

Seroprevalence of Dengue in Chandrapur Urban and Rural areas: A Retrospect

Rajendra Bhanudas Surpam¹, Bhausaheb Anil Mundhe^{2*}, Virendra Shankarrao Kolhe³

¹Professor and Head, Department of Microbiology, Govt. Medical College, Chandrapur, Maharashtra, India

²Associate Professor, Department of Microbiology, Govt. Medical College, Chandrapur, Maharashtra, India

³Assistant Professor, Department of Microbiology, Govt Medical College, Chandrapur, Maharashtra, India

Received: 24-09-2021 / Revised: 29-10-2021 / Accepted: 15-11-2021

Abstract

Introduction: Dengue was emerged from eastern parts of India as first epidemic catastrophe in early 70's aiming lakhs of in-house deaths till date. Considering burden of the disease on society in the present COVID era Dengue is seeking top priority of the medical practitioners for prevention and cure of the disease. Therefore, we have aimed this study to depict the yearly variation on dengue cases from August 2020 to July 2021 which may help in assembling a buoyant health care system against the disease. **Material and methods:** Serum samples from suspected cases of dengue illness were processed for IgM anti dengue antibody by Dengue IgM capture ELISA (Mac ELISA). **Observation and Results:** A sum 965 samples (536 males and 429 females) from dengue suspected cases were processed in Microbiology research laboratory. Out of 965 samples a total of 265 (158 males and 107 females) samples were found reactive for IgM capture dengue ELISA. With a period, prevalence of dengue for a period of 12 months is 27.46%. On the other hand, the period prevalence of dengue amongst the male dwellers of Chandrapur was found to be 29.47%. While in females the period prevalence was observed to be 24.24%. **Conclusion:** Dengue cases were maximum in the mid of the monsoon. If vector control measures and amended disease surveillance strategies are followed in this period then it will be beneficial to break the chain of disease spread.

Keywords: Period prevalence, Dengue, Dengue haemorrhagic fever (DHF), Dengue shock syndrome (DSS), ELISA.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Dengue is a tropical viral borne disease mainly caused because of different strains of dengue virus which were previously supposed to be self-limiting disease. Dengue was emerged from eastern parts of India as first epidemic catastrophe in early 70's aiming lakhs of in house deaths till date.[1,2]

Considering modern advancement in treatment of the disease deaths due to Dengue shock syndrome (DSS) and dengue haemorrhagic fever (DHF) are considerably out braking the numbers when compared to self-limiting dengue fever (DF).[3] Also there is increased frequency of DHS and DSS in recent times this change could be attributed to reformation of the diseases from occurring due to its four different serotypes and a only little protective immunity besides the other serotypes. This has led to a huge chaos towards the beginning of the century grossly hampering the Indian continent.[3,4]

Dengue has become a serious point of concern both in rural as well as urban population because of its increased mortality rate. Till date more than half a dozen of out breaks were experienced only by Capital of India alone since 1967. Such frightening outbreaks and sporadic spread of the disease is continually asking medical professionals to take firm preventive action against it.[5]

In today's date more than 40% of the globe's inhabitants are at risk with a probability 500 000 people with severe dengue compelled for hospitalization every year out of which 2.5% of individuals lose their lives to the disease.[5]

Dengue had also badly struck Maharashtra state making its potential call at Mumbai in the year 2003 with similar catastrophic

outbreaks in Marathwada (Parbhani) and North Maharashtra region (Dhule).[7-9]

Considering burden of the disease on society in the present COVID era Dengue is seeking top priority of the medical practitioners for prevention and cure of the disease. Therefore we have undertaken this study to depict the yearly variation on dengue cases from August 2020 to July 2021 which may help in assembling a buoyant health care system against the disease.

Material and Methods

The present study was carried out at sentinel surveillance centre in Department of Microbiology, Government Medical College, Chandrapur. The present study was carried out in the period of August 2020 to July 2021. The reports for Dengue were made from sample received by Chandrapur city and district. Demographic evidences like age, sex, address, and patient's particulars like date of hospitalisation, history of present illness, signs, and symptoms were gathered.

Collected samples were processed for IgM anti dengue antibody by Dengue IgM capture ELISA (Mac ELISA). The ELISA machine utilised for making reports was mindray micro plate reader model: MR-96A by Shenzhen Mindray bio-medical electronics, Shenzhen, China. Observed conclusions were made out as given in literature and the data acquired was employed for perception of seroprevalent dengue in Chandrapur district.

Results

A sum 965 samples from dengue suspected samples were handled in Microbiology research laboratory. A total of 265 tested samples were found to be reactive for IgM capture dengue ELISA as depicted in table. 1. Considering the total population under study 536 were males and 429 were females. Amongst these 158 males and 107 females were positive. Considering monthly distribution most number of suspected cases were seen in the month of August were 287 of which 101 were dengue positive.

With the present scenario Prevalence of Dengue amongst the population of Chandrapur district could be calculated as:

*Correspondence

Dr. Bhausaheb Anil Mundhe

Associate Professor

Department of Microbiology

Govt. Medical College, Chandrapur, Maharashtra-442401, India.

E-mail: drbhausaheb@gmail.com

Prevalence of Dengue = total number of positive cases / sample size under observation ×100.Hence period prevalence of dengue for a period of 12 months is 27.46%.

Considering point prevalence of Chandrapur district month of August was highest and climbed up to 35.19%. On the other

hand the period prevalence of dengue amongst the male dwellers of Chandrapur was found to be 29.47%. While in females the period prevalence was observed to be 24.24%.

Table 1: Monthly distribution of Dengue suspects in males and females

Year-20-21	Male			Female			Total		
	Tested	Positive	Negative	Tested	Positive	Negative	Tested	Positive	Negative
Aug-20	164	62	102	123	39	84	287	101	186
Sep-20	65	12	53	25	3	22	90	15	75
Oct-20	34	13	21	27	5	22	61	18	43
Nov-20	25	6	19	30	9	21	55	15	40
Dec-20	17	4	13	16	3	13	33	7	26
Jan-21	14	4	10	6	2	4	20	6	14
Feb-21	9	0	9	13	2	11	22	2	20
Mar-21	13	3	10	11	0	11	24	3	21
Apr-21	10	1	9	6	1	6	16	2	15
May-21	6	0	6	1	1	0	7	1	6
Jun-21	5	0	5	18	3	15	23	3	20
Jul-21	174	53	121	153	39	113	327	92	234
Total	536	158	378	429	107	322	965	265	700

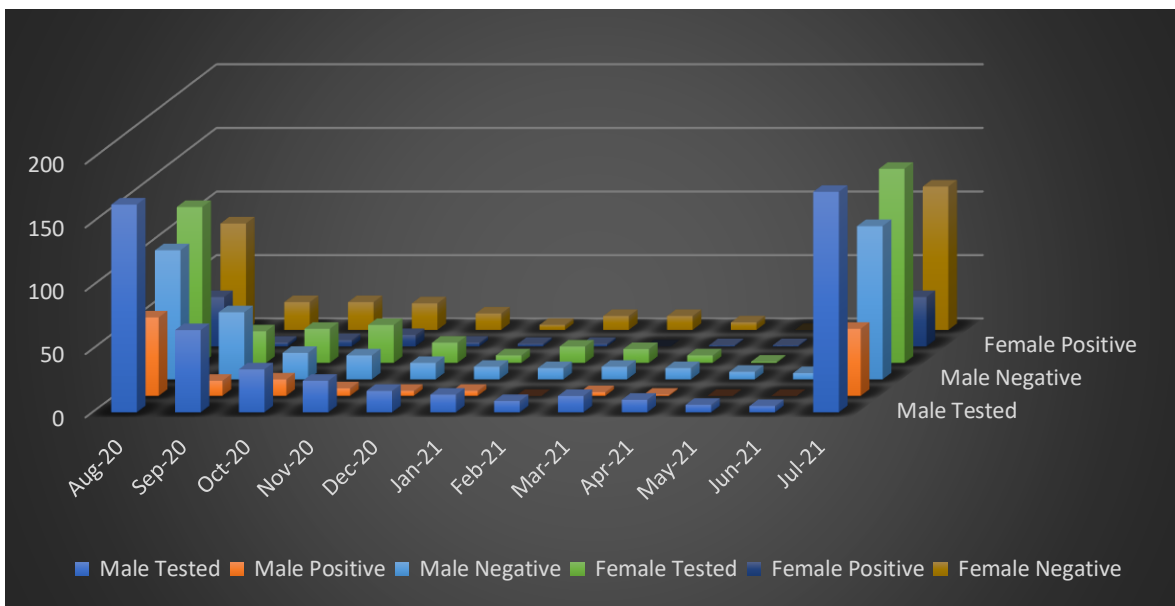


Fig. 1: Distribution of Dengue reports in year August 2020 – July 2021

Considering various zones of Chandrapur city and districts number of cases were divided as per their reporting / residing areas to look for number of cases and their geographical distribution. Table no. 2 depicts region wise distribution of cases as follows

Table 2: Region wise reported dengue cases

Name of zone	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
CHANDRAPUR URBAN AREA													
Zone 1	4	1	3	3				1			1	12	25
Zone 2	61	12	1	1	1							41	117
Zone 3	3											4	7
Zone 4	2					1							3
Zone 5	3				1							1	5

Zone 6	2		1	1	1							2	7
Zone 7	7	1	1	3	2							14	28
CHANDRAPUR RURAL AREA													
Gondpimpri	19		1	2	2	3		2	2	1	2	10	44
Jiwati		1											1
Mandwa			3										3
Konsasar			3			1						1	5
Warora			4			1							5
Naranda				5			2						7
Bhadrawati				1									1
Ballarpur												1	1
Chandankheda												1	1
Nagari												3	3
Pombhurna												2	2

Considering the region wise distribution of Chandrapur district; the city is divided into seven zones of which zone 2 is having maximum number of cases number tending to 117 (60%) amongst the total 192 cases found in municipal area or the Urban area.

Considering the peripheral or rural area of Chandrapur district Gondpimpri region is having maximum number of cases 44 out of the sum 73 cases found in rural area of Chandrapur.

Discussion

Dengue has become a massive obligation on Indian population with its four different serotypic versions (DEN 1-4) which are found prominently even in remote places of our country. Considering lessons from previous lethal epidemics of the diseases now it has become our utmost priority to prevent the spread of the diseases. This will directly or indirectly help to circumvent its overburdened complications like dengue haemorrhagic syndrome (DHS) and dengue shock syndrome (DSS).

In our country metastatic out breaks were seen from Delhi, West Bengal, and Punjab to Karnataka (Bengaluru) in the earlier part of this century demarcating the need to strengthen health care system.[10-12]

In the present study a total of 27.46% of the patients were positive out of the total suspected cases with similar sign and symptoms. These outcomes were coinciding with recent dengue out breaks from Parbhani and Dhule district. In in the year 2019-20 nearly 31.6% cases were positive in Chandrapur district which is showing a ray of hope to success of health care system in the region prompting our system to make more rigorous efforts towards prevention of the disease.[8,9,13]

In present study it was observed that peak of Dengue occurred during mid of the monsoon season in the month of August 20 and July 21. It goes along with the fact that this period of the season is favourable for breeding of mosquitos specially the known vector the disease aedes aegypti. Hence this time of the season could be the best time for to operate pest control programme which will prove to the mile stone in regulating Dengue in Chandrapur region with a hefty area covered by dense forests similar school of thought was run by Ram S. in accordance with R. Surpam.[14,15]

With application of these preventive measures along with dengue its complications like DHS, DSS and thrombocytopenia can also be prevented. [16]

In current study it was observed that period prevalence of Dengue amongst males was 29.47% which is more as compared with

females which was 24.24% comparable results were seen by Mehendale SM in nearby region Nagpur for a period of five years.[8]

PM Ukey also had detected that approximately 31% patients were seropositive who are inherent of Nagpur city and district. The rise in the disease was observed during mid and late monsoon period these conclusions are consistent with the annotations of present study.[17]

Considering the Sex ratio between the seropositive patients in present-day study were having a few differences concurrent results were also observed by T. Arun marking out a greater number of affected males as associated with females.[18]

In present study it was also observed that a large number of Dengue cases were emerged from Zone 2 of Chandrapur Urban and Gondpimpri of Chandrapur rural population. This clustering of disease and its outbreak could be attributed to the fact that these regions are very close or lies nearly to the centre of paddy fields having loads of stagnated water. Hence to dodge such outbreaks early diagnosis and treatment of the disease plays a key role. The finding of the present study is in accordance with Shastri J and Pridhivi S who further elaborated use of Taq Man assay for epidemiological investigations of the disease and strict vector control measures to avoid epidemic outbreaks of the disease are a must.[19,20]

Hence with the outcomes of this study it can be observed that cases of Dengue were maximum in the month of July and August that is in the mid of the monsoon season. If vector control measures and amended disease surveillance strategies are followed in this period then it will be beneficial to break the chain of disease spread. Also waste management, residual water bodies management and community education programme should be implemented with highest priority during this season.[21]

The study pulls attention towards the fact that dengue cases are more in central part of our country specially Chandrapur region with its prevalence of nearly 27% making its hattering epidemic in this region. Appropriate explorations, firm monitoring and swift reassuring management can lower mortality and spread of dengue; which could be a marching stone en route for creating a Dengue free India.

Acknowledgement

Department of Microbiology acknowledge the technical support extended by Dr. Satyadev Dhote, Mr. Sandip Badge, Mrs. Supriya

Ture, Laboratory scientific officers and our Dean for rendering his administrative support.

References

1. Broor S, dar L, Sengupta S, Chakraborty M, Wali J P, Biswas A, Kabra S K, Jain Y, Seth P. Recent dengue epidemic in Delhi, India. In Factors in the emergence of arbovirus diseases, edited by: Saluzzi JE, Dode B, Paris: Elsevier 1997, 123-27.
2. Rao CV. Dengue fever in India. Indian J Pediatr. 1987 Jan-Feb;54(1):11-14
3. Dar I, Broor S, Sengupta S, Xess I, Seth P. The first major outbreak of dengue haemorrhagic fever in Delhi, India. Emerg Infect Dis 1999, 5:589-90.
4. Cecilia, D. Dengue Re-emerging disease. In: NIV Commemorative Compendium. National Institute of Virology, Golden Jubilee Publication. 2004; 1: 278-307.
5. Anuradha S, Singh N P, Rizvi S N, Agrawal S K, Gur R, Mathur MD. The 1996 outbreak of Dengue haemorrhagic fever in India. Southeast Asian J Trop Med Public Health 1998, 29: 503-06.
6. Rodrigues, F.M., Patankar, M.R., Banerjee, K., Bhatt, P.N., Goverdhan, M.K., Pavri, K.M., M. Vittal. Etiology of the 1965 epidemic of febrile illness in Nagpur City, Maharashtra state, India. Bull. WHO. 1995; 46: 173-9.
7. Shah I, G C Deshpande, P N Tardeja. Outbreak of dengue in Mumbai and predictive markers for dengue shock syndrome. Journal of Tropical Paediatrics 2004, 50:301-05.
8. Mehendale SM, Risbud AR, Rao JA, Banerjee K. Outbreak of Dengue fever in rural areas of Parbhani district of Maharashtra, India. Indian J Med Res. 1991;93:6-11.
9. Paddidri VS, Mahadev PV, Thakre JP, Pant U, Illkal MA, Varghese GG, et al. Virological and entomological investigations of an outbreak of Dengue fever in Dhule district, Maharashtra. Indian J Med Microbiol. 1996;14:25-32
10. George S, Soman RS. Studies on Dengue in Bangalore City: Isolation of virus from Man and Mosquitoes. Indian J Med Res. 1975;63:396-401.
11. Kaur H, Prabhakar H, Mathew P, Marshalla R, Arya M. Dengue haemorrhagic fever outbreak in October-November 1996 in Ludhiana, Panjab, India. Indian J Med Res. 1997;106:1-3.
12. Gupta E, Dar L, Narang P, Srivastava VK, Broor S. Serodiagnosis of dengue during an outbreak at a tertiary care hospital in Delhi. Indian J Med Res. 2005;121:36-8
13. Bhausahab Munde, Rajendra Surpam, Virendra Kolhe. Prevalence of seropositive dengue cases in Chandrapur district. IJSR. 2020;9(3): 29-30.
14. Dr. R. Surpam, Dr. B. Munde, Dr. V. Kolhe, Dr. O. Bobade. Prevalence of seropositive dengue cases in Chandrapur district: A retrospect. IJSR. 2019; 8(8):19-20.
15. Ram S, Khurana S, Kaushal V, Gupta R, Khurana SB. Incidence of dengue fever in relation to climatic factors in Ludhiana, Punjab. Indian J Med Res 1998;108:128-33.
16. Elzinandes Leal de Azeredo, Robson Q. Monteiro, and Luzia Maria de-Oliveira Pinto, "Thrombocytopenia in Dengue: Interrelationship between Virus and the Imbalance between Coagulation and Fibrinolysis and Inflammatory Mediators," Mediators of Inflammation. 2015; 3:1-16.
17. PM Ukey, SA Bondade, PV Paunipagar, RM Powar, SL Akulwar. Study of Seroprevalence of Dengue Fever in Central India. Indian J Community Med. 2010 Oct-Dec; 35(4): 517-519.
18. Tank Arun G, Jain Mannu R. Trend of dengue in a tertiary care hospital of Surat city, western India. National Journal of Community Medicine. April 2012; 3 (2): 302-304.
19. Shastri J, Williamson M, Vaidya N, Agrawal S, Shrivastav O. Nine-year trends of dengue virus infection in Mumbai, Western India. *J Lab Physicians*. 2017;9(4):296-302. doi: 10.4103/JLP.JLP_169_16.
20. Prudhivi S, Yenigalla BM, Myneni RB. Incidence of dengue in a rural hospital, Chinakakani, Andhra Pradesh, South India and comparison of two commercially available enzyme linked immunosorbent assays with immunochromatographic rapid test. Int J Res Med Sci. 2014;4:1534-40.
21. R. S. Sharma, Roop Kumari, P. K. Srivastava, Kalpna Barua, L. S. Chauhan. Emergence of Dengue Problem in India – A Public Health Challenge. J. Commun. Dis. 2014; 46(2): 17-45.

Conflict of Interest: Nil

Source of support: Nil