Brief Epidemiological report on Chikungunya outbreak in Bihar, India in 2017: Implications for control

ABSTRACT: Index case of Chikungunya was reported on 15 Feb 2017. Thereafter, few scattered cases were reported till 23 Aug 2017. Cases started increasing from 24 Aug 2017 onwards. From 15 Feb till 31 Dec 2017, total 1223 cases were reported from 32 districts in Bihar. 1 case each was also reported from Jharkhand & UP in the State. District most affected was Patna (1081 cases that represented 88% of the overall reported cases) > Nalanda (26 cases that represented 2% of the overall reported cases) followed by Vaishali (24 cases that represented 2% of the overall reported cases).0.40% of the cases were migratory. Case Fatality Rate (CFR) due to the disease was Nil in the State. The outbreak peak laid from 3-Nov to 12-Nov when 218 cases were reported. Out of 1223 cases, 100% cases were ELISA confirmed. Almost all age groups were affected but the frequency was greater in age group 21-30 (25%)> 31-40 (21%)>11-20 (19%). Males (61%) were more affected than females (39%). Out of the total 1223 cases, 100% of the cases were reported from Govt. institutions. State Health Department, Govt. of Bihar took many measures to limit the outbreak and through strengthening the surveillance and response activities, transmission of the disease was curtailed in the State.

KEY WORDS: Chikungunya, Case Fatality Rate, Surveillance, ELISA

1. INTRODUCTION

In India, Chikungunya outbreak was first reported in 1963 from Calcutta in (Sarkar, 1967). Dengue and Chikungunya were found circulating together. The mosquito-borne viral disease Chikungunya has affected more than 1 million people worldwide in epidemic outbreaks since 2005 which seem to have originated in the Kenyan coastal towns of Lamu and Mombasa (Chretien et al., 2007). Outbreaks of Chikungunya fever was also reported from Italy (Angelini et al.2007,a,b), Mauritius (Beesoon et al., 2006; Ramchurnet al.,2007, 2008) and from reunion island (Josseran et al.,2006).From February 2006 to 10 October 2006, the WHO Regional Office for South-East Asia reported 151 districts in 8 states/provinces of India affected by Chikungunya fever. The affected states were Andhra Pradesh, Andaman and Nicobar Islands, Tamil Nadu, Karnataka, Maharashtra, Gujarat, Madhya Pradesh, Kerala and Delhi. More than 1.25 million suspected cases were reported from the country, of which 752,245 were from Karnataka and 258,998 from Maharashtra provinces. In some areas reported attack rates reached 45%.Chikungunya is an acute viral infection transmitted to humans through the bite of an infected adult female *Aedes aegypti* mosquito which usually bites during daylight hours.

It is characterized by sudden onset of fever, chills, headache, nausea, vomiting and severe joint pain with or without swelling, low back pain and rash. The incubation period is usually 2-3 days but can range from 1-12 days. These symptoms are usually self-limiting and rarely fatal. In Bihar, first ever Chikungunya fever outbreak was reported from Nalanda district in

September 2011. Thereafter recurring outbreaks are being reported in the State. The present study was done to identify the epidemiology of the disease outbreak in Bihar in 2017 and suggest remedial measures for the prevention of future possible outbreaks of Chikungunya.

2. MATERIALS AND METHODS

Case definition

Standard Case definition as prescribed by NVBDCP, Govt. of India was used to identify the cases as mentioned below:

Probable or suspected case: An acute illness characterized by sudden onset of fever with any of the following symptoms: headache, backache, photophobia, severe arthralgia and rash

Confirmed (definitive) case: A patient meeting both the clinical and laboratory criteria,

A case compatible with the clinical description of chikungunya fever with at least one of the following: Demonstration of IgM antibodies by IgM antibody capture ELISA in a single serum sample; Detection of viral nucleic acid by PCR; Isolation of chikungunya virus from clinical specimen.

Further differential diagnosis for the confirmation of Chikungunya was done as Fever with or without arthralgia is a very common manifestation of several other diseases like Dengue Fever, Malaria, Leptospirosis, Enteric Fever, Rheumatic Fever, Reactive arthritis, Serum sickness illness, Rickettsial disease etc. Due to similarity in symptoms of Dengue and Chikungunya, majority of the clinicians underreport Chikungunya cases when compared to Dengue. Therefore, following criteria was used for differential diagnosis of Chikungunya cases

Sl. No.	Features	Chikungunya	Dengue
1.	Fever Onset Duration	Acute 2-4 days	Gradual 5-7 days
2	Rash	Maculopapular	Petechiae maculopapular
3	Arthralgia Frequency Duration	Frequent May last longer than a month	Less common Short duration
4	Hypovolaemic shock	Rare	Common
5	Leukopenia	Common	Infrequent
6	Thrombocytopenia	Infrequent	Common
7	Haematocrit	Normal	High

Data collection

Daily reports on Chikungunya were collected in prescribed format from the District Surveillance Unit, Integrated Disease Surveillance Programme (IDSP) that included case details from Govt. Medical Colleges and various Private Hospitals in the State.

Data analysis

The cases were analyzed with respect to time, place and person. Daily reporting on the health conditions of the cases and the status of the control measures like fogging and larvicidal spray in the affected area was monitored at the State level.

3. RESULTS AND DISCUSSION

Index case of Chikungunya was reported on 15 Feb 2017. Thereafter, few scattered cases were reported till 23 Aug 2017. Cases started increasing from 24 Aug 2017 onwards. From 15 Feb till 31 Dec 2017, total 1223 cases were reported from 32 districts in Bihar. 1 case each was also reported from Jharkhand & UP. District most affected was Patna (1081 cases that represented 88% of the overall reported cases) > Nalanda (26 case that represented 2% of the overall

reported cases) and Vaishali (24 cases that represented 2% of the overall reported cases).0.40% of the cases were migratory. Case Fatality Rate (CFR) due to the disease was Nil in the State. The outbreak peak laid from 3-Nov to 12-Nov when 218 cases were reported. Out of 1223 cases, 100% cases were ELISA confirmed. Almost all age groups were affected but the frequency was greater in age group 21-30 (25%)> 31-40 (21%)>11-20 (19%). Males (61%) were more affected than females (39%). Out of the total 1223 cases, 100% of the cases were reported from Govt. institutions. Health Department, Govt. of Bihar took various measures for the control of the outbreak. Health Alert including all the necessary guidelines and protocols on Chikungunya were sent to the districts & Govt. Medical Colleges & Hospitals, Bihar much earlier than the occurrence of the outbreak. Daily monitoring of the cases & the status of the control measures like fogging and larvicidal spray was done at the State level. Adequate stock of drugs, larvicide, malathion for larva and adult control and ELISA kits for laboratory confirmation of the samples was made available in the districts and Govt. Medical College & Hospitals respectively. In 2016, 608 cases of Chikungunya were reported in the State that just doubled in 2017 when 1223 cases were reported. With recurrent outbreaks of Chikungunya in the State, there is dire need to expedite the process of early preparedness for the control of outbreak. Strengthening the communicable disease surveillance in the State would help in early recognition of potential outbreaks and further would also help to reduce the morbidity and mortality due to the disease. Summary of the epidemiological observations have been briefed in Figure 1 and 2 and Table 1.

4. CONCLUSION

Overall 1223 cases of Chikungunya were reported during the outbreak period in 2017.The outbreak peak was recorded from 3-Nov to 12- Nov 2017 when 218 cases were reported. Patna district was most affected followed by Nalanda and Vaishali. Young adults of age group 21-30 were most affected. Males were more affected than females. Health Department, Govt. of Bihar took various measures for the control of the outbreak. By strengthening the surveillance and response activities, transmission of the disease was curtailed in the State. The outbreaks of Chikungunya are recurrently being reported in the State since 2011 which is a great concern for the State. Early preparedness to prevent the outbreak including active fever surveillance before the peak season would help in reducing the morbidity and mortality due to the disease in the State.

5. RECOMMENDATIONS

- Strengthening of the surveillance, particularly fever and entomological surveillance, along with appropriate response is important. Surveillance should also be strengthened in other unaffected areas to ensure appropriate and timely response.
- Sensitization of medical and para-medical personnel in the government as well as private sectors needs to be undertaken for appropriate and timely management of cases.
- District level coordination meeting comprising of local community leaders of affected areas and other departments like municipality and other stakeholders should be called to spread awareness regarding the disease & to prevent future outbreaks.
- Medical camps in affected areas would be beneficial as this would also ensure community awareness.
- For emergency, immediate control of infective mosquitoes may be undertaken by Pyrethrum space spray (2%) within 100 meters radius of a Chikungunya case house. However, in large areas having concentration of cases or areas with higher vector density, Malathion fogging must be undertaken on a priority basis.
- Anti-larval measures with Temephos (Abate) (1ppm) should be taken. Larvicide may be put in big drums and containers from which water cannot be discarded or thrown away.

- Vector & larval surveillance should be carried out throughout the year to map the vector density & larval breeding sites.
- Awareness of Community through IEC, IPC & BCC must be done for success of intervention methods. This should cover following aspects:
  i) Cause and transmission of Chikungunya fever, about the vector breeding places, specifically household container breeding and biting habits, etc, symptoms of the disease, management including treatment of the cases, and community measures for prevention of breeding and to prevent man mosquito contact.
  ii) Vector control measures like intensification of entomological surveillance in the area on regular basis, emptying the containers on weekly basis and scrubbing & drying them when not in use.
- All paces adjoining the affected areas where a case of Chikungunya has been recorded should be made alert & an eye on all the fever cases should be kept for timely referral & cases management and to prevent future outbreak.
- Possibility of providing regular water supply to residential areas.
- More number of laboratories should be strengthened to support for early diagnosis of
- Chikungunya fever and for blood collection from suspected cases.
- Waste management should be properly planned by District Health Authorities & Municipality.

Figure 1: Time Distribution of Chikungunya cases

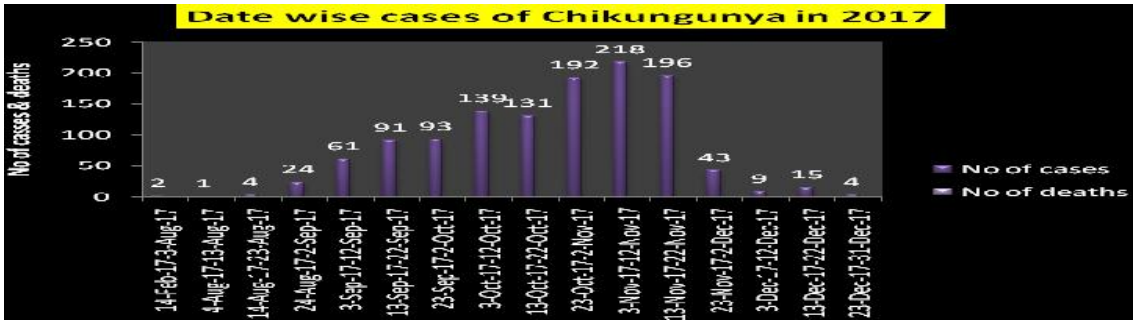

Table 1: Person distribution of Chikungunya cases

Age Group	Frequency	Percentage (%)
0-10	89	7
11-20	237	19
21-30	310	25
31-40	246	21
41-50	186	15
51-60	108	9
61+	47	4
Total	**1223**	**100**
Sex	**Frequency**	**Percentage (%)**
Male	740	61
Female	483	39
Total	**1223**	**100**

Figure 2: Place distribution of Chikungunya cases

4. FUTURE RECOMENDATION

From 6 Jun till 15 Sep 2017, total 25 cases were reported from 7 districts in Bihar. Out of total 25 reported cases, 7 were cross-notified from other States while 18 cases were reported within the State. District most affected was Patna (15 cases that represented 60% of the overall reported cases) > Gopalganj (3 case that represented 12% of the overall reported cases) followed by Muzaffarpur (2 cases that represented 8% of the overall reported cases).24% of the cases were migratory. The outbreak peak laid from 6-Jun to 26-Aug 17 when 18 cases were reported. Almost all age groups were affected but the frequency was greater in age group 21-30 (24%)= 41-50 (24%)>21-60 (20%). Males (68%) were more affected than females (32%). 89% of the internal cases were managed by providing drugs, masks and by keeping them under home isolation. 11% of the cases required hospital admission for treatment and management. Daily monitoring of the health conditions of each case was done and control measures were taken by the Health Department, Govt. of Bihar. Due to rigorous monitoring and active involvement by the Health Department at the State level, the H1N1 outbreak was efficiently managed and substantial mortality due to the disease was reduced in the State when compared to other States where many deaths were reported. The report would guide other outbreak prone States for early preparedness and to ensure public health response to manage future outbreaks due to H1N1.

7. REFERENCES

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