



CLINICO-DEMOGRAPHIC PROFILE AND SEROPREVALENCE OF DENGUE AT A TERTIARY CARE HOSPITAL - CENTRAL INDIA

Bhawana Bajare	Assistant Professor, Government Medical College And Hospital, Nagpur
Prerna Robinson*	Junior Resident, Government Medical College And Hospital, Nagpur *Corresponding Author
Sandeep Kokate	Associate Professor, Government Medical College And Hospital, Nagpur
Sunanda Zodpey	Professor & Head Of Department, Government Medical College And Hospital, Nagpur

ABSTRACT

Background: Dengue virus infection has been a major public health problem over the past decades. The disease is endemic in many parts of India. Mortality is high when dengue manifests as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). Early diagnosis and treatment greatly help prevent complications. **Aim:** The study was aimed to determine the clinic-demographic, and seroprevalence of dengue infection among patients attending Government Medical College and Hospital, Nagpur, Maharashtra during the period from January 2021 to December 2021. **Methods:** In a retrospective study from Jan 2021-December 2021 blood samples were withdrawn from patients with fever. Samples were tested with BeneSphera Dengue NS1 and Dengue IgG/IgM Rapid card test (Lateral flow). **Results:** Serodiagnosis of dengue at tertiary care hospitals was 23.44% (1062/4530). The most affected group was 21-30 years old. Men (64.08%) were more affected. Common features were fever 1062 (100%), headache 508 (52%), body aches 205 (21%), vomiting 205 (21%), itching 68 (7%), rash 29 (3%). Of the 1062 dengue-positive cases, 998 (93.97%) were NS-1 positive, 18 (1.69%) were IgM positive, 21 (1.97%) were IgG positive, and 25 (2.35%) were NS1+. was IgM positive. Dengue cases peaked in August. **Conclusions:** The dependability of Immunochromatographic test makes it an excellent tool for early diagnosis and treatment. Dengue cases were more during August, so it is useful to plan special preventive strategies to prevent the outbreaks.

KEYWORDS : Dengue, Seroprevalence, clinic-demographic profile.

INTRODUCTION

Dengue is a systemic, febrile disease caused by a mosquito-borne virus known as Dengue virus (DENV) and is one of the major public health problems in tropical and subtropical countries.^{1, 2} DENV is a small (50 nm) enveloped virus that belongs to the genus *Flavivirus* of the family "Flaviviridae".³

Dengue virus infection has become a notable public health problem in terms of morbidity and mortality over the past decades.⁴ Mortality in patients with dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) can reach as high as 44%.⁵

The increase in outbreaks of this disease has been attributed to inadequate water storage, rampant and unplanned urbanization, overcrowding, inadequate sanitation and sewage systems, and breeding grounds for vectors in urban, semi-urban, and rural areas. is rapidly increasing.⁶

MATERIALS AND METHODS

This retrospective study was conducted at the Department of Microbiology, GMC, Nagpur from the period of January 2021-December 2021. About 3-5ml blood was collected in a sterile vial with all aseptic precautions. The serum was separated from the sample and treat with early dengue diagnostic tests, viz., rapid NS1 antigen, IgG and IgM. The duration of fever (in days) and other relevant clinical information were recorded from the requisition form. Rapid test for dengue as NS1Ag, IgG and IgM test were performed in accordance with the manufacturer's instructions. The dengue NS1Ag, IgG and IgM rapid test is an in vitro immunochromatographic test (ICT), a one-step assay designed for the qualitative determination of dengue NS1Ag, IgG and IgM in human serum for the diagnosis dengue infection. About 50 μ l of patients serum was added to the sample well marked as "S" and then three drops of buffer were added in the buffer well marked as "B". The result was interpreted in 20-30 min. The presence of only one color line within the control line marked as "C" indicated negative result and the presence of two color lines within the marked as "T" band and "C" line indicated a positive result.

The test was concluded as invalid when no control line (C) was found.

RESULTS

A total number of 4530 samples were tested, out of which 1062 were positive. So, the Seroprevalence of dengue in GMC, Nagpur was found to be 23.44 % as shown in Table 1.

Table 1: Seroprevalence Of Dengue

Total no of patients	Dengue positive patients	%
4530	1062	23.44

Table 2: Age, Gender-wise Distribution Of Patients Tested For Dengue Serology (jan 2021 - Dec 2021)

Age in years	Total no. of cases (%) (Male)	Total no. of cases (%) (Female)
0-10	57 (8.38)	33 (8.63)
11-20	175 (25.73)	91 (23.79)
21-30	238 (35)	110 (28.79)
31-40	122 (17.94)	89 (23.29)
41-50	73 (10.73)	38 (9.94)
>50	16 (2.35)	21 (5.49)
Total	680	382

Table 2: Shows That The Maximum Positive Cases Were In The Age Group Of 21-30 Years (35%)

Sex-wise seroprevalence of dengue virus infection (Jan 2021 - Dec 2021)

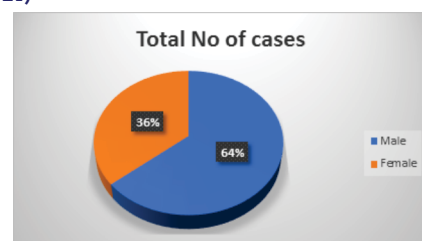


Figure 1: shows that Males (64%) were affected more than females (36%).

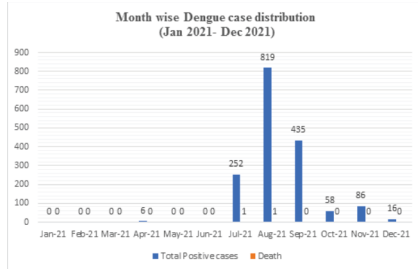


Figure 2: The infection started spreading in July, peaked in August, and slowly tapered by December. The seasonality of transmission of dengue with increased activity in monsoon and post-monsoon seasons was seen in the present study. Two death case has been reported.

Clinical Profile Of Dengue Patients (n= 1062)

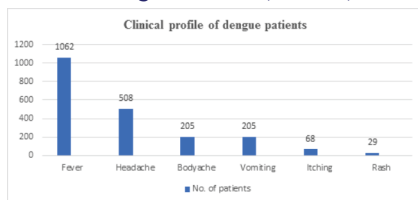


Figure 3: The common symptoms of dengue were fever (100%), body ache (21%), headache (52%), vomiting (21%), and rash rare 3% only.

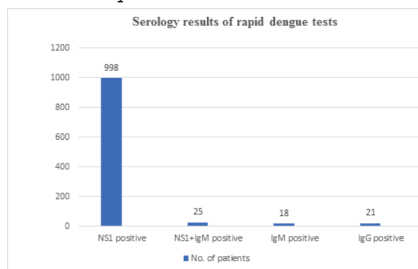


Figure 4: Serology results of rapid dengue tests

Out of 1062 dengue cases, NS1 positive 93.97%, NS1+IgM/IgM were positive for 2.35%, suggesting primary infections. IgG was positive in 1.97% cases, suggesting secondary or past infection.

DISCUSSION

Dengue fever is an emerging, modifiable disease of the tropics and subtropics. It is one of the diseases with seasonal epidemics, which also has the potential to cause life-threatening infections worldwide.⁷

During the study period, a total of 4530 blood samples were tested for dengue. Of the total samples tested, only 23.44% (n= 1062) were found to be positive for dengue virus. Our result was in concordance with those reported by Chitkara et al. (2018)¹⁶(20.4%), Garg et al. (2011)⁷(19.7%).

During this study, the majority of patients who tested positive for dengue were between the ages of 21 and 30. Of the total number of dengue-positive cases, 64.04% (n=680) were male and 35.96% (n=382) were female. Thus, dengue has been observed to affect men and women in a ratio of 2:1. In other studies, Lakshmi et al. (2018)¹³ and Kumar et al. (2010)⁹ showed that cases were highest in the adult age group of 21-30 years with male predominance.

The proportion of men and the age group 21-30 indicates a higher risk of dengue transmission in the workplace. This may be due to differences in socio-cultural environments, where men are more exposed to outdoor activities and their bodies are less covered than women.¹¹

There was a gradual increase in the number of cases starting in July with a peak in August. This indicates active viral transmission; The rainy season is the breeding period for *Aedes aegypti* mosquitoes that reproduce continuously until winter.⁷

The common symptoms of dengue were fever (100%), body aches (21%), headache (52%), vomiting (21%), and rash rare 3% only. Similar clinical pattern with fever as the most common clinical presentation; was also observed in studies by Narayanan et al (2002)¹²

Out of the 1062 dengue positive cases, 998 (93.97%) were NS-1 positive, 18 (1.69%) were IgM positive, 21 (1.97%) were IgG positive, 25 (2.35%) were NS1 + IgM positive.

NS1 was positive 93.97%, and NS1+IgM/IgM was positive 2.35%, suggesting primary infections. The majority of patients were symptomatic so, NS1 positivity is higher. IgG was positive in 1.97% of cases, suggesting secondary or past infection.

During our study, the NS1 antigen was found in the blood samples of 998 (93.97%) individuals, which confirmed them to be having a recent primary infection. NS1 antigen can be found in the blood of infected patients at the first day of onset of fever till ~ 10 days, with the highest between second and fourth day.

Overall, 1.69% of patients in our case revealed primary infection (IgM positive). IgM antibodies are said to be the result of quick immune response against any infection. Dengue virus-specific antibodies appear at 3–4 days after the onset of fever and decline gradually to undetectable after 2–3 months. IgG antibodies are known as secondary Igs, as they come after the IgM. Our results were identical to those reported by Lakshmi et al. (2018)¹³, (Patel & Bhatnagar 2018)¹⁴, Malik et al. (2017)¹⁵.

CONCLUSIONS

Based on current research, dengue is considered a major public health problem in central India. Cases of the disease are moderate throughout the year and peak during monsoons have proven its endemicity in our region. The study also drew attention to the adult male population. An ongoing seroepidemiological surveillance control program is needed to control future dengue outbreaks, thereby minimizing complications, outbreaks, and deaths.

REFERENCES

- GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2017;388: 1459–544.
- Jentes ES, Lash RR, Johansson MA, Sharp TM, Henry R, Brady OJ, et al. Evidence-based risk assessment and communication: a new global dengue risk map for travellers and clinicians. *J Travel Med*. 2016;23(6).
- National Vector Borne Disease Control Programme. Dengue cases and deaths in the country since 2010. Available from: <http://www.nvbdc.gov.in/index4.php?lang=1 & level=0&linkid=431&lid=3715>. (Accessed on 17 Nov 2017).
- World Health Organization: Dengue haemorrhagic fever: Diagnosis, Treatment, Prevention and Control. 2nd ed, Geneva: World Health Organization; 1997. p. 12-23.
- Perez JG, Clark GG, Gubler DJ, Reiter P, Sanders EJ, Vorndam AV. Dengue and Dengue haemorrhagic fever. *Lancet* 1998; 352:971-6.
- Ramachandran S. Changing trends in clinicopathological parameters in dengue with evaluation of predictors of poor outcome in children. *Int J Contemp Pediatric*. 2016;3(4):14115.
- Garg A, Garg J, Rao Y K, Upadhyay G C, Sakhuja S. et al., Prevalence of dengue among clinically suspected febrile episodes at a teaching hospital in North India. *J. Infect. Dis. Immun.* 2011; 3(5): 85-89.
- Gupta E, Dar L, Kapoor G, Broor S. The changing epidemiology of dengue in Delhi, India. *Virology*. 2006; 3:92.
- Kumar A, Rao R, Pndit V, Shetty S, Bamigatti C, Samarasingh CM. Clinical manifestation and trend of dengue cases admitted in tertiary care hospital, udupi, Karnataka. *Ind. Jr. Comm. Med.*, 2010; 35: 386-391.
- Lall H, Gupta P, Debbarna M, Sharma P, Ansari S K, Jais M and Kaur R, Seroprevalence of Dengue in Tertiary Care Hospital in Delhi. *Int. J. Curr. Microbiol. App. Sci.*, 2016; 5(6): 439-445.

- [11] Prasith N, Keosavanh O, Phengxay M, Stone S, Lewis HC, Tsuyuoka R, et al. Assessment of gender distribution in dengue surveillance data, the Lao People's Democratic Republic. *Western Pac Surveill Response J*. 2013;4(3):18-25.
- [12] Narayanan M, Aravind MA, Thilothammal N, Prema R, Sargunam CR, Ramamurty N. Dengue fever epidemic in Chennai-a study of clinical profile and outcome. *Indian pediatrics*. 2002 Nov 1;39(11):1027-33.
- [13] Lakshmi SD, Devi PN, Saikumar C. The seroprevalence of dengue in a tertiary care hospital. *Int J Curr Microbiol Appl Sci* 2018; 7:43-51.
- [14] Patel P, Bhatnagar R. Seroprevalence of dengue infection: a hospital based study from Udaipur, Rajasthan. *J Comm Health Manage* 2018; 5:10-12.
- [15] Malik MSM, Javed F, Wasim M, Ulfat M, Arshad S. Frequency of dengue virus infection among febrile patients of Lahore. *Glob J Health Sci* 2017; 9:212-217.
- [16] Chitkara S, Chhina D, Gupta V, Mahajan R, Sharma D. Epidemiology of dengue fever among clinically suspected febrile patients in a tertiary care center in Punjab. *J Microbiol Infect Dis* 2018; 8:43-48.