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Original Research Article

Incidence of dengue in the Islands

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ABSTRACT

Background: Dengue is transmitted mainly by bite of Aedes mosquito namely Aedes aegypti and Aedes albopictus posing major public health concern. The objective of the study is to study incidence of dengue in Andaman and Nicobar Islands.
Methods: Prospective study from January 2012 to December 2018 from all primary, community and tertiary health centres of Andaman and Nicobar Islands.
Results: Out of a total of 5255 blood samples tested from 2012 to 2018 the total dengue positive cases were 525 (9.99%).
Conclusions: There has been gradual increase in number of dengue cases from 2012 to 2016 thereafter there has been reduction of cases.

Keywords: Dengue, Andaman and Nicobar, Incidence

INTRODUCTION

Dengue is a mosquito borne acute viral infection which is transmitted mainly by bite of Aedes mosquito namely Aedes aegypti and Aedes albopictus. Dengue virus belongs to the family Flaviviridae which has four serotypes. The manifestation can vary from mild asymptomatic illness to severe fatal complications like dengue hemorrhagic fever or dengue shock syndrome (DHF/DSS).[1,2]

"Dengue" is a Swahili word meaning "cramp-like seizure". First clinically documented dengue epidemic occurred concurrently in Asia, Africa and North America in 1780s.[1]

Approximately half of the world's population are living in tropical and sub-tropical countries which is supposed to be endemic for dengue thus posing major public health concern in these areas involving mainly the urban and semi-urban areas of the world.[3]

In India, dengue virus was first time isolated in 1945 and dengue fever was first time reported in 1956 from Vellore, Tamil Nadu. Historically the first epidemic of clinical dengue-like illness has been recognized in Chennai in the year 1780 and the first virologically diagnosed epidemic of dengue fever (DF) occurred in Kolkata and Eastern Coast of India in 1963-1964.[1,4,5]

It has been estimated that loss to the economy due to dengue is 264 disability-adjusted life years (DALYs) per million populations per year.[6,7]

Recurring outbreaks of dengue fever and dengue hemorrhagic fever cases has been reported from all 36 states and union territories except Lakshadweep in the last two decades.[3]

There has been increase in global incidence of dengue and is considered the most common arboviral disease. The attributing factors for spread of DF/DHF are unmatched

population escalation, uncontrolled and unplanned rapid urbanization, increase in air travel, changes in environmental conditions, and absence of an efficient integrated mosquito control programme and weakening of public health infrastructure.[2]

Dengue is one of the endemic diseases in India as a result of increased mosquito breeding. Recurrent epidemics are known to occur in various parts of the country resulting in increased morbidity and mortality due to poor accessibility of resources.[8]

There has been considerable increase in the spread of dengue cases in the past four decades, in several parts of India. There are very few studies on incidence of dengue in Andaman and Nicobar Islands. Therefore, this study was taken up with the following objective: to study incidence of dengue in Andaman and Nicobar Islands.

METHODS

Study design

Prospective study was conducted over a period from January 2012 to December 2018.

Study area

All 35 primary and community health centers and one tertiary care centre. There is only one tertiary care centre, GB Pant Hospital catering to the whole of Andaman and Nicobar Islands. Andaman and Nicobar Islands is divided into 3 districts- South Andaman, North and Middle Andaman and Nicobar district.

Study subjects

All the patients with fever as chief complaint, who either attended OPD in primary health centre, community health centre or tertiary hospital, were included in the study. Blood samples were collected from these symptomatic patients and tested for dengue IgM Enzyme linked immunosorbent essay (ELISA).

Inclusion criteria

All fever cases attending outpatient department were included.

Ethical approval

Ethical clearance was obtained from the Institutional ethics committee.

Statistical Analysis

The data was cleaned and entered in MS excel spread sheet. Data was analyzed using statistical software Statistical package for the social sciences (SPSS) statistics version 20.0 (Chicago). Data was expressed in frequency, percentage, and proportions.

RESULTS

A total of 5255 blood samples were tested from 2012 to 2018 the total dengue positive cases were 525 (9.99%). In 2012 out of 484 blood samples tested 24 samples (4.96%) were tested positive while in 2013 out of 670 samples tested 67 (10.00%) were tested positive. In 2014 out of 1128 samples 155 (13.74%) were positive while in 2015 only 144 samples (10.64%) were positive of the 1353 samples. In 2016 out of 615 samples taken 92 samples (14.96%) were positive, in 2017 only 18 samples (11.61%) positive of 155 samples tested, in 2018 dengue positive cases were 25 (2.94%) out of 850 blood samples tested. (Table 1) (Figure 1)

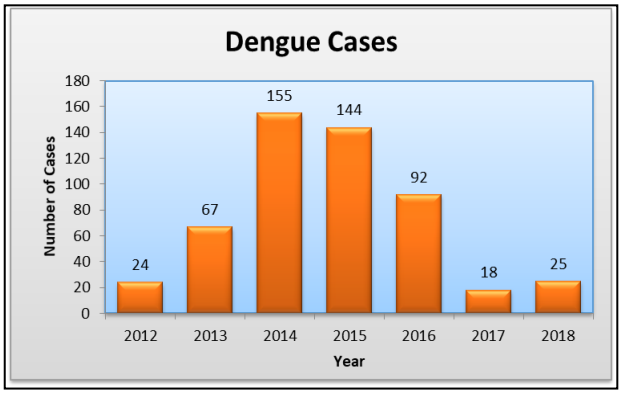

Figure 1: Year wise distribution of dengue.

Incidence of dengue per lakh in 2012 was 6.27, in 2013 it was 17.41, in 2014 incidence was 40.06, in 2015 it was 37.02, in 2016 incidence was 25.53, in 2017 it was 4.68 and in 2018 incidence was 6.33 per lakh population. (Table 1) (Figure 2).

Table 1: Year wise dengue cases from 2012 to 2018.

Year	Blood samples tested	No. positive cases	Percentage of positive (%)	Population	Incidence per lakh
2012	484	24	4.96	382725	6.27
2013	670	67	10.00	384837	17.41
2014	1128	155	13.74	386919	40.06
2015	1353	144	10.64	388970	37.02
2016	615	92	14.96	390990	23.53
2017	155	18	11.61	392942	4.58
2018	850	25	2.94	394942	6.33

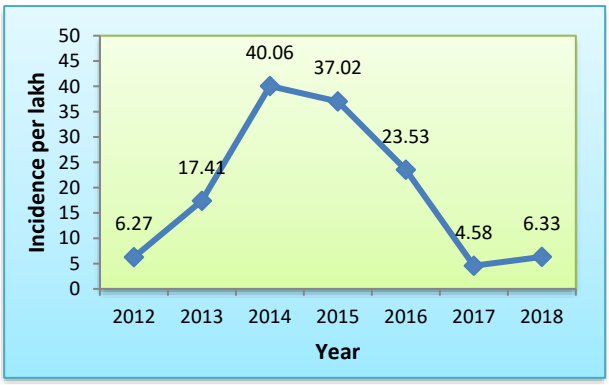

Figure 2: Year wise trend of dengue.

DISCUSSION

Dengue is an emerging public health problem. The growing geographical circulation of both the virus and the mosquito vector has led to occurrence of epidemics, and emergence of dengue hemorrhagic fever.[9]

There is no specific treatment for dengue therefore early detection and access to rapid and appropriate treatment can combat the seriousness of the illness. Effective vector control measures can prevent emergence of dengue. A successful intervention is integrated vector control which is a combined method to achieve maximum results with minimum inputs. It also prevents environmental pollution with toxic insecticides and development of insecticide resistance. Controlling the breeding of aedes mosquitoes will reduce morbidity and mortality of dengue fever.

Incidence of dengue cases per lakh population was observed to be high in our study from the year 2014 to 2016. In the year 2014 the incidence was 40.06 per lakh population. It can be attributed to climatic change and increase air travel as the islands are known for tourism. Similar studies done in other parts of India have shown higher incidence rate compared to the islands.

It was observed that from 1998 to 2014, the highest dengue incidence was reported from Pondicherry (372.92), followed by Dadra Nagar Haveli (176.31) and Delhi (102.15). Likewise, incidence, ranging between 21 and 50 per million, was reported from the states of Punjab, Gujarat, Karnataka, Kerala, Tamil Nadu and Orissa.[10]

Highest incidence of dengue in India was observed in 2012 (about 41 per million population), in 2013 (61 per million population) and in 2014 it was 32 per million population.[10]

In 2016 worldwide large dengue outbreaks have been observed. About 2.38 million cases were reported from Region of the Americas. Brazil alone contributed a little less than 1.5 million cases. Western Pacific Region reported about 375,000 suspected cases of dengue in 2016, out of which Philippines reported 176 411 cases and Malaysia reported 100 028 cases. It has been estimated that around 500 000 people with severe dengue require hospitalization every year, with estimated case fatality of about 2.5% annually. Nevertheless, many countries have reduced their case fatality rate to less than 1% due to significant improvement in case management mainly by strengthening its own resources like capacity building at all levels.[11]

From our study we have observed that there has been steady increase in percentage of positive cases from 2013 to 2016 in the islands. Several studies have already shown changes in spatial trends in dengue transmission. The reasons for such changes are associated to several factors like globalization of travel and trade, which promotes propagation of pathogens and vectors, to climatic changes or modified human behavior.[12-15]

Nevertheless the possible factors that probably would have contributed to the present scenario in these islands are rapid urbanization and population growth, ultimately leading to scarcity of water which has caused people to store water in containers which in turn has caused increase in Aedes aegypti population densities facilitating transmission of dengue. The other cause is domestic/peri-domestic breeding of mosquitoes of Aedes aegypti and Aedes albopictus. Andaman and Nicobar Islands being a tourist place which has frequent movement of tourists from mainland and also from one island to another. This increased air travel facilitates transportation of dengue virus from endemic regions of mainland.[15]

Previous studies have reported that daily temperature variation may play a major role in development rate of the mosquito and shortening of virus incubation time with increase in transmission rate.[16,17]

From 2017 onwards there has been decline in number of cases in the Andaman and Nicobar Islands. This could be due to stringent steps taken by the Health Department especially vector-borne disease unit to prevent spread of dengue. They have been keeping a vigil on the emergence of the disease. Insecticide treated mosquito nets are distributed frequently in the islands especially in remote areas. There has been contribution from civil department to prevent breeding of mosquitoes by source reduction.

The existence of multiple serotypes of the virus in the islands increases the risk of DHF and DSS and therefore, future dengue outbreaks could lead to increased morbidity and mortality. The existence of multiple serotypes of the virus in the islands increases the risk of DHF and DSS and therefore, future dengue outbreaks could lead to increased morbidity and mortality. The existence of multiple serotypes of the virus in the islands increases the risk of DHF and DSS and therefore, future dengue outbreaks could lead to increased morbidity and mortality.

Due to existence of different dengue virus serotypes in the islands there is always risk of dengue outbreaks in the isles therefore constant vigil on the emergence of the disease

will reduce morbidity and mortality due to dengue outbreaks.

CONCLUSION

There has been increase in dengue cases from 2012 to 2016, thereafter the cases have been on decline. Incidence of dengue was high in 2014 about 40.06 per lakh population. There is a need for community-based action programmes with greater emphasis on integrated vector control like source reduction and spraying to arrest mosquito breeding sites and personal protective measures to prevent mosquito bites.

Limitations

Important parameters like socioeconomic and demographic factors like age, gender, population density and migration and outcome should have been included to further understand this fast-growing vector borne diseases.

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