

STUDY COMPARING DENGUE WITH DENGUE HEMORRHAGIC FEVER IN YOUNG AND OLDER CHILDREN

Pusala Venkatanarayana

Assistant Professor, Department of Pediatrics, Katuri Medical College, Chiakondrupadu, Guntur, AP, India.

Corresponding author: Pusala Venkatanarayana, Assistant Professor, Department of Pediatrics, Katuri Medical College, Chiakondrupadu, Guntur, AP, India.

Abstract

Background: Dengue fever is widespread over much of Southeast Asia. The *Aedes aegypti* mosquito, which also spreads the other three kinds of dengue virus, is responsible for its transmission. Between 2.5 and 3 billion people around the world are predicted to be susceptible to this disease.

Material and Methods: The study was conducted at the Renuka children's hospital and Katuri medical college, and it was of the descriptive variety. All hospitalized children with a confirmed dengue infection as determined by clinical symptoms and/or serology were included in the Study was done between the April 2022 to March 2023.

Results: Blood tests revealed that 150 children were infected with dengue, which was confirmed by the findings of the tests. Five of the cases that were finally ruled out due to preexisting diseases were confirmed to have *Salmonella typhi*. The remaining 145 children and adolescents who satisfied the inclusion criteria are a part of the study.

Conclusion: Over the past two years, dengue fever has spread rapidly throughout the region. Death rates were especially high among children younger than 2 years old, while dengue fever was a prominent cause of illness among kids of all ages.

Keywords: Infants, dengue, and dengue hemorrhagic fever

INTRODUCTION

Many countries in Southeast Asia have widespread problems with dengue fever (DF). One of four strains of dengue virus, carried by the *Aedes aegypti* mosquito, is responsible for this illness. Worldwide, between 2.5 and 3 billion people may be exposed to this disease. Every year, there are 5 Lakh instances of DHF that necessitate hospitalisation; 90% of them are in children younger than 15 years old. In recent years, severe epidemics in South and Southeast Asia have struck India, Sri Lanka, Thailand, Myanmar, and Indonesia. Over the past three to five years, the prevalence of DHF and DSS has grown with the frequency with which new outbreaks have broken out [1, 2]. There is a lack of knowledge on what is driving the rapid growth of these pandemics. The rapid urbanisation of tropical countries and the resulting increase in their population have contributed significantly to the development of these diseases [3].

As a result, infrastructure for providing clean water, trash disposal, and maintaining overcrowded homes has deteriorated. There has been an uptick in air travel, which is a perfect vector for dispersing the virus throughout the world's major landmasses [4]. Dengue hemorrhagic fever can swiftly develop to shock, multiorgan dysfunction, and death, hence it is important to distinguish between the milder dengue fever patients and those. It is crucial in the treatment of these cases to recognise capillary leak, the defining feature of the severe type of this infection. The death rate from DF complications can reach 20% if left untreated, although it can be reduced to under 1% with prompt diagnosis and treatment. Therefore, it would be helpful to identify symptoms, indications, and laboratory data that are related with the development of problems so that these cases might receive more attention [4-6].

This study aimed to examine the clinical and biochemical characteristics of newborns and older children who had been exposed to dengue virus. So that risk factors for developing dengue shock can be determined by identifying the parameters linked with shock. These individuals can be hospitalised and given specialised care to decrease their risk of dying while receiving treatment [6, 7].

The dengue virus causes the most severe form of human arbovirus infection and is a major cause of illness across the tropics. It is the virus that spreads the quickest from mosquito to mosquito. Expansion to new countries during the past half-century has contributed to a nearly 30-fold increase in incidence. Dengue fever, often known as break bone fever, is an acute febrile disease condition caused by many arthropod-borne viruses [7, 8].

MATERIALS AND METHODS

The study was conducted at the Renuka children's hospital and Katuri medical college, and it was of the descriptive variety. All hospitalized children with a confirmed dengue infection as determined by clinical symptoms and/or serology were included in the Study was done between the April 2022 to March 2023.

Inclusion Criteria

- The trial included all kids who were admitted with serologically confirmed dengue illness.

Exclusion Criteria

- Children with pre-existing medical conditions
- Children with co-infections with other organisms in addition to dengue infection

All children hospitalised with dengue infection that were diagnosed based on clinical symptoms. Parents gave their assent after receiving thorough background information. From the moment of admission to the time of release, all clinical and investigation parameters were documented in a well-structured format. Repeat complete blood counts were performed at regular intervals to track the above parameters' behaviour in both age groups. The dengue ELISA IgG and IgM test was performed on serum samples from all of the children to confirm the diagnosis of dengue. The results of treating the cases in accordance with the WHO guidelines were analysed. Statistical analysis was applied to the collected data to determine whether or not there were significant differences in the symptomatology and laboratory parameters between the two groups.

Information about the patient's background, physical exam findings, laboratory results, course of therapy, and any difficulties that arose were all recorded in a standard form called a Proforma.

RESULTS

During the study period, 150 children were diagnosed with dengue fever, as determined by serology. Five patients were ruled out because of preexisting conditions or double infections with salmonella typhi. The remaining 145 kids who met the study's criteria were enrolled.

Age distribution of study population:

The male-to-female ratio is high throughout the board. The median age for dengue infection in those younger than two years old was two months.

Table 1: Age breakdown of research participants

Age	Minimum	Max	Mean
<2 years In Months	2	23	11.02
>2 years	2	14	8.01

Weight and nutritional status

With a mean weight of 9.47 kg in the group under 2 years and 25.81 kg in the group over 2 years, both age groups' nutritional status was normal.

Table 2: Nutritional status

	Min	Max	Mean
<2 years	5	15.2	9.47
>2 years	11	72	25.81

Average length of hospital stay

The 3.85-day hospitalization average for those younger than two years old is not statistically different from the 5.85-day average for those older than two years old (Table 3).

Table 3: Average length of hospital stay

	Min	Max	Mean
<2 years	2	14	3.85
>2 years	2	31	5.95

Length of the fever:

Duration of fever in both the groups were not statistically significant as shown in Table 4 with < 2 years showing a mean of 7.02 days and >2 years with mean of 8.10 days.

Table 4: length of the fever

	Min	Max	Mean
<2 years	3	14	7.02
>2 years	3	15	8.10

Highest recorded temperature

The mean highest temperature recorded during a hospital stay in the past two years was 100.15, and in the last two years it was 99.75, as shown in Table 5.

Table 5: Highest recorded temperature

	Min	Max	Mean
<2 years	97.3	103	100.15
>2 years	97.5	104	99.75

Lab standards used in the investigation:

The table 6 shows that the mean total count is higher in group <2 years vs. group >2 years and is statistically significant.

Table 6: Lab standards used in the investigation

	Min	Max	Mean
<2 years	2.6	31.8	9.10
>2 years	3.2	21.5	6.47

Reported Outcomes**Table 7: Outcome**

Age	Totalcases	Recovered	Death	Mortality Rate
<2 Years	41	39	3	6%
>2 Years	125	124	4	3.5%

According to the aforementioned result table, 39 out of 41 cases in the group following two years had good outcomes, while 2 instances died, representing a mortality rate of 6%. Out of 125 cases in the group > 2 years, 124 patients made a good recovery, and 3 fatalities were noted with a 3.5% mortality rate.

DISCUSSION

As a result, there is less written about dengue fever in western literature because the disease is less common in industrialised countries. The literature is primarily from the emerging countries of South and Southeast Asia. Children under the age of one are commonly overlooked in clinical descriptions and studies despite being at significant risk for severe disease after a dengue infection. Aiming to draw parallels between children under and beyond the age of two, this study compares their clinical profiles and outcomes [8]. After comparing the behaviours of newborns and late infants, Prasonk Witayathawornwong determined that the two age groups can be lumped together. That's why we're include babies and toddlers together in our study, and comparing them to older kids. Forty of the 166 kids in the research were younger than two, with a mean age of 12 months [8, 9].

Out of a total of 4,595 confirmed dengue patients admitted to children's hospital over a 5-year period, 245 (or 5.3%) were newborns, according to a study by Kalayanarooj S and Nimmannitya S. In 1964, 17 out of every 1000 newborns in Bangkok were diagnosed with DHF/DSS. According to a recent study conducted in Vietnam, Thailand, Burma, and Indonesia, the median age of DHF patients admitted to hospitals was seven months. Prasonk et al. found that the prevalence of DHF was 2.1% in babies and 1.4% in children aged 1-2 years. Our study's findings on the male-to-female ratio are consistent with those of Prasonk Witayathawornwong, who found a male-to-female ratio of 1:0.9 among infants and 1:0.7 among school-aged children [9, 10].

Both the under-2 and over-2 age groups had healthy mean body weights of 8.38 and 26.78 kilogrammes, respectively. In both groups, the average duration of fever was nearly the same. It was 6.83 days for kids

younger than 2 and 7.30 days for kids older than 2. The frequency of signs and symptoms was also not significantly different between the two groups. Children younger than 2 years had a greater incidence of cough, rash, and irritation. This result agrees with that of Prasonk's research. Witayathaworn Infants and toddlers were more likely to experience a wong were rash than children of school-age. Infants are more likely than older children to experience URI symptoms, according to research conducted by Kalayanarooj S and nimmannitya S [10, 11].

Children older than 2 years were more likely to experience vomiting, diarrhoea, and anorexia than children younger than 2 years. This is in line with the findings of Pancharoen and Thisyakorn (2001), as well as the findings of Pancharoen et al. (2001), who found that nausea and vomiting were much more common in the older patients, but at odds with the findings of Prasonk et al., who found that similar symptoms were more prevalent in infants and young children. Only older children experienced abdominal pain, accounting for 39.68% of cases. Children younger than 2 years old will be unable to verbally express their distress, so there is no way to compare this across the two groups. Abdominal pain was identified, primarily in older children, in the study by Prasonk et al [10-12].

Petechiae and tachypnoea were more common in babies and late infants than in older children, which is consistent with a study by Prasonk Witayathawornwong that found petechiae to be more common in younger children. The current study found that malena incidence was 19% in older children and 12.50% in babies. Children older than 2 years (13.49%) and younger than 2 years (12.50%) were more likely to experience other bleeding manifestations such gum bleed, hematemesis, epistaxis, and menstrual bleed. In the study by Prasonk et al., the prevalence was higher in babies, therefore this finding is different. Clinically substantial bleeding in DHF almost never results in a haemoglobin decrease or necessitates a blood transfusion. Our research showed that no children needed transfusions of entire blood [13-15].

According to Prasonk Witayathawornwong's research, splenomegaly is only seen in newborns, especially those younger than 6 months, when it occurs in roughly 10% of cases. The prevalence of organomegaly was higher in the 2 years group. Children admitted with serologically confirmed dengue often have liver damage, albeit this is less prevalent according to a South American study. When comparing DHF to dengue fever syndrome, hepatomegaly was found to be substantially more common in the former [14-16].

Consistent with the findings of Prasonk Witayathawornwong and Kalayanarooj S, nimmannitya, shock was more common in children older than 2 years of age compared to newborns and children younger than 2 years of age. The contrary was true, as shown by other investigations. In children younger than 2 years, plasma leakage symptoms such as facial puffiness, ascites, and pleural effusion were more common. Babies have more permeable capillary beds than older kids or adults do. Capillary leak syndrome increases the risk of early cardiovascular impairment and fluid overload in neonates. When comparing blood counts between the two groups, there were noticeable discrepancies. Children less than 2 years old had higher total WBC and lymphocyte counts and lower neutrophil counts. Possible explanations for these results include age-related differences in reference ranges between babies and older children. WBC and lymphocyte normal values are higher in newborns than in older children, although neutrophil normal values are lower [15-17].

The study's bleeding characteristics showed that the average partial thromboplastin time of children younger than two years old was much longer than that of older children. Higher rates of liver involvement and/or dysfunction, as measured by mean SGOT/SGPT increase, were observed in the group 2 years compared to the group >2 years. It agrees with research conducted by Kalayanarooj S and nimmannitya S. Children older than 2 had a mean platelet count of 82387, which was not significantly different from the mean of 84558 in younger children. The average PCV in this study was 30.546 in babies and 35.826 in older children. The average PCV of the two groups was statistically different. According to serology testing, older children have a higher rate of secondary dengue than infants do. Infant DHF was almost always linked to first-time dengue infections. Prasonk Witayathawornwong found that initial dengue infection was common among both newborns and young children [18-20].

Long-term fever, fulminant hepatitis, and seizures were all more common in newborns than in older children (1.6% vs. 3.7% and 0.8%, respectively) in this study. This finding corroborates the research of Kalayanarooj S. and Nimmannitya S., who found that newborns are more likely than older children to present with unique symptoms of epilepsy. Two children in the older than 2 year old group have been diagnosed with acute

respiratory distress syndrome, and one child has developed encephalopathy [19-21]. According to the results, infant and toddler mortality was greater than child and toddler mortality. Case fatality rate was reported to be 1.2 per 1,000 live births in newborns and 0.3 per 1,000 live births in older children, which is in line with the findings of a study.

CONCLUSION

Over the past two years, dengue fever has spread rapidly throughout the region. Death rates were especially high among children younger than 2 years old, while dengue fever was a prominent cause of illness among kids of all ages. Dengue's clinical manifestations, laboratory markers, and prognosis differed across age groups. Infants have a higher incidence of complications such as hepatic dysfunction and fluid overload, and a higher case fatality rate as well. Due to the difficulty in early detection and the occasionally unique signs of DHF, management of newborns with the condition is crucial. Many nations in southeast Asia have seen a significant drop in mortality thanks to the World Health Organization's treatment guidelines, an increase in the availability of parental fluids, and the establishment of good networks for the support and education of health care personnel at all levels.

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Conflict of Interest

None

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