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Epidemiology of dengue in Rajasthan

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Abstract. OBJECTIVES: To study the epidemiology of dengue and its spread.

METHODS: serology and microscopy, vector survey, population study, distribution, seasonal impects, age group, diagnostic methods, public awareness

CONCLUSION: Survey between 2016-2020 shows that the dengue is predominantly founded in arid regions And most commonly age group of 5-9 years are effected. And Ae. Albopictus shown maximum vertical transmission and the most common variant of virus is DENV-2 which responsible for fever in Rajasthan

INTRODUCTION

Dengue is a viral infection transmitted by the bite of an infected female Aedes mosquito. Symptoms appear in 3–14 days (average 4–7 days) after the infective bite. Dengue fever is a flu-like illness that affects infants, young children and adults.

Dengue fever is a disease caused by a family of viruses that are transmitted by mosquitoes. It is an acute illness of sudden onset that usually follows a benign course with symptoms such as headache, fever, exhaustion, severe muscle and joint pain, swollen lymph nodes

In present scenario dengue is the most dangerous and deadly public health problem. As there is no vaccine are available for the prevention of dengue. Still there is lack of early diagnosis of the disease in the early and acute phase of illness. This lack of early treatment of the patient results in the mortality of the patient suffering from the dengue

Material and method

Serology and microscopy

Dengue is arboviral disease and caused by the virus which belong to the family Flaviviridae

Viruses in this family are enveloped virus with the positive single standard RNA. The genome of dengue virus (DENV) and its four types (DENV-1, DENV-2, DENV-3 and DENV-4) is of 11kb in length and consist of three structural proteins (nucleocapsid or core protein(C), membrane protein (M) and envelop protein (M)) and seven non structural proteins (NS1, NS2A, NS2B, NS3, NS4A, NS4B, NS5). The worse form of dengue can also result in DHF/DSS which can even result in the death of the patient.

VECTOR SURVEY

Transovarial transmission of dengue virus by available vector species in a dengue endemic setting could be the key etiological phenomenon responsible for re-emergence of the disease from inter-epidemic to epidemic phase of disease onset. The observations in the present study suggest that during winter season which is not the active transmission season of dengue in Rajasthan, Ae. albopictus has shown maximum percentage of vertically transmitted virus. Our observation substantiates with the earlier studies that how Ae. albopictus is horbouring virus during inter-epidemic period of dengue. Another important lead emerging through present study is the high mosquito infectivity of Ae. aegypti during summer and rainy seasons especially from desert districts, Jodhpur and semi district. This observation suggests that in Rajasthan, owing to tendency of overstorage of domestic water by the inhabitants, mosquito and vertically transmitted virus get pronounced during summer season which could precedes the active transmission season of dengue during following rainy season. Dengue do not transmit through any outside sources in the area but the dengue virus keeps on circulating in the main stream by maintaining its virus in the body of the host and then from the same infected host to the mosquitoes which are breeding in the same household of the patient suffering from the dengue or mosquitoes may breed and come from the neighboring area where the fresh water is getting continuously logged out and mosquitoes can easily breed and lay egg in such areas

POPULATION STUDY

According to W.H.O estimation dengue has infected about 50 million people around the globe. In India according to NVBDCP (National Vector Born Disease Control Program) since 2009 dengue is observed in 35 states of a country

Distribution in Rajasthan

The state of Rajasthan has an area of 342,239 sq. km. and a population of 56.51 million. There are 33 districts, 237 blocks and 41353 villages.

Though, Rajasthan is arid region geographically still dengue cases are observed in a regular manner. Dengue is observed in Rajasthan because of the common practice of the people living here. People living here use to collect the rain water for the drinking purpose as there is scarcity of drinking water. So to get drinking water easily they have built the practice to store drinking water in the pots and tanks which are the best place for the mosquitoes to breed.
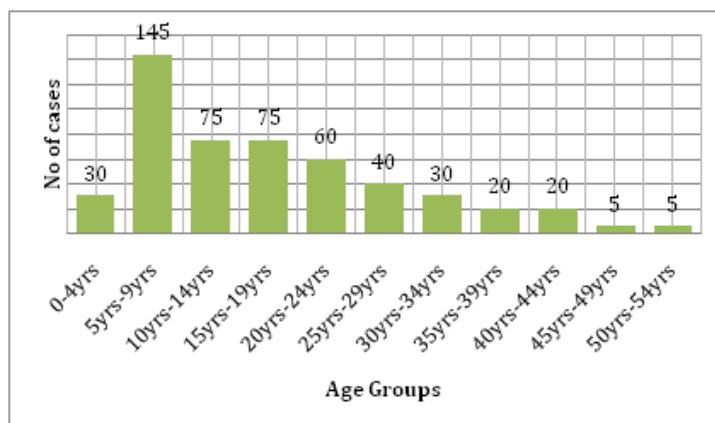
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Pic.1 The map of countries where observed Dengue fever

Pic 2. There is a shortage of clean water in Rajasthan.

Table 1. Age groups

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The age group chart shows a diversity among the different stage of ages, most commonly children's of age group of 5-9 years. As they are having low immune system against this disease and they are not much health conscious..

The graph declines as the age group increases as the persons are getting tolerance and are becoming hygienic.

If we try to take out the mean of the number of cases of dengue from 2016 to 2020 the mean comes out to be 7788 which depicts that out of total population of the state of Rajasthan around 8000 person get suffered from dengue every year.

And if we try to take out the mean of the number of deaths occurred by dengue we will see that about 12 people died due to dengue in Rajasthan every year.

Table 2. Data of cases and death for 5 years

year	Case	DEATH
2016	5292	16
2017	8427	14
2018	9587	10
2019	13706	17
2020	1929	6
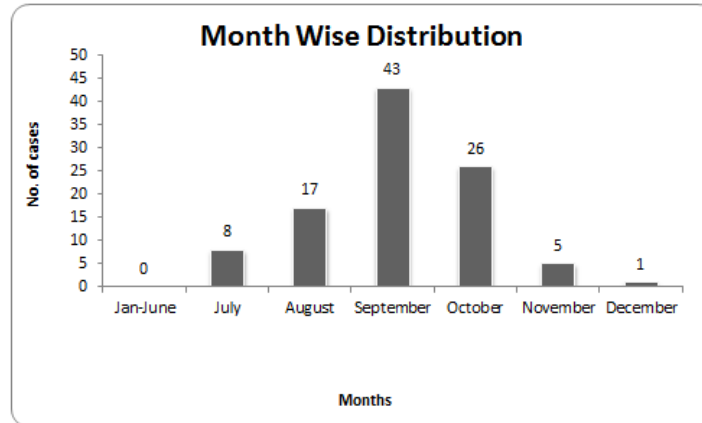
▸ The infection rates are higher in august, September, and October.
▸ In rainy season (before above given months) the mosquitoes lays eggs in the still water and high temperature. After they mature and results in infections.

Pic 3. SEASONAL IMPECTS

Diagnostic Methods

The dengue fever is divided into two phases of illness i.e. primary phase and the secondary phase of illness. During illness the patient shows the clinically symptoms such high fever, headache, vomiting, nausea, loss of appetite etc.

Table 3. Most signs and symptoms

Symptoms and signs	Ambulatory (n = 276), %	Hospitalized (n = 96), %	P
Fever	98.2	96.9	0.72
Myalgia or arthralgia	94.9	94.8	0.82
Headache	91.3	91.7	0.91
Retro-orbital pain	82.6	78.1	0.33
Dizziness	81.9	87.5	0.20
Rash	75.0	78.1	0.53
Abdominal pain	62.3	65.6	0.56
Vomiting	50.4	70.0	0.0001
Bleeding	24.3	47.9	0.0001
Diarrhea	41.7	46.9	0.37
Sore throat/running nose	37.3	30.2	0.20

In the primary infection of the dengue can be determined by the low titre of the antibodies in the blood serum. During the primary infection the first antibody that appears is IgM antibody. And anti dengue IgG at very low concentration can be detected in the blood serum after the first week of the illness by dengue virus5 . In secondary infection the titre of antibodies is very high in the blood serum of the dengue patient. The concentration of IgM reduce in the patient blood serum and test for anti dengue IgM is observed false during the secondary infection of dengue.

Table 4. Laboratory diagnosis

Test results	Total%	Without warning	With warning	Severe
NS1- Positive	52	30	20	2
igM- positive	27	16	10	1
Ig G- Positive	21	12	8	1

There are different serological diagnostic methods are used and practiced in the hospitals and health care units. These serological methods such as NS1 strip test, ELISA (Enzyme- linked immunosorbent assay) test, HA-HI (Haem-Agglutination Haem-Inhibition) test, and various other tests for detection of dengue virus are like cell cuture method for dengue isolated virus in mosquito cell line C6/36 cell line which is a cloned from Aedes Albopictus , Nuclic acid detection by Real-Time PCR etc are present for the detection of dengue virus which is used for the detection of virus in the blood serum of the patien

STEPS TAKEN BY INDIAN GOVERNMENT

The steps have been taken at the block level at primary health centres and community health centres and at the district level. For providing people protection from mosquitoes, Chief

Medical and health officers and principal medical officers have been directed to carry out anti-larval activities in their respective areas.

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These include house-to-house surveys by ANMS, ASHAS and nursing students to identify people who are at risk of contracting the diseases or have already been affected.

Regular fogging and reduction of the anti-larval source has also been taken up and doctors have been asked not to ignore any cases.

Public awareness

DO'S AND DON'TS FOR PATIENTS

If you or any family member is suffering from suspected dengue fever, it is important to carefully watch yourself or relative for the next few days, since this disease can rapidly become very serious and lead to a medical emergency.

The complications associated with Dengue Fever/Dengue Haemorrhagic Fever usually appear between the third and fifth day of illness. You should therefore watch the patient for two days even after fever disappears.

WHAT TO DO:

• Keep body temperature below 39oC.

• Give large amounts of fluids (water, soup, milk, juice) along with the patient's normal diet.

• The patient should take complete rest.

• Immediately consult a doctor if any of the following manifestations appear

• Red spots or points on the skin;
• Bleeding from the nose or gums;
• oFrequent vomiting;
• Vomiting with blood;
• Black stools;
• Sleepiness;
• Constant crying;
• Abdominal pain;
• Excessive thirst (dry mouth);
• Pale, cold or clammy skin;
• Difficulty in breathing.

WHAT NOT TO DO:

• Do not wait in case the above symptoms appear. Immediately consult a doctor. It is crucial to quickly get treatment in case of these complications.

• Do not take Aspirin or Brufen or Ibubrufen.

Conclusion

Survey between 2016-2020 shows that the dengue is predominantly founded in arid regions And most commonly age group of 5-9 years are effected. And Ae. Albopictus shown maximum vertical transmission and the most common variant of virus is DENV-2 which responsible for fever in Rajasthan. Rainey season and after Rainey season the fever is on peak. Hot weather and scarcity responsible of water storing in rajasthan is the reason behind the dengue prevalence in rajasthan. Annually around 7000 patients are found in rajasthan 15 peoples dies of dengue. Fever ,Myalgia, headache are the common clinical findings in approximately 98.2% of the cases, abdominal pain and vomiting is seen in 50% of population, diarrhea and sore throat are least common. Serological tests such as NS1strip test, ELISA test, HA-HI and many more serological identification is done. During the primary infection of the dengue can be determined by low titer of the antibodies and the first antibody seen is igM. The government Is taking actions by recruiting medical and health officers on district lavel. And along with the public awareness and hygiene management is also necessary.

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