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Prevention of Transmission of Zika Virus at Point of Entries - Experience from International Airport, Mumbai

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Abstract:

Introduction: *Zika virus is a mosquito borne flavivirus. It is transmitted by the bite of the Aedes Aegypti mosquito. In July 2015 Brazil reported an association between Zika virus infection and Gullain-Barre syndrome. In October 2015 Brazil reported an association between Zika virus infection and microcephaly. Considering the gravity of the situation, WHO has declared Zika virus disease to be a Public Health Emergency of International concern (PHEIC) on 1st February 2016.*

Objective: *To analyse/look through how well the PHEIC situation was managed at Mumbai Airport and problem faced if any.*

Methods: *Data available at APHO Mumbai from 1.2.2016 to 30.10.2016 was analysed. Information was collected by interviewing representatives of APHO, FRRO, CISF, Airport Manager and Airline Operators.*

Results: *During the study period a total of 2833244 international passengers arrived at C S I Airport. Out of 2833244 international passengers 31369 (1.1%) were from Zika affected countries. There was good Intersectoral coordination between Airport Authority, Local government, Nodal officer of Point of Entry and other stakeholders.*

Conclusion: *APHO, Mumbai has shown the capacity to detect, assess, report and respond to Zika PHEIC as per IHR 2005.*

Keywords: ***PHEIC, Zika Virus, POEs, APHO Mumbai, C S I Airport.***

Introduction:

Zika virus is a mosquito borne flavivirus. It is transmitted by the bite of the Aedes Aegypti mosquito. It was first identified in Uganda in 1947 in monkeys. It was later identified in humans in 1952 in Uganda and United Republic of Tanzania. Outbreaks of Zika virus disease have been recorded in Africa, the Americas, Asia and the pacific. From the 1960s to 1980s human infections were found across Africa and Asia, typically accompanied by mild illnesses.[1]

The first outbreak of the disease caused by Zika infection was reported from the island of yap in 2007. In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infections in Brazil. In July 2015 Brazil reported an association between Zika virus infection and Gullain-Barre syndrome. In October 2015 Brazil reported an association between Zika virus infection and microcephaly.[1]

World health organisation has reported 22 countries and territories in Americas from where local transmission of Zika virus has been reported.[2]

Zika virus disease has the potential for further international spread given the wide geographical distribution of the mosquito vector, a lack of immunity among population in newly affected areas and the high volume of international travel and there is no vaccine or drug available to prevent/treat the disease at present.[2]

Considering the gravity of the situation, WHO has declared Zika virus disease to be a Public Health Emergency of International concern (PHEIC) on 1st February 2016.

Till date the disease has not been reported in India. However the mosquito that transmits Zika virus namely Aedes Aegypti is widely present in India. In the Indian scenario, infection can enter India through the points of Entry i.e Airports, Ports and Ground border crossing.

So, the Govt of India took threat of Zika virus disease seriously and heightened the surveillance and risk communication at National and State levels and all the POE s were put on high alert.

Airport Health Organisation (APHO), Mumbai is a designated Point of Entry (POE) and a nodal agency for

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coordination of activities and containment of PHEIC. At present C.S.I Airport is the largest Airport in India in terms of both International and Domestic passengers. Daily more than 30,000 passengers arrive to C.S.I Airport Mumbai and handle more than 780 aircraft movement per day.

Objectives:

We wanted to analyse/look through how well the PHEIC situation was managed at Mumbai Airport and problem faced if any.

Methods:

Data available at APHO Mumbai for the period from 1.2.2016 to 30.10.2016 was analyzed. Information was collected by interviewing representatives of APHO, Foreigners Regional Registration Office (FRRO), CISF, Airport Manager and Airline Operators. All the orders related to Zika virus were scrutinized and assessed. It was found that Govt of India instituted a multipronged attack to control transmission of Zika virus within the country. They issued several guidelines for POE and community.

As per advisory issued by Ministry of Health & Family Welfare, Govt of India following steps was taken at APHO Mumbai:

1. **Coordination with other stakeholders working at Mumbai Airport:**
   a. Meeting with Municipal Corporation of Greater Mumbai (MCGM) and Airport Authority (GVK-MIAL).
   b. Doing HEALTH AWARENESS of all the stakeholders such as immigration officers, Airlines officials, Customs, Central Industrial Security Force (CISF) personnel in 'Airport Facilitation Committee meeting'.[3]

2. **Training:** Training of immigration officers were to be given on origin, mode of spread and control of this Zika PHEIC as they are the front line officers to interact with the incoming passengers. They were also assigned to distribute the pamphlets.

3. **Risk communication/Awareness programme for the passengers:** Govt of India issued guidelines regarding risk communication
   a. **Signage in the pre-immigration area**- Signages to be displayed in the pre-immigration area for arriving travelers stating that all travelers who have visited or transited through countries affected with Zika virus infection during the past 14 days and all having one or more symptoms e.g. Acute onset of fever, Rash, Joint Pain and/or Conjunctivitis should report to airport health unit.
   b. **Pamphlets containing travel advisory** – These were to be distributed by frontline officers e.g. Immigration officers to the passengers. Travel advisory consisted of 'Non-essential travel to the affected countries to be deferred/cancelled, Pregnant women or women who are trying to become pregnant should defer/cancel their travel to the affected area, All travelers to the affected countries/areas should strictly follow individual protective measures etc'.[4]
   c. **Scrolling message strip**-Message strip were to be displayed in several area of the Airport 'If you are having FEVER and RASH please contact ZIKA HELP DESK or Airport Health Organisation, Mumbai(Tel No. 022-26881011)) or Immigration staff'.

4. **Passive screening- M.I Room** preparedness and establishment of Health desk in the pre-immigration area was to be established and passive screening of cases were to be done as per case definition. Incoming passengers from affected countries were requested to report at the 'Zika Help Desk' if they were suffering from acute onset of fever, macula-papular rash and arthralgia. Suspected cases were to be sent to 'Kasturba infectious disease Hospital, Mumbai' and 'Hindu Hridaysamrat Balasaheb Thackeray Trauma care Centre, Mumbai 'for confirmation and isolation. Ten beds in each hospital were ear marked for Mumbai APHO. Confirmed cases were to be followed by state Government. The designated laboratory for APHO was 'National Institute of Virology Pune' and laboratory diagnosis of the cases had to be done by RT-PCR test. Daily reporting was to be sent to DDG (MH&IH) regarding number of cases screened and number of suspected cases. As per International Health Regulation 2005(IHR 2005), our national focal point is situated at NCDC, New Delhi.

5. **Vector control at Airport and Aircraft disinsection:** Aedes aegypti is the main vector species of ZIKA virus disease. This vector is widely prevalent in India and is common in most of the urban areas on account of deficient water management, presence of non degradable tyres and long lasting plastic containers as well as urban agglomeration. Aedes aegypti breeds almost entirely in manmade receptacles in and around the Airport such as flower pot, ornamental pond, cooler and freeze receptacle etc. Therefore, the key control to Zika virus disease is adoption of a comprehensive approach by way of regular antilarval measures with surveillance and fogging for adult mosquito killing.[6]

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Results:

On 1st February 2016, the Director General of WHO declared 'Zika virus Disease' as Public Health and on the same day notification we received from DDG(MH&IH) regarding public health measures to be taken at Airport and Port. Immediately it was circulated through Email to GVK, CISF, Immigration and Airline operators. Health Advisory was displayed in the arrival and departure on 4.2.2016 as ZIKA VIRUS ALERT for departing and arrival passengers.

Health awareness pamphlets were given to immigration officers for distribution of passengers going to Latin America.

From and on 2nd Feb 2016, Passive screening was started. Passengers arriving from Zika affected countries were instructed to report in the Medical Inspection (MI) Room as per the display in the signage.

Table 1: Month wise arrival of international passengers from Zika affected countries

Month	No of passengers from ZIKA affected countries	Total international passengers arrived at C S I Airport	Percentage
February	4106	276062	1.5
March	3989	305059	1.3
April	3578	281855	1.3
May	3205	323826	1
June	3412	365830	0.9
July	3230	376701	0.9
August	3223	277516	1.2
September	3200	289711	1.1
October	3426	336684	1
Total	31369	2833244	1.1

Out of all international passengers arrived at C S I Airport 0.9 to 1.5 percent were from Zika affected countries.

Zika Help Desk in the pre-immigration area was started on 7.9.2016. After 13 cases/ tested positive for Zika evidences were found in Indians at Singapore on 1.9.2016.

On 4.2.2016, we called for a meeting involving Municipal Corporation of Mumbai and GVK personnel consisting of Airport manager, Chief of the Doctor and vector control officer of GVK-MIAL. We discussed all the pros and cons to control this Zika PHEIC.

A major issue in the meeting was Aedes mosquito control in and around 400 meter of the Airport. This was due to congestion and lack of water movement in the Mithi River. The river was totally filled with water hyacinth. It was on the northern side of the airport and running just outside the boundary wall. Every year it was to be cleaned but this year cleaning has not started due to non selection of contractor by MCGM.

Table 2: Vector surveillance reports for the last three years

Year	Pre monsoon		Post monsoon	
	Airport Area	Municipal Area (400 meter around airport)	Airport Area	Municipal Area(400 meter around airport)
2013	Nil	10.89%	8.79%	12.30%
2014	2.8%	2.14%	1.03%	12.74%
2015	Nil	8.89%	14.9%	13.5%
2016	3.1%	1%	1.4%	Nil

It shows that average pre monsoon container index ranges from nil to 3.1%. On 6.2.2016, on behalf of National Vector borne Disease Control Programme (NVDCP), vector surveillance team from Pune arrived to do the vector surveillance in and around airport.

During the Zika PHEIC their survey showed 25% as container index. The authority for cleaning was MCGM and administrative selection of contractor was going on. So for the immediate purpose GVK-MIAL (Airport Authority) cleaned the river adjacent to the airport boundary and it was completed by 10th Feb 2016. MCGM completed the total cleaning of the river by the end of February 2016. The mosquito nuisance then greatly reduced as was evident from the NVDCP survey on 25.05.2016.

Vector surveillance wing of APHO Mumbai does weekly larval survey of Airport Area. NVDCP does cross checking in two times Pre-monsoon and post monsoon. Health

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education regarding Zika and control of Aedes mosquitoes were routinely given in the community surrounding 400 meter area of the airport by MCGM.

On 29.3.2016, a letter was written to Bureau of Immigration for orientation training on Zika virus disease and all total 75 immigration officers were trained in thirteen different batches.

Discussion:

Various stakeholders are operating in this Point Of Entry e.g. Immigration, customs, CISF, airline operators etc. So, Intersectoral coordination is a must. APHO Mumbai has shown an excellent example of Intersectoral coordination not only with internal stake holders but also with external stakeholders e.g. State Government.

Every minute detail was to be discussed in 'Airport Facilitation committee' from time to time and solutions with reddressal were jointly ventured.

Risk communication at every point of time to the passengers and stakeholders were remarkable.

The training of paramedical worker and immigration officer were very much beneficial regarding detection, assessment, reporting and responding.

Community awareness programme of the MCGM was remarkable as during the ZIKA PHEIC, as the container index for Aedes Aegypti was nil in and around the 400 meter surrounding the boundary wall of airport.

Shortage of doctor was a major problem. Manpower shortage for surveillance work on vector control was also a issue.

Stagnated Mithi river is a great environmental hazard for Mumbai Airport and large scale engineering method has to be adopted to permanently control the mosquito population.This time it had clearly shown that how environmental engineering i.e. cleaning the water hyacinth gave rise to a drastic reduction of container index of Aedes mosquito.

Conclusion:

APHO, Mumbai has shown the capacity to detect, assess, report and respond to this Zika PHEIC as per IHR 2005.

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