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Global threat and meta-analysis of Dengue following Nilavembukudineer - Review

[*1]A. Nicholas Daniel & [2]Dr. Jeyarajmani

[1]*Research Scholar, Government Arts College (Autonomous), Kumbakonam (India)*
[2]*Head of the Department, PG & Research Dept. of Biochemistry, Government Arts College (Autonomous), Kumbakonam,(India)*

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[*]**Corresponding Author**
Email:anicholasdaniel[at]gmail.com

ABSTRACT

Dengue is viral disease; billions of people live in endemic areas of the world where dengue arises are at risk of emerging dengue fever (DF) with its severe complications. Dengue virus disease and prevalence, severity and changes in the viral process has to be analyzed to prevent the dengue disorder. Early management of fastest recovery of dengue has to detect and implement to prevent. Dengue is a key issue among the community health in India and participates meaningfully to the overall dengue burden in Southeast Asia. Siddha medicine heading the different types of pyrexia by Suram, it includes malaria also. This study states that the review of dengue and its prevention by the siddha formulation of nilavembukudineer.

1. Introduction

Dengue is a painful fever caused by the virus family transmitted through the mosquitoes to human beings. Dengue severity levels are depending upon the rising level of the infection. Dengue like epidemics or dengue was reported during the early twentieth and nineteenth centuries in different nations. Now the virulent of spreading dengue seems to be increased by decade to decade. As per the report in Bangladesh, India, Indonesia and Nepal the dengue fever mortality were increased together 40 percent. 90 percent of the dengue fever deaths occur because of the mosquito bite and dengue virus through Aedesaegypti.

1.1. Epidemiology

In 610 A.D and again in 992 A.D (Paramasivan et al. 2006) dengue like outbreak in human beings is analyzed with Medical encyclopedia of Chinese. Later in 1635 at French West Indies and in 1699 at Panama were the dengue like illness was reported. In 1771, in the military hospital in San Juan, Puerto Rico treated the dengue by oral administration of rum by Dr. Benjamin Rush. During that time dengue was named as “Break bone fever”. Whereas the Dr. Benjamin Rush recorded the same in Philadelphia, Pennsylvania, resembled the symptoms with fever, aches, rashes, weakness, and nausea, vomiting and bleeding.

The huge development of shipping in the 18th and 19th centuries pave the way for dengue to new geographic areas leads to epidemics. In 1801, the disease was called as “Dengue”, the same was acknowledged by the Queen Luisa of Spain got recovered by the infection. In her letter she stated that dengue and dengue is Spanish as affection, careful or fastidious. Some information from the Researchers states that name origin from the Swahili as Kadingapepo it means that evil spirit.

In 1818, Peru was strike with epidemic more than 50000 people. Then the first pandemic record of dengue was occurred on 1827 to 1828. Affected the Virgin Islands, Jamaica, Cuba, Venezuela, the United States, and Mexico. Another pandemic of dengue falls during the World War II spread and affected many soldiers. In 1953 to 1954, severe dengue cases occurred epidemically in Manila, Philippines (Rigau-Perez J G et al. 1998).

In Asia.

Early 1970, dengue epidemic was found in 9 countries now it’s found more than 100 countries. Among those 100 countries mostly affected countries are America, the Eastern Mediterranean, South-East Asia and the Western Pacific (WHO 2018). In 2015, 3.2 million got affected in the regions of America, South-East Asia and Western Pacific. Out of those 1181 cases were lead to death. In 2016, 2.38 million cases by diagnosed in America. In 2017 the numbers of dengue cases in the America were found as 584,263. In early 2018 Paraguay and Argentina also had an outbreak of dengue. Dengue has also been reported from Bangladesh, Cambodia, India, Myanmar, Malaysia, Pakistan, Philippines, Thailand, and Yemen.

1.2. In South East Asia

In 2003, South East Asia reported dengue cases in eight countries. In 2006, dengue cases were identified in Bangladesh, Bhutan, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste (East Timor). The only exception is the Democratic People's Republic of Korea.

1.3. In India

India ranks the second in the population by exceeding one billion people. India challenges in facing the most public health issues also in the dengue burden. India also pays the way for the dengue virus to spread through the vector by the climatic supports of different geography. The climate are varies as mountain climate, tropical wet climate, subtropical humid climate and tropical dry climate. Such climatic variations in India lead to face different atmospheric changes in various seasons to produce the dengue virus to spread through the vector. Based upon the altitude India varies in the annual temperature and rainfall. Climatic diversity makes the dengue vector to distribute the parasite in different forms.

Dengue viruses in India have been since 1956, whereas in Tamilnadu, at 1961, Vellore, South Arcot District is the first chief outbreak of dengue. Dengue outbreak was recognized by the segregation of dengue virus (Carey et al. 2005). In India, around 1963 to 1964 at Calcutta, West Bengal the first dengue hemorrhagic fever has been identified in the eastern coastal region (Carey et al. 2005; Chatterjee et al. 1966; Sarkar et al. 1969). The same in the year 1967 the dengue spread toward the northern part of India and reached Delhi (Balaya et al. 1969) 10252 cases were identified and 423 deaths reported.

After the sequence of endemic prevalence of dengue outbreak, in the year 1964, 1966 and 1968 virological investigations identified and proved dengue 2 outbreak (Carey et al. 2005; De Ranitz et al. 1965). In the year 1965, dengue 3 was observed in Madras. In the same year 1965, dengue 4 was noticed in Nagpur. Hence, four various types of dengue virus disease were identified throughout over the India were well documented.

1.4. In Tamilnadu

Dengue outbreak was identified by the isolation of dengue virus. In 1965, Madras (Chennai) outbreak of dengue was noticed. Whereas in 1997 and in 2001 many villages in the Dharmapuri district, Tamilnadu, suffered by dengue fever (Abdul Kader et al. 1997; Victor TJ1 et al. 2002). In 1998, Coimbatore and Erode district of Tamilnadu dengue virus reported. In Chennai, 2001, dengue 2 and dengue 3 viruses was identified (Kabilan L et al. 2003). In 2003, at Kanyakumari district dengue serotype 3 virus presence were proved (Paramasivan et al. 2006). Every year, during the period of July to November, an increase in the cases of Dengue hemorrhage fever has been observed.

2. Virology

Dengue virus is a Flaviviridae family and genus Flavivirus, dengue fever virus is also denoted as DENV. Growth of virus is moving very quickly in basic virology. The flavivirus field is diverse, small and dynamic.

Dengue virus as referred as DEN1, DEN 2, DEN 3 & DEN

4. AedesAegypti infected mosquito as a vector, transmit the viruses to human being by the bite. AedesAegypti usually survive in the latitude of 35◦N and 35◦S and at the height of 3300ft.

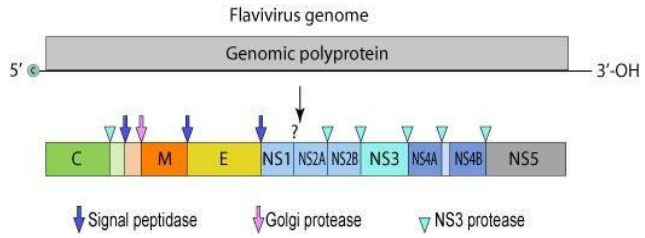

Fig. 1Diagrammatic Representation of the Dengue Genome (Zone 2012)

Dengue virus belongs to the family flaviviridae 3, it is a RNA virus also called as arbovirus.

3. Structure of Dengue Virus

There are four serotypes of dengue virus were found, it is classified as DENV-1, DENV-2, DENV-3 and DENV-47. Virus existing in spherical shapes as of 50nm in diameter and 60nm in diameter with an envelope made up of lipopolysaccharide. Genomic study of dengue virus encodes structurally as capsid, membrane and envelope. Apart from these structural proteins are found as NS1, NS2A, NS2B, NS3, NS4A, NS4B and NS510.

The dengue spherical particle consists of the genomic RNA, surrounded by the capsid, then the envelope with E and M proteins bound.

4. Virus replication

The virus enters the host by involving in macrophages, monocytes and dendritic cells by the cell mediated endocytosis processes. Then the virus got processed and replicated (D.J. Gubler et al 2010; Mackenzie et al 2004).

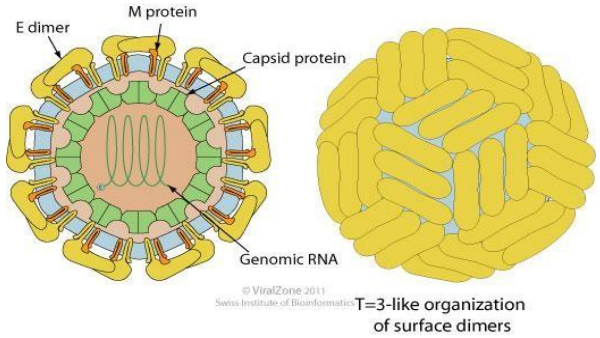

Fig. 2Dengue Envelope and Virion Structure. (Zone2012).

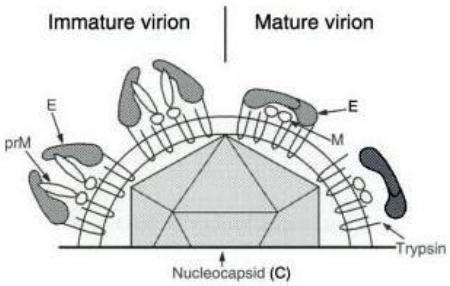

Fig. 3Envelope Spikes on Immature and Mature Virions

Representation of the “spiky” immature virion and the mature virion (Heinz F X 2004).

5. Transmission

Dengue virus transmitted through the Aedesaegypti mosquitoes, especially in the early morning and the evening (WHO 2009).Even in the day time also mosquitoes bite and spread the infection. Apart from the Aedesaegypti mosquito species Aedesalbopictus, Aedespolynesiensis and Aedesscutellaris also transmit the dengue disease (WHO 2009).

A female mosquito takes the blood from the dengue infected person and bites the normal person. After biting the gut cells lining contains virus and get infected within 2 to 10 day as febrile period. After 8 to 10 days the virus reaches the salivary glands of the mosquito, moreover the virus does not shows effects on the mosquito. The same repeated for one infected person to another person transmission of dengue virus occurs. Dengue also be transmitted through the infected blood

products and donating organs (Stramer SL et al 2009; Wilder-Smith et al 2009).

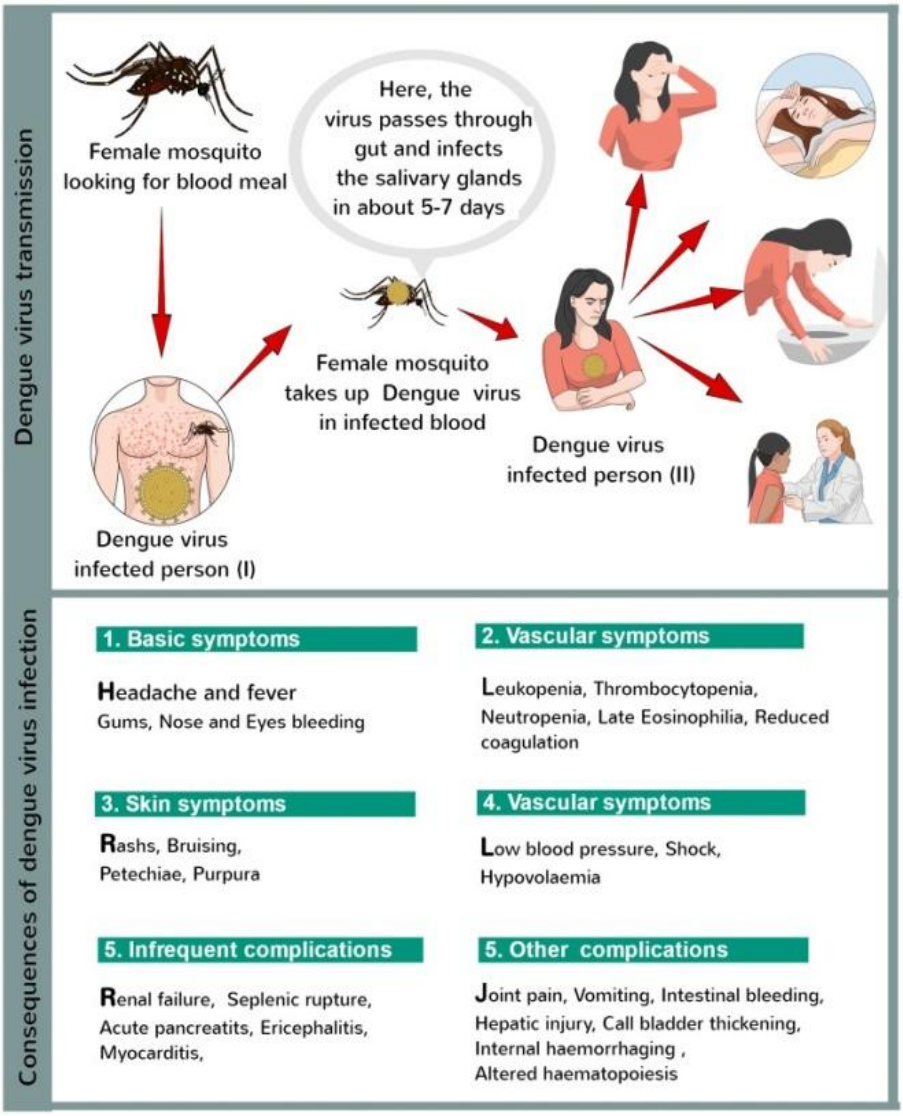

Fig 4: Dengue virus infection (Irfan A. Rather et al, 2017)

6. Clinical Diagnosis

Dengue is a disease of systemic and dynamic infection and has a clinical manifestations of severe and non-severe clinical spectrum (Rigau-Perez et al, 1998). Clinically dengue is diagnosed by isolating the virus with the help of serological tests or molecular methods. During the first 3 to 5 days dengue infection can be tested by serum samples as acute or recent dengue infection. With the help of reverse transcription-polymerase chain reaction (RT–PCR) specific virus genome is identified by the isolated serum during an acute febrile disease. Also be identified by the dengue viral antigen or RNA by immunofluorescence analysis or by IgM antibody seroconversion.

Viral RNA is also detected by the isolation of virus cell culture or by viral antigens by ELISA or rapid tests. The isolation of virus and identification of virus by cell cultures normally takes several days. Whereas nuclei acid assay helpful to identify the dengue virus within 24 to 48 hours. In most cases NS1 antigen detecting kits are available commercially to identify the dengue virus within few hours.

Tables:

Table 1Summary of diagnostic characteristics and methods (WHO2009)

Methods	Acute infection	Duration of results	Specimen	Time of collection after onset of symptoms	Facilities
Virus isolation & serotype identification	Confirmed	1–2 weeks	Whole blood, serum, tissues	1–5 days	Mosquito or cell culture facilities, BSL-2/BSL-3 laboratory, fluorescence microscope or molecular biology equipment
Nucleic acid detection	Confirmed	1 or 2 days	Tissues, whole blood, serum, plasma	1–5 days	BSL-2 laboratory, equipment for molecular biology
Antigen detection	Not yet	1 day	Serum	1–6 days	ELISA facilities

	determined				
	Confirmed	>1 day	Tissue for immuno-chemistry	NA	Facilities for histology
IgM ELISA	Probable	1–2 days	Serum, plasma, whole blood	After 5 days	ELISA facilities
IgM rapid test		30 minutes			No additional supplies
IgG (paired sera) by ELISA, HI or neutralization test	Confirmed	7 days or more	Serum, plasma, whole blood	Acute sera, 1–5 days; convalescent after 15 days	ELISA facilities BSL-2 laboratory for neutralization assay

7. Symptoms

For some patients dengue symptoms does not notices, this makes the doctors to be in trouble in diagnosing dengue. Whereas in some babies and children infected with the dengue virus, mild symptoms occurs as fever and rashes in the body. In older children and adult there will be a classic symptoms occurs as high fever for two to seven days, severe aches in the muscles, bone pain, joint pains, pain behind the eyes, headache, rashes, nausea and vomiting.

Other Clinical symptoms of dengue are decrease in the WBC counts, decrease in platelets count, skin hemorrhages as red and purple spots on the body (Ethel R. Nelson et al 1960).

8. Prevention

Treatment and Prevention of dengue fever through siddha medicine are the natural healing through traditional medicine (Prof BV Subbarayappa et al 1997).

Papaya Leaf Juice Extract

Fresh papaya leaf is mixed with a small quantity of cold water, then grinded and filtered. Dengue affected person should consume 10 ml as four times a day. Fever will decrease slowly after consumption of 5 days. The same has to be continued for another 2 days. Papaya leaf juice is an ancient homemade natural medicine (Juan HernándezCano et al 2003).

Malaivembu Leaf Extract or Juice

Fresh Malaivembu (Neem) leaves mixed with cold water, then grinded and filtered. Dengue affected person should consume 10 ml as 2 to 3 times a day. Fever will slowly subside after 5 days of consumption. Even after recovery from dengue fever the same should be continued for another 2 days. Malaivembu leaf juice is a traditional home made natural medicine (Kadavu, K et al 2009).

NilavembuKudineer Decoction

Recently most of the persons in Tamilnadu are using nilavembukudineer and papaya leaf extract for the treatment and prevention of the dengue. All types of fever associated with bodyache are controlled by Nilavembukudineer, it is a poly herbal method based. It can be prepared from the Equal parts of

Nilavempu (Andrographispaniculata),
Vettiver (Vetiveriazizanioides),
Vilamiccamver (Vetiveriazizanioides),
Cukku (Zingeberofficinale),
Milaku (Piper nigrum),
Koraikkilanku (Cyperusrotandus),
Santanam (Santalum album),
Peyputtal (Trichosanthescucumerina) and
Parpatakam (Mollugocerviana).

How to make NilavembuKashayam

Take 10 grams NilavembuKudineerChoornam and mix it with the 240 ml water. Boil the mixture until it reduces to ¼th 60 ml. Then, using sieve, separate the decoction. Drink as per dosage recommended.

The following analyses are planned from the above kudineer viz. plant pigments: alkaloids, flavonoids, terpenoids, bioactive compounds, functional groups from the FTIR and GCMS. The kudineer and papaya extract are formulated and planned to give patients affected by the Dengue and Non Dengue persons in a selected area at Kumbakonam, Thanjavur District. The Physical analysis like Height, Weight, BMI, Gender, Age, BP, ECG, Urine volume, Urine pH, Urine colour, Sputum, Blood Group, Fever temperature etc., Blood analysis like Hematology, LFT, KFT, Lipid Profile, Sugar, Total Protein, Antioxidants and Clinical analysis like Total Blood Count, Differential Count, Platelet Cells Count, ELISA, Creatinine, Urea, Uric acid, Vitamin C, Urine analysis to be monitored for the above persons.

Collect the nilavembu leaves, dry it and make it as a powder. Take 10 gram of Nilavembukudineer powder add it with the 100 ml of water and boil it until it reduced to partial of its quantity. Dengue affected person should consume 50 ml nilavembukudineer for 2 times a day may be in the forenoon and in evening session. Each time consuming must be prepared freshly. After consumption of nilavembukudineer fever will subside after 5 days. Even after the recovery from dengue fever the same should be followed for another 2 days. Nilavembukudineer powder is available to all siddha wings in Government hospital and in PHC free.

Table 2:The general dosage of NilavembuKudineer Decoction is as follows.

Infants (Age: Up To 12 Months)	2.5 to 5 ml
Toddler (Age: 1 – 3 yrs)	5 ml
Preschooler (3 – 5 yrs)	5 to 7.5 ml
Grade-schooler (5 – 12 yrs)	7.5 to 15 ml
Teenager (13 -19 yrs)	15 to 30 ml
Adults (19 to 60 yrs)	30 to 60 ml
Geriatric (above 60 yrs)	30 to 60 ml
Pregnancy	15 to 30 ml
Lactation	30 to 60 ml
Maximum Possible Dosage	180 ml Per Day (in divided doses)

* Twice a day

Best Time to Take: Before Food

9. Discussion

The study estimated the burden of dengue fever data published on the literature from India for a decade. In most

states in India corresponding to the monsoon and post-monsoon season in India the Dengue persistence was seems to be higher between the months of August and November.

The lot of clinical differences are expecting between before and after treatment of the Nilavembukudineer and Papaya leaf extracts. Andrographispaniculata (Nees) is a valuable traditional medicinal plant and it has many important bioactive compounds. It cures and prevents a number of diseases in human beings Andrographispaniculata is a valuable ancient medicinal plant and it has many important bioactive compounds. It cures and prevents a number of diseases in human beings (Baby Shalini et al 2015). It is more helpful for everyone for the betterment in their health and hygiene.

Among all the treatment Nilavembukudineer decoction is seems to better for dengue fever treatment. Moreover NilavembuKudineer releases body ache, fatigue, headache, energy loss, joint pain, muscle ache, and inflammation associated with fever or pyrexia. It works in four ways:

- Reduces the toxin (AMA) accumulation by AMAPACHAK Action
- Decreases the temperature outstanding to antipyretic action of AndrographisPaniculata and other herbs with in it
- Diminishes the inflammation by anti-inflammatory action of several ingredients in it
- Employs anodyne action and gives relief from body ache and pains.

10. Conclusion

As per the study in Singapore, A. aegypti control would be a real preventive measure for epidemic dengue and yellow fever in Asia (Eng-EongOo et al 2006). As the contagious outbreak of DENV continues to prevail in today's world, the development of safe, cost-effective, and latent preventive and control measures, including development nilavembukudineer, evidently promise the reduction of dengue viral infection.

Carbohydrates, proteins, and then vitamin C content were found in the plant of Carica papaya leaf and Nilavembukudineerchoornam. All human being need a number of complex organic and inorganic compounds in diet to meet the need for their activities. The important constituents of diet are carbohydrates, proteins, fats, vitamins and water. Every constituent play a vital role and deficiency of any one essential may lead to abnormal growths in the body (Zafar et al 2010).

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