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Outbreak of dengue serotype 3 in villages of Morena district of Madhya Pradesh

M K Shukla and P V Barde

Introduction:

Dengue is an arthropod-born viral infection which manifests in flu like febrile illness and may lead to sever forms dengue fever (DF) dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS). The causal agent of DF is dengue virus (DENV) from genus flavivirus and family flaviviridae, the virus contains single positive sense strand RNA. An estimation study on prevalence of dengue demonstrates that it unfurls to the 128 counties and 3.9 billion people are at risk of infection with dengue viruses. Dengue virus has four serotypes, which are all infectious and antigenically related to each other and known as DENV-1, 2, 3 & 4.The principal vector of DENV is female mosquito of species *Aedes aegypti*, the mosquito is an anthropophilic day-time feeder. Dengue generally considered as a disease with urban and semi-urban spread, its vector also breeds mostly in urban habitats and man-made containers/utensils. Though witnessing recent past several studies published with reports on dengue outbreak and prevalence in rural and tribal areas.

The virology laboratory of National Institute for Research in Tribal Health (NIRTH), Jabalpur is an apex referral laboratory for dengue and chikungunya diagnosis in Madhya Pradesh (M.P.) and Chhattisgarh (CG). On request of State Programme Officer (State Vector Borne Disease Control Programme) M.P, NIRTH team of virology laboratory conducted outbreak investigations in 2 villages of district Morena.

Study Area:

District Morena is northern district of M.P. (26.30°N 78.00°E) bordering Rajsthan and Uttar Pradesh state. The district administered in a set-up of four sub-division and six tehsils with population of 19, 65,137. The average annual rainfall in district is 753.7 mm, normally maximum rainfall (about 91.8%) recorded during south west monsoon period i.e., June to September. Affected villages were Noorpur block Jaura and Gutikapura block Noorabaad as per district record and discussion with state programme officer and district health authorities (Fig 1-A). Village Noorpur has 71 households and Gutikapura has 106 households.

Results:

The door to door fever survey in 67 households of the village Noorpur and 77 household of village Gutikapura were carried out by NIRTH team in the month of September 2016 (Fig 1-B). Survey teams found 20 and 30 fever cases, of which 14 and 27 patients gave consent and blood samples for participation in the study from Noorpur and Gutikapura village respectively. Simultaneously 35 samples were collected from OPD/IPD patients from same villages treated at district hospital Morena. A total of 47 (61.8%) out of 76 samples were positive by various tests. Out of 29 admitted patients at district hospital, 46.80% were found positive for dengue. Analysis of demographic data revealed that age group 16-30 years was worst affected where age group 31-45 years was the lowest. Village wise positivity (Noorpur 61.8% and Gutikapura 63.9%) suggest both the villages were equally affected, though household with dengue positive cases showed two different patterns of spread. In village Gutikapura, cases were scattered all over the village where in Noorpur all the cases were aggregated to the house of index case. The qRT-PCR results showed aetiological agent of outbreak was DENV-3. Team also found positive container for *Aedes* larvae in five households of village Noorpur which were destroyed immediately (Fig 1-C).

As we recruited all 76 patients with fever in our study, though clinically headache was the second most prevalent symptom 39/23 (patients with symptoms/dengue positive), and other symptoms were also present as 29/18 arthralgia, 22/11 myalgia, 13/8 rigors, 13/10 retro-orbital pain, 12/7 chills, 7/6 vomiting, 6/4 stomach ache, 4/4 nausea, 4/4 diarrhoea, 2/2 high blood pressure, 2/2 rash, 1/1 jaundice. Platelet counts of 23 hospitalised patients were available of which 05 has count <50000cu/mm. Five cases also identified as CHIKV IgM reactive of those two were also positive for dengue IgM ELISA.

Discussion:

As per Morena district hospital pathology records from 8th to 16th September 2016 a total of 45 Dengue NS1 rapid diagnostic test card (J Mitra Co Ltd Cat No: IR028010) were found positive and authorities also informed three deceased haemorrhagic cases which is similar to previous findings from Central India. Spread of DENV in isolate villages were also reported from central

India. The outbreak of dengue with 61.8% positive DF cases in villages indicating that dengue is no more a sole urban and semi-urban viral disease. No significant difference in positivity was found in villages affected with outbreak though aggravated condense cases of dengue positive and larvae positive container near to house of index case in Noorpur suggest poor vector control and sensitisation. Team suggested district authorities to follow National Vector Born Disease Control Programme (NVBDCP) guidelines for effective and intense vector control strategy and sensitization. Delayed diagnosis was one of the major difficulties which were found in the study as early diagnosis helps to minimize the severity and initiation of vector control. Imported index cases and poor vector control with delay in notification and delayed diagnosis may cause explosive outbreak of DENV-3 young adults (age group 16-30) were most affected group among the patients which was reported earlier in different studies probably due to immunological or other epidemiological or social factors. Gender equality in affected patients (male 64.5% and female 60.0%) was found in study which was observed in previous study from Narshinghpur. Co-circulation of dengue and chikungunya was found in Noorpur village, though it has already been reported from this part of country which makes important to carry out simultaneous diagnostic tests for both dengue and chikungunya. We therefore suggest strengthening the diagnosis of vector borne diseases at local level which will help sending timely alarms and initiate control activities to avoid outbreaks.

The study was funded by ICMR (Grant No. VIR/43/2011-ECD-I)

Figure 1. A: Meeting and record observation by NIRTH team.



Figure 1. B: House to house fever survey



Figure 1. C: Larvae breeding container and spot destruction.



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- Kumar D. Goel AK. Use of antenatal care services and knowledge among Baiga women in Madhya Pradesh. Indian Journal of Scientific Research, July 2016; 7(1):197-200.
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- Chand G, Kaushal LS, Choudhari NK, Singh N. Mapping is a prerequisite for elimination of Filariasis and effective targeting of filarial 'hot spots'. Pathogens and Global Health. June-July 2016; 110(4-5):157-63.
- Rao VG, Bhat J, Yadav R, Muniyandi M, Bhondeley MK. Smoking and alcohol consumption: Risk factors for pulmonary tuberculosis amongst the tribal community in central India. Indian Journal of Tuberculosis (in press).

Workshops/Trainings/Meetings attended

Dr. Neeru Singh, Director

- "Expert Group meeting for Malaria in Pregnancy" organized by Maternal Health division of Ministry of Health & Family Welfare, Government of India for developing policy for prevention and treatment of malaria during pregnancy on 5th May, 2016 under the chairmanship of Dr. Dinesh Baswal, Deputy Commissioner, Maternal Health division, MoHFW, Govt. of India at Taj Vivanta Ambassador, New Delhi.
- Meeting of Executive Council, ICMR held at ICMR, New Delhi on 13th May 2016.
- 1st meeting of the Executive Committee for Sickle cell Anaemia on 20th May 2016 at Ministry of Science & Technology, Government of India.
- Visited Washington D.C. USA to attend the Workshop on 'Problem Formulation for the Use of Gene Drive Technology in Mosquitoes' organized by the Foundation for the National Institutes of Health (FNIH), Rockville Pike Bethesda, MD and Bill & Melinda Gate Foundation from 25th to 27th May 2016.
- Meeting of the Stakeholders of the NIRTH Field Station on Tribal Health, at Keylong, Lahaul & Spiti on 31st May 2016.





- Attended 'Technical consultation on *P. falciparum* hrp2/3 gene deletions' as an expert invited by the World Health Organization (WHO)/Global Malaria Programme (GMP), Geneva, Switzerland held on 7th and 8th July, 2016. She presented the prevalence of Pfhrp2 and Pfhrp3 gene deletion in India covering 8 endemic states which contribute 80% malaria, 85% *P. falciparum* and 70% death due to malaria in the country.



- PRC meeting to review the projects under THRU via Skype call on 27th July 2016.

Dr. V. G. Rao, Scientist G

- Joint ICMR-WHO workshop for the 'Development of TB Prevalence Survey protocol 'from 10th to12th May 2016 at ICMR, New Delhi.
- Member, Assessment team, concurrent assessment of private sector engagement intervention for TB under Universal Access to TB Care (UATBC) Project, Delhi and Mumbai from 16th to 21st May 2016.
- Meeting at Office of the National Health Mission (M.P.) on 8th July 2016 regarding funding of research projects on Tuberculosis, Scabies, Rational use of anti-malarial drugs, prevention of tobacco use and Dengue control in tribal areas of M.P. Mrs. Gauri Singh [IAS] Principal Secretary, Health and Family Welfare, Govt. of M.P. chaired the meeting. Dr. V.G. Rao, Scientist 'G', Dr. Tapas Chakma, Scientist 'G', Dr. K.B. Saha Scientist 'E' and Dr. Pradip Barde Scientist 'D' from NIRTH presented the proposed projects. Dr. K.L. Sahu, Director Health Services, Govt. of M.P. and Dr. Rajeev Saxena, Additional Director (Finance) Health Services, Govt. of M.P. was present.



- DST-ICMR Workshop on "Climate Change Impact on Human Health "on 25th and 26th July 2016, New Delhi.
- Review meeting of the Tribal TB Task Force project, Institute of Medical Sciences (PIMS) on 29th and 30th August 2016 at Puducherry.

Dr. Tapas Chakma, Scientist G

- Two days workshop on formulation of Ethical Guidelines for Research in Marginalized communities on 21st and 22nd May, 2016.
- Meeting on MRHRU Chhattisgarh at Raipur on 14th June 2016.

Dr. GyanChand, Scientist E

- State level meeting for solution of additional sites for mf survey on 24th June 2016 at Bhopal.

Dr. Praddep V. Barde, Scientist D

- Meeting at ICMR New Delhi regarding Transgenic Mosquito on 23rd and 24th May 2016.
- Dr Barde and Mr. M. J. Ukey attended meeting organised by WHO regarding polio sero survey at Bhopal on 1st July 2016.
- Meeting regarding viral haemorrhagic fever network project at Pune on 30th August 2016.
- Mr. M. K. Shukla, SRF-VRDL Project and Mr. M. J Ukey have successfully completed training on ZIKA virus diagnosis from 15th to 19th February 2016 at National Institute of Virology, Pune.
- Mr. A. K. Thakur, SRF-VRDL Project, was selected for MedTech Internship Award-2016 organized by ICMR and IIT-Kharagpur at IIT-Kharagpur. He did his internship under the guidance of Prof. Pralay Mitra at the Department of Computer Science and Engineering, IIT-Kharagpur (W.B) from 9th May to 3rd July 2016.
- Mr. Rameshwar Pralhad Khedekar, Technician 'C' and Mr. Piyush Joshi, Technical Assistant-VHF Project attended training organized at NIV, Pune from 1st to 10th September 2016. The training was organized for technical exposure of the Virology staff for application in performing laboratory practices under VHF-Project.

Dr. Vidhan Jain, Scientist C

- Successfully completed NIE, Chennai offered 20 hour online course on "Health Research Fundamental" organised in collaboration with NPTEL (National Programme of Technology Enhanced Learning) and IIT Chennai from 18th July to 15th September 2016.

Workshops/Trainings/Meeting conducted

- The 6th Regional Workshop on "Capacity Building of the Faculty/Researchers in the Medical Colleges/Research Institutions" was conducted by Dr Tapas Chakma, Scientist G under the scheme of Multi-Disciplinary Research Units (MRUs) of Department of Health Research, Ministry of Health & Family Welfare, Govt. of India at National Institute for Research in Tribal Health, Jabalpur from 16th to 18th May 2016.



- A two days workshop to finalize the ethical guidelines for biomedical research on tribal population was held on 21st and 22nd May 2016 at National Institute for Research in Tribal Health, Jabalpur. Dr. Y.K. Gupta, Professor and Head, Department of Pharmacology, AIIMS, New Delhi chaired the meeting. Dr. Vijay Prakash Mathur, Additional Professor, Centre for Dental Education and Research, AIIMS, New Delhi was present as subject expert.



Events

- The Institute celebrated International Yoga Day on 21st June 2016. Dr. R.S. Sharma, Vice chancellor, MP Medical Science University, Jabalpur chaired the session.



- The institute celebrated 'International Day of the World's Indigenous Peoples' on 9th August 2016 at National Institute for Research in Tribal Health, Jabalpur with zeal and enthusiasm. Shri Faggan Singh Kulaste, Hon'ble Minister of State for Health & Family Welfare, Govt. of India, graced the occasion as Chief Guest. Other dignitaries present includes Smt. Nandini Maravi, Hon'ble MLA, Sihora Constituency, Jabalpur, Shri Chhote Singh, Additional Collector, Jabalpur, Dr. Rooplekha Chauhan, Dean, NSCB Medical College, Jabalpur, Dr. Harpreet Kaur, Scientist 'E' and acting ECD Chief, ICMR, New Delhi and Dr. Debashish Chatterji, President, DISHA, Darekasa, Gondia, Maharashtra. The local tribal youths/students, Principals of schools and Sarpanch from various villages of Baigachak area,Dindori were awarded for their remarkable performance in terms of sensitizing masses on malaria and health utilization during 2011-2015 in the institute's IEC intervention project on malaria at Dindori.





- The Institute celebrated 70th Independence Day on 15th August 2016 with great enthusiasm. Dr. VG Rao, Scientist F & Director In-charge hoisted the flag.

Visits



- Dr. Venkatachalam Udhayakumar, Associate Director for Laboratory Science, Division of Parasitic Diseases and Malaria, Center for Global Health, CDC, Atlanta, GA, USA visited the institute and delivered a talk on use of Luminex Multi Disease Surveillance on 22nd August 2016.The Director In-charge, Scientists, technical staff and students of NIRTH were present.

Promotion/Transfer/Superannuation

- Mr. Arvind Kavishwar promoted to Technical Officer-A and Mrs. Reena Shome promoted to Technical Assistant on 4th July 2016.
- Mr.Vikas Kumar Gupta, Mr.Rahul Koshta and Miss Anjali Rajput appointed as Lower Division Clerk, Miss Sneha Bhandari appointed as Technical Assistant and Mr.Anup Kumar Vishwakarma, Mr.Surendra Singh Mehra, Mr. Ramshwaroop Uikey and Mr. Puneet Kumar Gupta appointed as Techincian-A,
- Mr. P.Vinay Rao retired on 30th June 2016 from the post of Technical Officer-A.
- Mr. M.L.Patel retired on 31st July 2016 from the post of Technical Assistant.

