

## INCIDENCE OF DENGUE HAEMORRHAGIC FEVER IN LOCAL POPULATION OF LAHORE, PAKISTAN

KHALID MAHMOOD<sup>1</sup>, TAHIR JAMEEL<sup>2</sup>, HUMA F. ASLAM<sup>3</sup>, M. TAHIR<sup>4</sup>  
<sup>1,2</sup>Ittefaq Hospital and University of Lahore, <sup>3</sup>F.J.M.C. and <sup>4</sup>K.E.M.U., Lahore

### ABSTRACT

*Dengue virus infection is the most common mosquito born viral disease and is a major public health problem (globally). More than 2.5 billion people in over 112 countries of the world are at risk from dengue virus. According to WHO, more than 100 million new cases of dengue fever occur world wide including dengue haemorrhagic fever (500,000) cases and Dengue Shock Syndrome (DSS) along with 2.5% mortality rate. In Pakistan incidence of dengue is increasing since 1994 and is becoming an important public health problem. Among the 341 acute cases, 166 (48.7%) were confirmed by IgM dengue specific kit, 27 (7.9%) in gray zone and 148 (43.4%) were negative. IgG was used on 200 suspected re-infected patients. Among them 79 (39.5%) were positive, 3 (1.5%) in gray zone and 118 (59%) were negative. Male to female ration was 1.25:1. Most patients presented typical sign and symptoms of fever, headache, myalgia, anorexia, malaise, skin rash and retro-orbital pain in 98, 81, 75, 63, 47 and 41% respectively in descending order. Among 245 confirmed dengue fever patients 43 (17.6%) were considered dengue haemorrhagic fever cases on the basis of lab and clinical findings. More prevalence has been observed in old age (37.8%) as compared to children (7.1%) in age group 1–15 years. Continuous surveillance and education of the clinician is essential for the recognition of the risk factors of dengue haemorrhagic fever for early diagnosis and management.*

### INTRODUCTION

Dengue infection is the most common mosquito born viral disease and is a major public health problem, mainly affecting children in the South East Asia since 1950.<sup>1,2</sup> More than 2.5 billion people in over 112 countries of tropical and sub tropical region of the world are now at risk from dengue virus infection.<sup>3-5</sup> Dengue fever epidemic was 1st reported during 1779 in Asia, Africa, North America and its pandemic occurred after 2nd world war.<sup>6,7</sup>

In Pakistan, 1st case of D.F. was reported in 1994 and since then its incidence is increasing rapidly and predominantly affecting the old age group, adult to children ratio is 3.3: 1.<sup>8-10</sup> Global distribution of DF is now comparable with malaria and according to WHO's estimation 100 million new cases of DF occur world wide each year including a potentially lethal form of disease Dengue Haemorrhagic Fever (DHF) (500,000) cases and Dengue Shock Syndrome (DSS).<sup>11-13</sup>

Fatality is more common in children and young adults. Primary infection with Dengue virus results in a self limiting disease ranging from asymptomatic infection to un-differential fever and an influenza like symptoms known as dengue fever to severe and some time fatal disease characterized by hemorrhage and shock known as D.H.F. or DSS.<sup>14</sup> Most of the people enjoy a complete recovery without any complication. Complications occur in only a very

few cases suffering from secondary dengue infection in whom mortality rate is 2.5%, which can be reduced to less than 1% with proper treatment protocol.<sup>15-18</sup>

Till now the efforts for disease control and prevention have mainly focused on vector control and surveillance activities. Despite heightened public awareness and vector control program, out breaks have occurred in several highly urbanized areas in America and its incidence has also markedly increased in developed countries.<sup>19-23</sup>

In the present study, we aim to demonstrate the clinical as well as laboratory findings associated with DF and DHF in our patients. It would be beneficial for our clinicians in early recognition and proper management of Dengue infected patients.

### MATERIALS AND METHODS

The objective of the study is to assess the incidence of DHF and its clinical sign, symptoms and lab findings in our local population. All Lahorites with suspected DF infection admitted and treated at Ittefaq Hospital between October and December 2008 were included in this study.

A suspected case of dengue fever was defined as any patient having a body temperature higher than 38°C and characteristic signs and symptoms of headache, retro-orbital pain, myalgia, arthralgia, rash and pruritus. A confirmed dengue fever case was la-

beled, on isolation of dengue virus from serum after 3-5 days of onset of symptoms or detection of dengue virus specific IgM or IgG in a single serum sample at least 6 days after on set of symptoms.<sup>24</sup>

Two blood samples, one in EDTA vial and second in serum gel tube were collected. We used Dengue specific IgM, IgG ELISA (DRG, EIA -3741 IgM DEN 2 and NOVALISA DEN IgG by NOVATEC). DHF was diagnosed on the basis of haemorrhagic manifestation, low platelet count (100,000/cmm or less), evidence of plasma leakage such as raised haematocrit, hypoalbuminaemia, hypoproteinaemia, electrolyte imbalance, acidaemia, elevated BUN, occult blood in stool, microscopic haematuria. Dengue Shock Syndrome (DSS) can be diagnosed when the dengue haemorrhagic patient presented with hypotension, narrow pulse pressure ( $\leq 20$  mmHg) in the presence of clinical signs of shock.<sup>25-28</sup>

For statistical analysis students t test was used and  $P < 0.01$  was considered necessary to obtain significance.

**RESULTS**

During one and a half months from 22<sup>nd</sup> October to 4<sup>th</sup> December 2008, a total of 341 suspected cases of dengue fever were admitted to Ittefaq Hospital, Lahore and were confirmed by dengue specific IgM and IgG with ELISA technique.

- In a total of 341 acute cases, 166 (48.7%) were confirmed having raised antibody titre against dengue IgM, 27 (7.9%) patients fell in Gray zone and 148 (43.4) were declared as negative, having no viral specific antibody after 6 days of on set of symptoms. IgG dengue specific ELISA was used for 200 cases segregated on suspicion of suffering from re-infection, 79 (39.5%) were positive, 3 (1.5%) in Gray zone and 118 (59%) were negative after 6 days of onset of symptoms. Male to female ratio was found to be 1.25:1 and most of the patients (80%) were adults while below the age of 15 years were only 18% (Table 1).

**Table 1:** Dengue fever confirmation by IgM and IgG in patients. n = 341, 200.

Results	Ig M		IgG	
	N = 341	% age	N = 200	% age
Positive	166	48.7	79	39.5
Negative	148	43.4	118	59.1
Gray zone	27	7.9	3	1.5

- Most of the patients in this study presented with typical sign and symptoms of dengue viral infection. Among them fever was the most common presenting symptom in (98%) patients, followed by headache in (81%), myalgia in (74%), anorexia in (63%), malaise in (47%), skin rash in (41%), pruritus in (14.9%) and retro-orbital pain in (10.8%) cases (Table 2).

**Table 2:** Clinical sign and symptoms of Dengue patients (n = 341).

Sign / symptoms	No. of pts.	% age
Fever	334	97.9
Headache	276	80.9
Myalgia	252	73.9
Anorexia	214	62.7
Malaise	160	46.9
Skin rash	140	41.05
Pruritis	51	14.9
Retro-orbital pain	37	10.85

- Leucopaenia with white cell count less than 3000/cmm was observed in (56.6%) patients and thrombocytopenia was found in 62.6% cases.

Among 245 confirmed dengue fever patients (43) 17.6% were considered as DHF cases on the basis of IgM +ve, TLC  $< 3.0$ , platelets  $< 100$ . None of the patient showed additional sign and symptoms of DSS like hypotension, shock etc during their illness or hospital stay. Male to female ratio was (1:0.8) and child to adult ratio observed was 1:5 (Table 3 and 4). Prevalence of (DHF) dengue haemorrhagic fever was mainly observed in old age groups, 14 patients out of 37 (37.8%) in age groups (46-80). Eighteen patients out of 94 (19.1%) in age group of 31-45 and lowest incidence was observed in young children. Three cases out of 42 (7.1%) only in age group 1-15 years (Table 3). All 43 DHF patients had platelet count ranged 1-100, white cell count ranged 1.1-3.0, Haematocrit ranged from 22-54. APTT: Partial thrombin time was prolonged in 64.7% of DHF.

Liver function tests, occult blood and microscopical haematuria were requested in only selected cases hence these findings are not included in this study.

## DISCUSSION

In this study patients with confirmed dengue viral infection were studied for clinical as well as necessary lab findings and risks factors for DF/ DHF/DSS during 6 weeks period. Early recognition of clinical signs, symptoms and risk factors for dengue are helpful, but early diagnosis of DSS is particularly important, as patient may die within 12-24 hours if appropriate treatment is not administered.

Close monitoring of young children and elderly patients with the DF especially patients with increased susceptibility to nosocomial infection may lessen case fatality. Chronic diseases like sickle cell anaemia, diabetes, asthma etc. are also suggestive of risk factors for DF. In this study

**Table 3:** Prevalence of D.F. and D.H.F. in different age groups. n=166,43.

DF (n = 166)			DHF (n = 43)		DSS
Age group	No. of pats	% age	No. of pts	% age	No. of pts
1 – 15 years	30	18.07	3	1.81	Nil
16 – 30 years	63	37.95	17	10.24	Nil
31 – 45 years	49	29.52	9	5.42	Nil
46 – 60 years	18	10.84	8	4.82	Nil
61 – 80 years	6	3.61	6	3.61	Nil

**Table 4:** Laboratory findings in DF and DHF patients at Ittefaq Hospital during Oct. to Dec. 2008.

Platelet (n = 166)					TLC (n = 166)				
Count × 10 <sup>9</sup> /L	No. of patients	% age	Male	Female	Count × 10 <sup>9</sup> /L	No. of patients	% age	Male	Female
1-50	13	7.83	9	4	1.1 – 2	7	4.22	4	3
51-100	30	18.07	18	12	2.1 – 3	37	22.29	15	22
101-150	61	36.75	27	34	3.1 – 4	50	30.12	31	19
151-200	39	23.49	20	19	4.1 – 5	39	23.49	21	18
201-300	23	13.86	14	9	> 5.0	33	19.88	16	17

majority of DHF patients have these pre existing disease. Similarly hypertension and uremia are significantly more prevalent in DHF patients. Secondary infection was the most important risk factor for DHF/DSS. A total of 79 cases out of 200 patients 39.5% were identified having secondary infection by IgG Dengue specific antibody titer and 166 cases of 341 patient's (48.7%) were 1st time exposed to Dengue Fever Virus and confirmed by IgM specific antibodies detection.

The number of cases who fulfill the criteria of DHF (>38°C), thrombocytopenia platelet count (< 100,000/cmm), haemorrhagic manifestation and evidence of increased capillary permeability such as haemo-concentration, pleural effusion, ascities and hypoproteinaemia were 43 out of 245 cases (18%) in our study which is nearly half the incidence reported by surveillance studies conducted in other parts of the country in which it is 34.7% DHF as reported by Ahmed et al in 2006.<sup>8</sup>

In South East Asia, DHF is primarily a children's disease whereas according to our study the disease is more prevalent in adults, age range 16-45 year groups. Among the 44 cases 27 (61.3%) were young adult patients. International studies have reported that DHF showed similar clinical feature in all age groups, though the incidence has been reported to be higher in children below the age of 15 years.

In our set up increasing frequency of dengue patients and dengue out breaks, increasing the epidemics of DHF and now it is becoming an important public health problem.

It is **concluded** that continuous surveillance and education of clinicians is essential for the recognition of risk factors of DHF for early diagnosis and management. In elderly patients, blood group and cross matching should be carried out as a routine precaution which may be helpful in emergency.

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