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Original Research Article

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Clinico-epidemiological features and outcome of dengue cases admitted in a tertiary care centre in Northern Kerala

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ABSTRACT

Background: Dengue is now emerging as a public health problem of global concern. Though dengue is endemic in Kerala, occasional outbreaks of dengue has been reported from the state. It is therefore essential to study the epidemiological factors playing a role in the transmission of the disease, which is crucial to limit the surge in dengue cases. By describing the clinical profile and outcome, better patient management can be practiced thereby reducing complications and mortality.

Methods: A record based descriptive study done in a tertiary care centre in North Kerala. A total of 327 clinically diagnosed dengue cases admitted in the tertiary care centre during June and July months were included in this study. **Results:** Out of the total 327 dengue cases included in the study, 101 (31%) had dengue fever, 220 (67%) had DHF and 6 (2%) had DSS. Majority 41.9% were in the age group 40-59 years of age. Majority 88.1% were from rural area. Rubber plantation (40.9%) was identified as the most common source of artificial collection of water.78.9% reported having similar dengue cases in the locality. Fever (87.1%), headache (55.3%), body ache (50.4%) were the common clinical presentation. 94.5% of cases with DHF were cured within 7 days. 33.3% of DSS cases required hospital admission for more than 7 days.

Conclusions: The present study inferred that, breeding premises, within the same household and in the same locality are some of the factors playing a role in transmission of dengue. With the ongoing COVID-19 pandemic, active public health surveillance of dengue has to be enforced. Appropriate referral to higher centres reduce complications and mortality.

Keywords: Dengue haemorraghic fever, Dengue shock syndrome, COVID-19 pandemic

INTRODUCTION

Dengue an arthropod borne viral illness, has emerged as a public health problem of global concern.¹ The global incidence of dengue has dramatically increased, with about half of the world's population now at risk. An estimated 100-400 million infections occur each year.²

India is one amongst the seven identified countries in the South-East Asia region, which regularly reports incidence of DF/DHF incidence.³ Dengue is endemic in about 29 states and 6 union territories in India, according to the annual report of the Department of Health and Family

Welfare 2019-2020.⁴ The epidemiology of dengue in India is changing dramatically. In addition to the rise in the number of cases and severity of manifestation of the disease, there is also a major shift in the geographical pattern. A recent change in the trend is the spread of dengue to peri-urban and rural areas, larger and frequent outbreaks and advancement to hyperendemicity in urban areas.⁵

These geographical variations are influenced by rainfall, temperature, precipitation, relative humidity and unplanned rapid urbanization.^{1,2} In 2019, Kerala reported about 4652 cases and was one among the states reporting

maximum number of deaths.⁶ Kerala is now hyperendemic for dengue, with the presence of all four serotypes, high rates of co-infection and local genomic evolution of viral strains.⁷

Individuals infected with dengue show a wide range of clinical manifestations, ranging from asymptomatic febrile illness to more severe clinical forms such as dengue haemorraghic fever (DHF) and dengue shock syndrome (DSS). Without proper treatment, DHF case fatality rates can exceed 20%.⁸ In India timely identification of cases and improved management has substantially lowered the case fatality rate due to dengue to 0.1%.⁴

Rationale

In 2020, Kannur and Kasargode were among the three districts in Kerala reporting dengue clusters making the health department to be vigilant. Being a tertiary care centre, a significant number of dengue cases were referred to the institution.

This study plays a pivotal role in understanding of the epidemiological factors in the transmission of the disease, thereby aiding in advocating adequate preventive and control measures to curb the spread of dengue. Most of the dengue patients improve by symptomatic management itself. The present study highlights the clinical features and outcome which will provide a good opportunity, for understanding the present practice of early diagnosis, referral and to institute prompt preventive and control measures.

Primary objective

The objectives of this study were as follows- (a) to describe the epidemiological profile of dengue cases admitted in a tertiary care centre in Northern Kerala; (b) to determine the clinical profile of dengue cases admitted in a tertiary care centre in Northern Kerala; and (c) to study the clinical outcome of dengue cases admitted in a tertiary care centre in Northern Kerala.

METHODS

Study design

It was a record based descriptive study.

Study setting

This study was carried out in a tertiary care centre in North Kerala.

Study population

All clinically diagnosed dengue cases who were admitted in the tertiary care centre from 1 June 2020 to 31 July 2020 were study population for the study.

Inclusion criteria

All clinically diagnosed dengue cases were included.

Study tools

A semi-structured format was developed and the required data was taken from the Regional prevention of epidemic and infectious diseases cell database.

Statistical analysis

The data collected was entered in MS excel sheet and analysed using Statistical Package for Social Sciences 16. Results are expressed as percentages. Chi-square test was applied to find association between variables. P<0.05 was considered as statistically significant.

Operational definition

The severity of dengue infection was operationally defined by the following criteria-

Dengue fever

Acute febrile illness of 2-7 days duration with two or more of the following manifestations: Headache, retro-orbital pain, myalgia, arthralgia, rash, haemorrhagic manifestations.¹⁰

Dengue haemorrhagic fever (DHF)

A case with clinical criteria of dengue fever. Haemorrhagic tendencies evidenced by one or more of the following- (a) petechiae, ecchymoses or purpura; and (b) bleeding from mucosa, gastrointestinal tract or other sites, plus thrombocytopenia (1<1 lakh cells per cumm), plus a rise in average haematocrit for age and sex ≥20%.

Dengue shock syndrome (DSS)

All the above criteria for DHF along with rapid and weak pulse or hypotension for age, cold clammy skin and restlessness.

RESULTS

Demographic profile

Of the 327 cases included in the study, 180 (55%) were male and 147 (45%) were females. Majority of the cases (41.9%) belonged to the age group of 40-59 years. The mean age of the study population was 46.1 years \pm 8.6 with a minimum age of 2 years and maximum age of 85 years.

Majority of the patients were manual labourers (28.4%), followed by homemakers (21.4%), students (17.1%), farmers (2.1%) and others (31%). Table 1 shows the epidemiological profile of patients admitted with dengue.

The mean duration of hospital stay was 4.07±1.4 days. Minimum period of admission was 1 day to a maximum of 11 days.

Table 1: Epidemiological profile of dengue.

Profile		Percentage (N=327) (%)
Geographic distribution	Rural	288 (88.1)
	Urban	39 (11.9)
District of residence	Kannur	280 (86)
	Kasaragod	47 (14)
Common sources of artificial collection of water	Rubber plantation	134 (40.9)
	Working place	12 (3.7)
	Agriculture/field area	47 (14.4)
	Domestic premises	27 (8.3)
	Unknown	107 (32.7)
Month wise	June	251 (76.8)
distribution	July	76 (23.2)
History of dengue cases in locality*		258 (78.9)
History of den household*	94 (28.7)	
Past history of dengue*		6 (1.8)

^{*}Not mutually exclusive.

Clinical profile

For majority of the patients, fever (66.9%) was the first symptom to develop followed by headache (18.35%). Abdominal pain though not so common, was the first

symptom reported in 2.14% patients. Most common clinical manifestation was fever (87.1%) in all the dengue cases, followed by headache (55.35%), body ache (50.4%) tiredness (42.5%), vomiting (23.5%), abdominal pain (14.37%), diarrhoea (7.9%), rash (2.45%) and constipation (1.2%). Mucosal bleeding was seen in 4.5% of patients. Altered sensorium and seizure was also reported in 1.53% and 0.92% patients respectively. The clinical profile of dengue fever in patients is depicted in Figure 1.

8.9% of the study population were alcoholic whereas 5.5% of the patients were smokers. Out of the 327 patients, 17.7% had hypertension as the most common comorbidity, followed by 13.5% who were diabetic.

Laboratory investigations revealed leucopenia (44.3%), thrombocytopenia (79.8%), elevated hepatic enzymes (60.2%) and raised haematocrit in 54.1% cases. 98.7% of cases were tested NS1Ag positive and 74.6% were IgM positive. There was statistically significant association between thrombocytopenia with severity of dengue.

Figure 2 shows the classification based on severity of dengue among the study population.

Majority of the patients with DHF (30.2%) and 10.7% of patients with dengue fever were in the age group of 40-59 years of age. For analysis, data was again recategorized into 2 groups as dengue fever and DHF. DSS was clubbed along with DHF. A statistically significant association was observed between age group and severity of dengue.

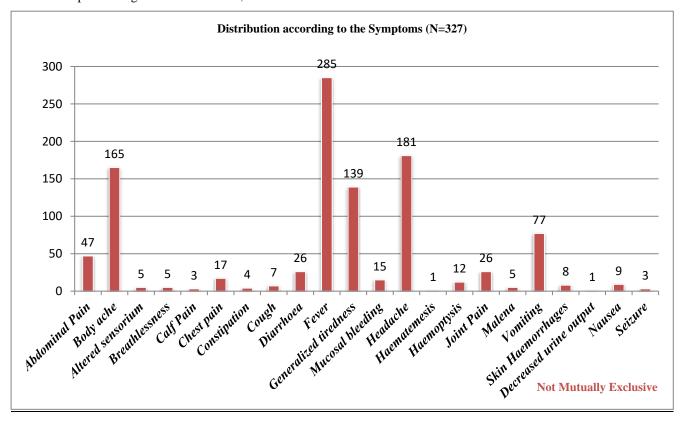


Figure 1: Clinical profile of dengue fever.

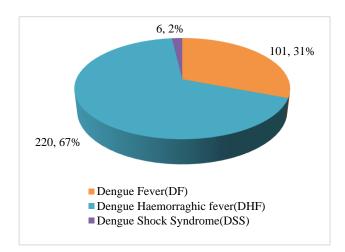


Figure 2: Classification based on severity of dengue among the study population.

Outcome

Table 2 shows the outcome of the patients based on severity of dengue.

100% of cases who were classified as dengue fever were cured and discharged within 7 days. Only 4.5% of cases with DHF were hospitalized for more than 7 days.33.3% of DSS cases required hospital admission for more than 7 days. 66.7% of DSS cases died during the course of their illness. There is no statistically significant association between the outcome and severity of dengue, when dengue fever and DHF were considered. DSS was not considered because the number was too small.

Delay in admission

The delay in referral to tertiary care centre after the onset of symptom was 5.28 days (SD±1.6).

Table 2: Outcome based on severity of dengue (N=327).

Outcome	Dengue fever	Dengue haemorraghic fever	Dengue shock syndrome
Cured before 7 days	101,100%	208,94.5%	0,0%
Hospitalized for more than 7 days	0,0%	10,4.5%	2,33.3%
Death	0,0%	2,0.9%	4,66.7%

DISCUSSION

Dengue a neglected tropical disease is emerging as public health problem of concern. In this study males were more affected than females, which is similar to that seen in a study done by George et al.¹¹

The male preponderance can be linked to the fact that most of them were working as manual laborer's in rubber plantation. With the latex collecting containers being identified as a common breeding site for Aedes vector. ¹² Homemakers were the 2nd most common affected group. It could be due to the artificial collection of water in sources like plastic containers, discarded containers, flower vases, flowerpot trays, unused tires, water polythene sheets, coconut shells found predominantly in the domestic premises.

Maximum number of admission was seen in the month of June (76.8%) followed by in the month of July (23.2%) which is similar to the study done in Tamil Nadu by Vijayakarthikeyan and in Kerala by George et al. 11,13 This is because of the variation in temperature during monsoon period, which increases the risk of dengue by increasing the mosquito development rate, shortening the virus incubation time and increasing the rate of transmission as reported in a study by Mutheneni et al. 1 Rainfall also causes water collection in places, thereby leading to increase in the mosquito population and thus affecting the dengue transmission dynamics. 14

28.7% of patients gave a history of dengue cases within the same household. This is due to the fact that during the first week of infection, dengue virus is found in the blood of an infected person. If a mosquito bites an infected person, the mosquito becomes infected. The infected mosquito can then transmit the virus to other people through bites. ¹⁵ Presence of breeding sites within the house is also a factor for dengue cases within the same household.

In the present study the mean duration of hospital admission was 4.07 ± 1.4 days which is comparable to a study done in Lucknow by Mishra et elsewhere it is 5.44 ± 2.77 days. ¹⁶ In the present study fever (87.1%) was the common symptom. Body ache was reported in 50.4% of cases unlike in a study by George et al where 71% of the patients had body ache. ¹¹

In the present study skin rash was seen in 2.45% patients and 4.5% of the patients had mucosal bleeding whereas in a study done by Kumar et al 21.7% and 7.7% of the patients has skin rash and mucosal bleed. ¹⁷ All of the those who had a previous history of dengue were diagnosed as DHF.

14.3% of the study population had abdominal pain and 7.9% had diarrhoea which is in accordance to the study done by George et al. Among the study population, 1.2% had also reported constipation. Though only few literature reviews are available, a case report described a case of DHF with retroperitoneal hematoma which presented with constipation. In this study, of the 3 cases who presented with abdominal pain and constipation, all were diagnosed as DHF. In the present study, an 84-years-old male who presented with the above findings died during the course of illness. In this study altered sensorium, a significant clinical finding was reported in 5 patients, of whom 4 were diagnosed as DHF and 1 as DSS. A 38-years-old male

patient, presenting with same clinical findings diagnosed as DSS with dengue encephalitis died during the course of illness.

In the present study 67% of cases, presented as DHF and 31% of cases as dengue fever. Whereas in a study done by Kumar et al in Karnataka, 83.9% of the cases presented with dengue fever.¹⁷ As the health facility is a tertiary care centre, dengue cases with worsening of symptoms were referred to this centre. This shows that our referral system is working appropriate to a large extent.

Strength

This study considered the epidemiological factors also along with clinical profile.

Limitations

This is hospital record-based study. This cannot be generalized to whole population.

CONCLUSION

The findings of the present study inferred that, dengue fever was mostly affecting the rural population. Breeding premises, dengue cases within the same household and in the same locality are some of the factors playing a role in making a person susceptible to dengue infection mainly during rainy season. With the ongoing COVID-19 pandemic, active public health surveillance of dengue has to be enforced. Community participation by on line awareness session on vector control measures can be taken by Arogya Jagratha members. In order to curb the surge in the cases preventive measures like source reduction, antilarval measures and personal protective measures can be emphasized. Even though fever and headache were the common clinical presentation, bleeding manifestation, abdominal pain and altered sensorium, shouldn't be disregarded as insignificant findings. Clinical practitioners should be able to identify these symptoms, thereby facilitating a timely referral and preventing the progression to severity of DHF cases.

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Institutional Ethics Committee

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