International Journal for Multidisciplinary Research (IJFMR)



• Email: editor@ijfmr.com

Pre-Monsoon Dengue Peak in Andaman and Nicobar Islands

Dilpreet Kaur Chani¹, Aishwarya P², Malarvizhi M³, Shahina Mustaqim⁴

¹Research Scientist B Medical, VRDL, Department of Microbiology, ANIIMS ²Research Assistant, VRDL, Department of Microbiology, ANIIMS ³Research Scientist B Non-Medical, VRDL, Department of Microbiology, ANIIMS ⁴Principal Investigator, VRDL, Department of Microbiology, ANIIMS

Abstract

Dengue is a vector-borne viral disease caused by the flavivirus dengue virus (DENV). The states of West Bengal, Uttar Pradesh, Punjab, Haryana, Delhi, Gujarat, Kerala, Karnataka, and Tamil Nadu have the highest dengue prevalence in India. In 2009, dengue epidemic was first introduced in the Malay chain of Andaman and Nicobar Islands. The South Andaman region is where dengue is most commonly seen among all of the Andaman and Nicobar Islands. The time frame for the retrospective investigation was January 2024–April 2024. 803 samples tested for Dengue NS1 and 1517 samples were tested for Dengue IgM, out of which 21 (2.61%) were positive for Dengue NS1 and 21 (1.38%) were found to be positive for Dengue IgM. According to this study, dengue cases also spike in the pre-monsoon season and then continue to rise all year long.

Keywords: Dengue, Andaman and Nicobar Islands, Pre- Monsoon.

1. Introduction

Dengue fever, a vector-borne disease primarily transmitted by infected mosquitoes of Aedes species, mainly Aedes aegypti or Aedes albopictus. The dengue virus belongs to the genus Flavivirus within the Flaviviridae family. Dengue virus has four serotypes including DENV-1, DENV-2, DENV-3, and DENV-4 and all serotypes can cause human infection[1].Infection and clinical manifestations include dengue fever (DF), dengue haemorrhagic fever (DHF), or dengue shock syndrome (DSS).

The incidence of dengue has grown dramatically around the world in recent decades, with cases reported to WHO increasing from 505430 cases in 2000 to 5.2 million in 2019. The highest number of dengue cases was recorded in 2023, affecting over 80 countries in all regions of WHO [2]. Since the beginning of 2023 ongoing transmission, combined with an unexpected spike in dengue cases, resulted in a historic high of over 6.5 million cases and more than 7300 dengue-related deaths reported [3].

In India, West Bengal, Uttar Pradesh, Punjab, Haryana, Delhi, Gujarat, Kerala, Karnataka and Tamil Nadu are the high dengue burden states [4, 5]. According to National Vector Borne Disease Control Program, the number of dengue cases in India during the year 2023 were found to be 289235 cases and with mortality rate of 485[6].

Dengue has been a significant increase in cases over the past few decades specially in the Andaman and Nicobar Islands (ANI). Dengue fever was first detected in Andaman n Nicobar Islands in the year 2009[7, 8]. This coincides with the construction of international airport in SVP, exposing large area to mosquito



E-ISSN: 2582-2160 • Website: <u>www.ijfmr.com</u> • Email: editor@ijfmr.com

breeding. Dengue is most commonly found to be in the South Andaman region among all the islands of Andaman and Nicobar Islands. Dengue fever is a public health concern in ANI as it has become endemic in these islands and are prone to frequent outbreaks of dengue; and all the four serotypes are present in this region round the year. In these islands mainly, increase in air travel, unplanned and uncontrolled rapid urbanization, population escalation, coupled with poor sanitation and challenging mosquito control measures, has contributed to the rise in dengue cases.

This study was done to detect peak of dengue cases during pre-monsoon period for evaluating disease burden in pre- monsoon season in ANI and for updated information to improve the public health strategies among the population of ANI.

2. Methods

2.1 Study Design

Retrospective study was done over a period from January 2024 to May 2024 with Tertiary care hospital based samples from three districts of Andaman n Nicobar Islands.

2.2 Study Area

This study was done with the hospital-based samples of Tertiary Care Hospital which is a tertiary care centre catering to the whole of Andaman and Nicobar Islands.

2.3 Inclusion Criteria

Patients with symptoms like fever, rash, body pain with other associated symptoms were included in the study.

2.4 Exclusion Criteria

Patients with incomplete medical records, uncertain dengue diagnosis.

2.5 Study Subjects

Patients with onset of fever with less than 5 days were tested for Dengue NS1 Antigen and for patients with onset of fever for more 5 days were tested for Dengue IgM Antibody both by ELISA method.

3. Results

A total of 2320 samples were tested for dengue in the period of four months, from January to April 2024. Out of 2320 samples 803 were tested for Dengue NS1 and 1517 samples were tested for Dengue IgM.







Figure 3.1 Depicts that the percentage of population tested positive for Dengue NS1 in January, February and March, was 11(3.87%),4 (1.36%),6 (2.80%), respectively. No cases were found to be positive in the month of April.



Figure 3.2 Gender wise analysis of Dengue NS1

Figure 3.2 Shows out of 21 positive cases for Dengue NS1, 6(28%) was female and 15(72%) was male.



Figure 3.3 Month wise distribution of Dengue IgM

Figure 3.3 In January, February and March, the proportion of individuals who tested positive for Dengue IgM was 13(2.17%), 4(1%) and 4(1.38%) in that order (Fig 2.1). In April, there were no confirmed positive cases.





Fig3.4 Gender wise analysis of Dengue IgM

Figure 3.4 Illustrates that the proportion of positive cases for Dengue IgM by gender is 12(57%) for men and 9(43%) for women.

Assessing the symptoms shows that no case history of maculopapular rashes was found, and 1853(79.87%) reported fever, 701 (30.21%) reported chills and rigors 523(22.54%) reported arthralgia, 899(38.75%), and 57(2.45%) experienced retroorbital pain.

4. Discussion

Dengue virus causes a wide range of disease from mild undifferentiated fever to classical DF, DHF and DSS [9]. Dengue has become a major public health problem in ANI. The incidence of Dengue is Found to be throughout the year in ANI and also in pre monsoon season.

This study observed that 2.84% (10, n=352), were found to be positive for Dengue NS1 out of which male to female ratio was 7:3. Similar findings were observed in Vinodkumar et.al. study [9]. Tiwari et.al. study also suggest that males are more affected than females [10]. In the present study, it was observed that the decreasing pattern of positive cases were from January to April with April confirming zero number of positive cases followed by commonest affected age group of people from 16-45 years of age. Tiwari et.al study also suggests that adults in the age group of 16-45 years are predominantly affected [10].

On an analysis of laboratory finding, it was observed that a total number of 21(1.38%), were found to be positive for Dengue IgM, out of which male were 57% and female were 43%. Dengue has become an annual epidemic in many parts of the Asia and the disease is becoming more hazardous as the environment changes [11, 12]. The recent study of Mondal et. al. stated that 110473 Dengue cases were documented in India between Jan and October 2022[13]. Our findings corroborate with the similar findings found in the study of Mondal et.al. with higher incidence in the month of January with 2.17% followed by February with 1%, March 1.38% and April with no positive cases.

Muscle and joint pain, loss of sense of taste and appetite, abrupt onset of high fever, nausea and vomiting were the most common symptoms found in 70% of the cases tested for both Dengue NS1 and Dengue IgM. In 80% of instances, there were no severe dengue infection symptoms. Patients belonging to same residing places were found to have similar symptoms. The highly affected places were found to be Junglighat and Haddo due to overcrowding, unhygienic locality and poor water drainage system which leads to the high risk of incidence of dengue in ANI.



5. Conclusion

The magnitude of dengue case dispersion in ANI during the pre-monsoon season has been discussed in this research. It was discovered that men predominated over women. Dengue incidence peaked in January and then significantly declined until May. This study found that the number of dengue cases increases also during the pre-monsoon season with rise and fall and then continues to rise throughout the year. This updated information of rise in dengue cases during pre monsoon season will help the health care workers to improve the health strategies among the population of ANI throughout the year.

9. References

- Muhammad Bilal Khan, Yang ZS, Lin CC, Hsu MC, Aspiro Nayim Urbina, Wanchai Assavalapsakul, et al. Dengue Overview: An Updated Systemic Review. Journal of Infection and Public Health [Internet]. 2023 Aug 1;16(10). Available from: https://www.sciencedirect.com/science/article/pii/S1876034123002587
- 2. World Health Organization. Dengue Global Situation [Internet]. www.who.int. 2023. Available from: https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON498
- 3. World Health Organization. Dengue and Severe Dengue [Internet]. World Health Organization. 2024. Available from: <u>https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue</u>
- Pillaveetil Sathyadas Indu, Nair S, Chintha Sujatha, Gnanaseelan Kanakamma Libu, Lawrence T, Nalinakshan Sudha Siju, et al. The burden of dengue and force of infection among children in Kerala, India; seroprevalence estimates from Government of Kerala-WHO Dengue study. The Lancet Regional Health - Europe. 2023 Dec 1;100337–7.
- 5. Dengue/DHF situation in India: National Centre for Vector Borne Diseases Control (NCVBDC) [cited 2022 December 8].
- 6. Ministry of Health & Family Welfare-Government of India. (n.d.). Dengue Situation In India :: National Center for Vector Borne Diseases Control (NCVBDC). <u>https://ncvbdc.mohfw.gov.in/index4.php?lang=1&level=0&linkid=431&lid=3715</u>
- 7. Haaithanya Ik, Bhattacharya D, Muruganandam N, et al. Dengue: a newly emerging viral infection in Andaman and Nicobar Islands, India. *Epidemiology and Infection*. 2012;140(10):1920-1924. doi:10.1017/S0950268811002500.
- Kartick C, Bharathi GSJ, Surya P, Anwesh M, Arun S, Muruganandam N, Avijit R, Vijayachari P. Outbreak investigation of fever mimicking dengue in Havelock Island, an important tourist destination in the Andaman & Nicobar Archipelago, 2014. Epidemiol Infect. 2017 May;145(7):1437-1442. doi: 10.1017/S0950268816003423.PMID: 28185603; PMCID: PMC9203299.
- 9. CS V, BS P, NK K, VL J. Occurrence of Dengue Virus Infection with Multiple Serotypes at Central Karnataka, India. Journal of Laboratory Physicians. 2021 Nov 23.
- Tiwari S, Shukla MK, Chand G, Sahare L, Ukey MJ, Joshi P, Khedekar R, Singh N, Barde PV. Outbreaks of dengue in Central India in 2016: Clinical, laboratory & epidemiological study. Indian J Med Res. 2019 Nov;150(5):492-497. doi: 10.4103/ijmr.IJMR_1315_18. PMID: 31939393; PMCID: PMC6977364.
- Messina JP, Brady OJ, Golding N, Kraemer MU, Wint GW, Ray SE, Pigott DM, Shearer FM, Johnson K, Earl L, Marczak LB. The current and future global distribution and population at risk of dengue. Nature microbiology. 2019 Sep;4(9):1508-15.



- 12. Rocklov J, Tozan Y. Climate change and the rising infectiousness of dengue. Emerging Topics in Life Sciences. 2019 May 10;3(2):133-42.
- 13. Mondal, Nitish. The resurgence of dengue epidemic and climate change in India. The Lancet.Volume 401, Issue 10378, 727 728.