya: an emerging and spreading arthropode-borne viral disease. Journal of infection in Developing Countries 2009; 3: 744-752.
5. Edwards CJ, Welch SR, Chamberlain J, Hewson R, Tolley H, Cane PA, Lloyd G. Molecular diagnosis and analysis of chikungunya virus. Jounal of clinical Virology 2007; 39: 271-275.
6. Robinson MC. An epidemic of viral disease in southern province, Tranganyika Territotry, in 1952-53. I. Clinical features. Transactions of the Royal Society of Tropical Medicine and Hygiene 1955; 49 (1): 28-32.
7. Chowdhury FI, kabir A, Das A, Mukerrama SM, Masud S. Chikungunya fever: an emerging threat to Bangladesh. Journal of Medicine 2012; 13: 60-64.
8. Khatun S, Chakraborty A, Rahman M, Banu NN, Rahman MM, Hasan, SMH et al. An outbreak of chikungunya in rural Bangladesh. PLoS Neglected Tropical Disease 2015; 9(7): e0003907
9. Faruque LI, Zaman RU, Gurley ES, Massung RF, Alamgir AS, Galloway RL et al. Prevalence and clinical presentation of Riketssia, Coxiella,Leptospira, Bartonella and chikungunya virus infections among hospital-based febrile patients from December 2008 to November 2009 in Bangladesh. BMC Infectous Diseases 2017; 17 (1): 141.
10. Hasan R, Rahman MJ, Moniruzzaman M, Rahim A, Barua S, Biswas R et al. Chikungunya an emerging infection in Bangladesh: a case series. Journal of Medical Case Reports 2014; 8: 67.
11. Rashad AA, Mahalingam S, Keller PA. Chikungunya virus: Emerging target and new opportunities for Medicine Chemistry. J Med Chem 2013; 57 (4):1147-1166.
12. Bharti N, Ramakritinan CM, Kolandas WK. Geographical information system based study on Dengue and chikungunya at western Ghat districts, Tamil Nadu, India. International journal of mosquito Research 2015; 2(3): 30-38.
13. Tomar MA, Hodiwala AVB, Khiste DD. Prevalence of chikungunya viral infection in a Tertiary care hospital Navi Mumbai Maharashtra. Journal of Medical Science and clinical research 2017; 5(1): 48-51.
14. Balasubramaniam SM, Krishnakumar J, Stephen T, Gaur R, Appavoo N. Prevalence of chikungunya in urban field practice area of a private Medical college, Chennai. Indian J community Med 2011; 36: 124-127.

15. Sergon k, Njuguna C, Kalani R, Ofulu V, Onyango C. Seroprevalence of chikungunya virus infection on Lamu Island, Kenya. Am. J. Trop. Med. Hyg 2004; 78: 333-337.

16. Kumar CVNM, Nadimpalli M, Vardhan VR, Gopal DVRS. Association of ABO blood groups with chikungunya virus. Virol. J. 2010; 7:140.

17. Mohanty I, Dash M, Sahu S, Naarasimham MV, Panda P, Padhi S. Seroprevalence of chikungunya in Southern Odisha. J. Fam. Med. Prim. Care 2013;2 (1): 33-36.

18. Akinola MT, EL-Yuguda AD, Bukbuk DN and Baba SS. Prevalence of IgG and IgM antibodies to chikungunya virus among outpatients with febrile illness attending University of Maidughuri Teaching Hospital, Maiduguri, Borno State, Nigeria. African Journal of Microbiology Research 2017; 11(7): 306-311

19. Sakhiya AJ, Gamit M, Prajapati K, Patel D & Shah P. Seroprevalence of chikungunya cases in a tertiary-care hospital in Ahmedabad. International Journal of Medical science and public Health 2015;4 (9): 1297-1300.

20. Sissoko D, Moendandze A, Malvi D, Giry C, Ezzedinek, Solet JL, Pierre V. Seroprevalence and risk factors of chikungunya virus infection in Mayotte, Indian Ocean, 2005-2006: a population-based survey. PloS ONE, 2008; 3:3066.

21. Moro ML, Gagliotti C, Silvi G, Angelimni R, Sambri V, Rezza G et al. Chikungunya virus in northeastern Italy: a serosurvay. Am. J. Trop Med Hyg 2010; 82: 508-511.

22. Kumar NP, Suresh A, Vanamail P, Sabesan S, Krishnamoothy KG, Mathew J et al. Chikungunya virus outbreak in Kerala, India, 2007: a seroprevalence study. Mem Inst Oswaldo Cruz, Rio de Janeiro 2011; 106 (8): 912-916.