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A Study on Prognostic Indicators of Severe Dengue Fever in Children

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Abstract **Original Research Article**

Dengue is the most important emerging tropical viral disease of humans and leading cause of death in SEAR after diarrhea and acute respiratory infections. It is a significant public health concern with its geographical distribution becoming worldwide, involving nearly all the tropical and subtropical regions of the world with significant morbidity and mortality. This study mainly aims at finding out the factors which were associated with severe dengue fever that helps determining the prognosis in children. This case control study was done during November 2017 to October 2018 from the children admitted in Pediatric ward, Vijayanagar institute of medical sciences, Ballari. Among the 201 study subjects, the factors like presence of bleeding manifestations(p<0.001), low pulse pressue<20 mmhg(p<0.001), prolonged capillary refill time(p<0.001), low O2 saturation(p<0.001), Hyponatremia(p=0.008), elevated SGOT/SGPT levels(p<0.001), Prolonged PT/APTT/INR levels(p<0.001), respiratory and abdominal involvement in the form of pleural effusion, pneumonia and ascites(p<0.001) were significantly associated with severe dengue fever with mortality of 15%. Leucopenia, thrombocytopenia and raising hematocrit was not found to have significant association with the severity of dengue fever in this study. These parameters may be used to predict, to forecast disease severity in patients suspected of dengue infection and to manage it early in the course of the illness. Various measures for early diagnosis and prompt intervention with emphasis on the warning signs and good supportive care would help decrease the fatality and morbidity associated with Dengue.

Keywords: Severe dengue fever, thrombocytopenia, hyponatraemia, leucopenia.

INTRODUCTION

Dengue is an essential mosquito-transmitted viral infection having significant mortality and morbidity. It is a significant public health concern with its geographical distribution becoming worldwide, involving nearly all the tropical and subtropical regions of the world [1]. It is the most common and widespread arboviral infection in the world today caused by Dengue virus. Dengue viruses (DV) belong to the family Flaviviridae, and there are four serotypes of the virus referred to as DV- 1, DV-2, DV-3, and DV-4 [2]. The course of the disease has changed in the recent years from milder form to severe form like dengue hemorrhagic fever & severe dengue fever and with increasing outbreaks frequency [3]. Approximately 1.8 billion (more than 70%) of the population at risk for dengue worldwide live in Member States of the WHO South-East Asia Region (SEAR) and Western Pacific Region, which bear nearly 75% of the current global disease burden due to dengue [4]. During the 1780s, the dengue epidemics were first recognized to occur almost simultaneously in Asia, Africa, and North America, shortly after the identification and naming of the disease in 1779. Benjamin Rush confirmed the first case report in 1789, and he coined Dengue as "**Breakbone Fever**" because of the symptoms of myalgia and arthralgia [5]. Nearly 10,000 deaths are attributed to dengue infection yearly, which is secondary to rapid urbanization and overcrowding. Temporal trends suggest that the incidence of dengue nearly doubled in every decade since 1990 [6]. Dengue is the primary cause of childhood death in many countries in Southeast Asia [7].

According to WHO 2012 guidelines, the clinical spectrum of disease includes[8]

- Dengue fever
- Dengue with warning signs and
- Severe dengue fever (DF).

Severe dengue is defined as a suspected dengue patient associated with severe bleeding, severe organ dysfunction or severe plasma leakage leading to shock.

In addition to the distinction between severe and non-severe dengue, the WHO recognizes three

phases in the clinical course of a dengue infection, i.e. the febrile, critical and recovery phase.

This study is aimed to find out the prognostic indicators in severe dengue fever in children which will help us in turn to identify severe dengue fever at the earliest and to assess the prognosis.

MATERIALS AND METHODS

Data will be collected by face to face interview from the parents of the children admitted in pediatric emergency ward with diagnosis of dengue fever and severe dengue fever in Department of pediatrics, Vijayanagar institute of medical sciences, Ballari from November 2017 to October 2018. Clinical parameters will be examined and documented.

Method of Collection of Data

This is a case control study design in which 201 cases of dengue fever admitted in the pediatric emergency ward, were enrolled. After taking written informed consent, data were collected in a predesigned semi structured questionnaire regarding Socio-Demographic profile, medical history, clinical and hematological profile and outcome. Investigations such as Complete blood count, Blood test(Serology) for Dengue fever, urine routine, serum electrolytes, random blood sugar, WIDAL/ Blood culture, Liver enzymes, Chest x ray, Ultrasound abdomen, PT, aPTT, INR were done based on the clinical scenario and if necessary, blood urea, serum creatinine, CSF analysis, 2D echo, CT scan brain/MRI was also done. Non randomized purposive sampling technique will be adopted to select both cases and controls.

Sample Size Calculation

Since this study is a time bound study, where a series of dengue cases (as per inclusion criteria) were enrolled during a study period of one year i.e., from November 2017 to October 2018. During this study period, we were able to enroll a total of 201 cases, out of which 142 were only dengue fever, 32 were dengue fever with warning signs and 27 were severe dengue fever.

Inclusion Criteria

I. **For cases:** Any child, between age 1 month to 12 years, having tested positive for dengue NS1 antigen in serum or tested positive for antibodies (IgM) in serum against dengue fever virus along with complications such as shock or fluid accumulation with respiratory distress or severe bleeding or severe organ involvement such as liver, CNS, heart and other organs.

II. **For controls:** Any child, between age 1 month to 12 years, having tested positive for dengue NS1 antigen in serum or tested positive for antibodies (IgM) in serum against dengue fever virus without any complications.

Exclusion Criteria

1. Children having other co-infections like malaria, typhoid or infective hepatitis, interfering with interpretation of the laboratory data.
2. Immunocompromised subjects.
3. Children less than 1 month.
4. Patients discharged against medical advice.

RESULTS

Table-1

Age wise distribution of the study subjects		
Age group	Frequency	Percent
< 1 yr	19	9.5
1 - 5 yrs	65	32.3
5 - 10 yrs	85	42.3
10 - 15 yrs	32	15.9
Total	201	100
Mean ± SD	6.59 ± 3.96	Mean ± SD

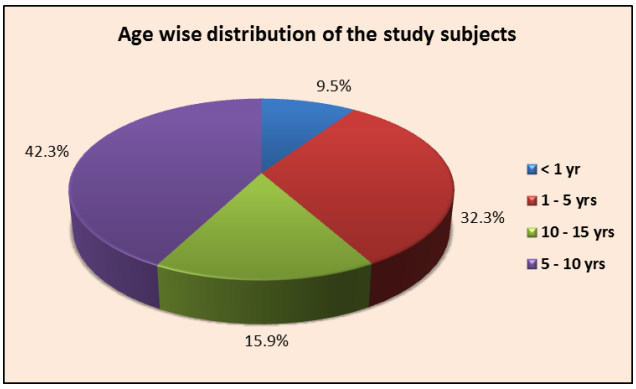

Fig-1

Among the 201 cases included in the study, 19(9.5%) were less than 1 yr, 65(32.3%) cases were 1-5 yrs, 85(42.3%) were between 5-10 yrs and 32(15.9%) were between 10-15 yrs of age.

Table-2

Sex wise distribution of the study subjects		
Sex	Frequency	Percent
Female	78	38.8
Male	123	61.2
Total	201	100

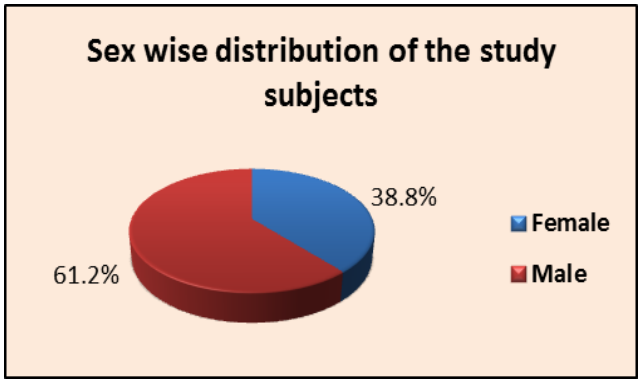

Fig-2

78(38.8%) cases were females and 123(61.2%) cases were males.

Table-3

History of dengue among the study subjects (n=201)		
History of dengue	Frequency	Percentage
Family history		
Yes	8	4.0
No	193	96.0
Past history		
Yes	3	1.5
No	198	98.5
Travel history		
Yes	8	4.0
No	193	96.0

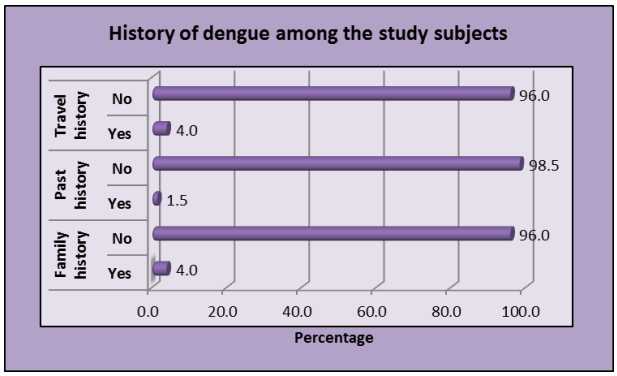

Fig-3

8(4%) of cases had positive family h/o dengue fever, 3(1.5%) cases had positive past h/o dengue fever and 8(4%) cases had positive h/o travel to dengue endemic areas.

Table-4

Symptomatology among the study subjects (n=201)		
Symptoms	Frequency	Percentage
Fever	201	100
Abdominal pain	78	38.8
Persisting vomiting	94	46.8
Anorexia	91	45.3
Headache	59	29.4
Rashes	30	14.9
Convulsions	14	7.0
Abdominal distension	12	6.0
Facial puffiness	16	8.0

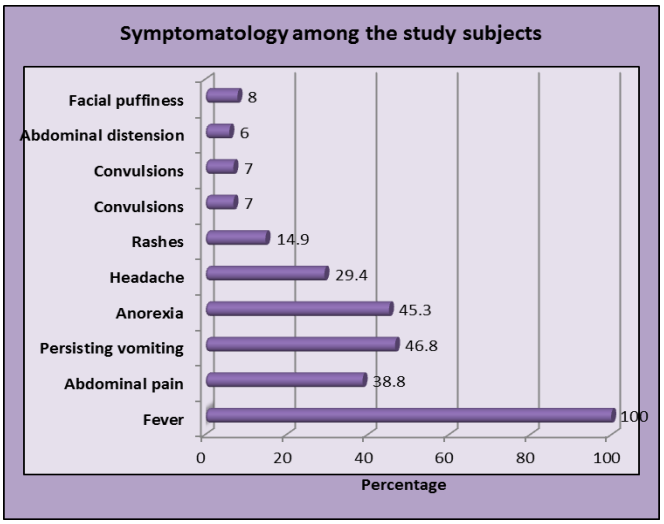

Fig-4

201(100%) cases had fever, 94(46.8%) had persistent vomiting, 91(45.3%) had anorexia, 78(38.8%) had abdominal pain, 59(29.4%) had headache, 30(14.9%) had rashes, 16 (8%) had facial puffiness, 14(7%) had convulsions and 12(6%) had abdominal distension.

Table-5(a)

Distribution of study subjects based on bleeding manifestation		
Bleeding MF	Frequency	Percent
Yes	31	15.4
No	170	84.6
Total	201	100

Table-5(b)

Bleeding manifestations among the study subjects (n=201)		
Bleeding MF	Frequency	Percentage
Malena	19	9.5
Epistaxis	9	4.5
Hemetemesis	7	3.5
Hematuria	2	1
Bleeding gums	2	1

Bleeding manifestations were seen in 31(15.4%) of cases with 19(9.5%) had melena, 9(4.5%) had epistaxis, 7(3.5%) had hemetemesis and 2(1%) had hematuria and bleeding gums. 170(84.6%) cases had no bleeding manifestations.

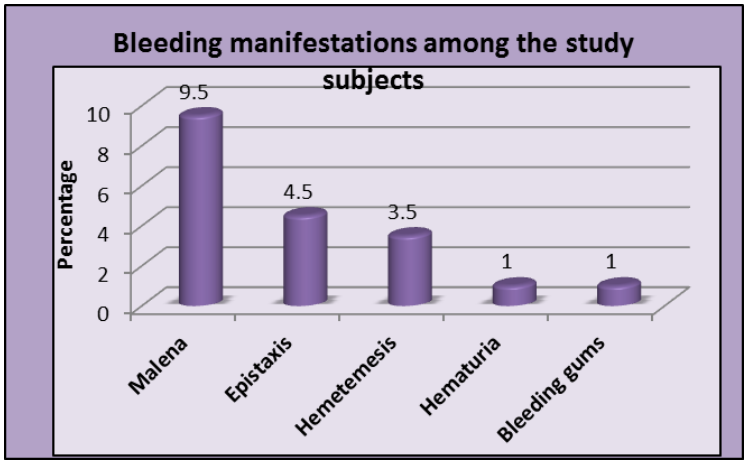

Fig-5(b)

Table-6

Clinical type of dengue among the study subjects		
Type	Frequency	Percent
Dengue fever	142	70.6
Dengue with warning signs	32	15.9
Severe Dengue	27	13.4
Total	201	100.0

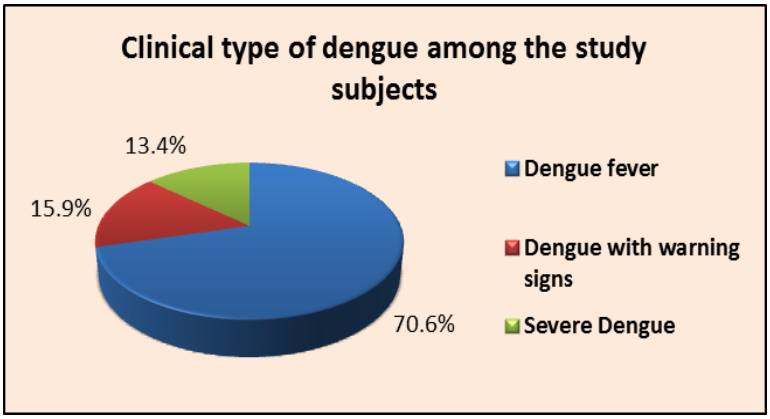

Fig-6

142(70.6%) had dengue fever, 32(15.9%) had dengue fever with warning signs, 27(13.4%) had severe dengue fever.

Table-7

Age group versus clinical type of dengue diagnosis							
Age group	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
< 1 yr	15	10.6	1	3.1	3	11.1	0.71
1 - 5 yrs	46	32.4	10	31.3	9	33.3	
10 - 15 yrs	20	14.1	8	25.0	4	14.8	
5 - 10 yrs	61	43.0	13	40.6	11	40.7	
Total	142	100.0	32	100.0	27	100.0	
Mean ± SD	6.39 ± 3.96		7.38 ± 4.07		6.67 ± 3.87		0.449

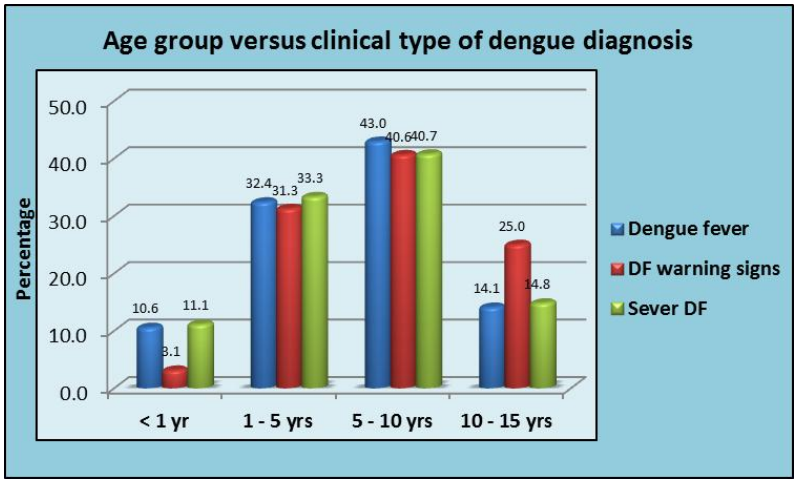

Fig-7

Mean age group of dengue fever were 6.39+3.93 yrs, DF with warning signs were 7.38+4.07 yrs, severe dengue fever were 6.67+3.87 yrs(p=0.449).

Table-8

Sex versus clinical type of dengue diagnosis							
Sex	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Female	59	41.5	10	31.3	9	33.3	0.458
Male	83	58.5	22	68.8	18	66.7	
Total	142	100.0	32	100.0	27	100.0	

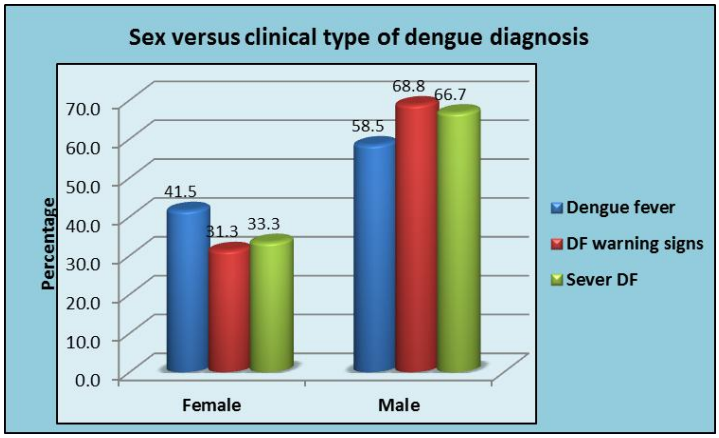

Fig-8

Although in the present study, the incidence of dengue fever, DF warning signs and Severe dengue fever was more in males, there is no significant association with the severity of dengue fever(p=0.458).

Table-9

Bleeding mainifestations versus clinical type of Dengue diagnosis							
Bleeding MF	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
No	138	97.2	20	62.5	12	44.4	<0.001
Yes	4	2.8	12	37.5	15	55.6	
Total	142	100.0	32	100.0	27	100.0	

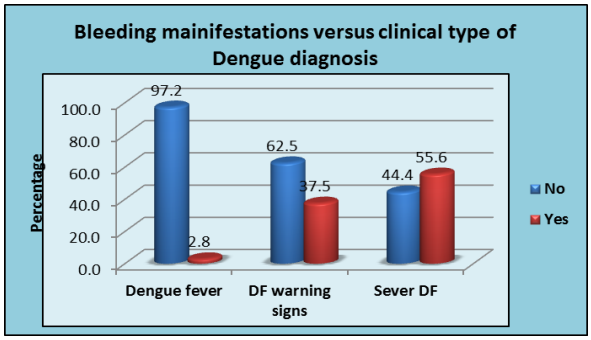

Fig-9

The presence of bleeding manifestations like melena, epistaxis, hemetemesis, petechiae, hematuria s more in DF with warning signs(37.5%) and Severe dengue fever(55.6%). There is significant association between bleeding manifestations and severity of dengue fever ($p<0.001$).

Table-10

Pulse pressure versus clinical type of Dengue diagnosis							
Pulse pressure	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
≥ 20 mmHg	117	82.4	28	87.5	15	55.6	<0.001
< 20 mmHg	12	8.5	3	9.4	12	44.4	
NR	13	9.2	1	3.1	0	0.0	
Total	142	100.0	32	100.0	27	100.0	

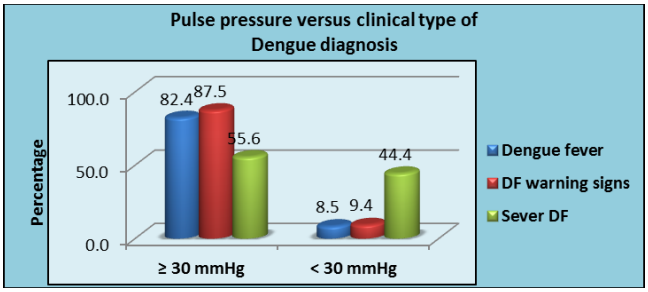

Fig-10

Narrow pulse pressure(<20 mmhg) was found in 8.5% in dengue fever, 9.4% in DF with warning signs, 44.4% in severe dengue fever and it is statistically signific($p<0.001$).

Table-11

CRT versus clinical type of Dengue diagnosis							
CRT	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
≤ 3 seconds	141	99.3	32	100.0	12	44.4	<0.001
> 3 seconds	1	0.7	0	0.0	15	55.6	
Total	142	100.0	32	100.0	27	100.0	

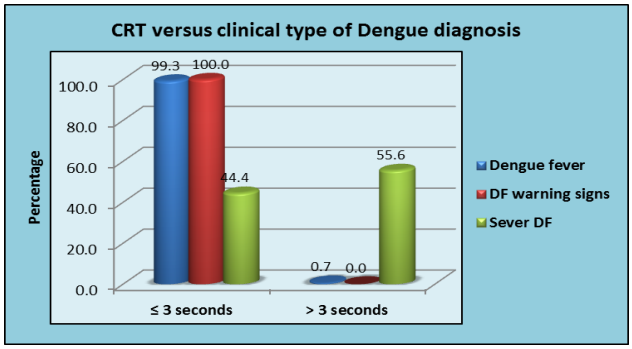

Fig-11

Prolonged Capillary refill time of > 3 seconds was found in 55.6% in severe dengue fever which is statistically significant (p<0.001).

Table-12

SpO2 levels versus clinical type of Dengue diagnosis							
SpO2	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Low	8	5.6	6	18.8	16	59.3	<0.001
Normal	134	94.4	26	81.3	11	40.7	
Total	142	100.0	32	100.0	27	100.0	

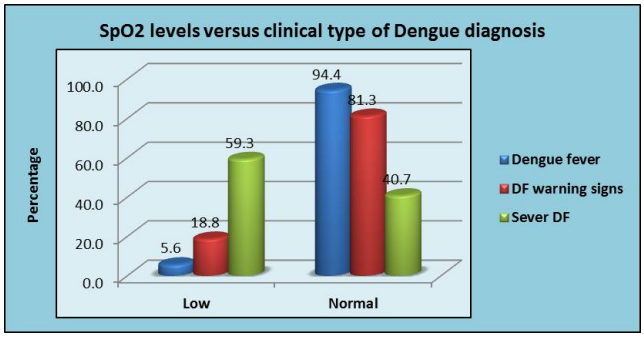

Fig- 12

Low spO_2 were identified in 5.6% in dengue fever, 18.8% in DF with warning signs and 59.3% in severe dengue fever and this has significant association with severity of dengue fever(p<0.001).

Table-13

Anaemia versus clinical type of Dengue diagnosis							
Anaemia	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Yes	47	33.1	11	34.4	8	29.6	0.921
No	95	66.9	21	65.6	19	70.4	
Total	142	100.0	32	100.0	27	100.0	

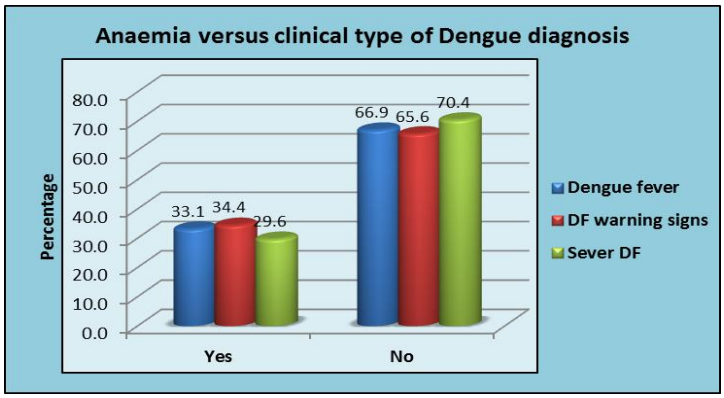

Fig-13

Anaemia was found in 33.1% in dengue fever, 34.4% in DF with warning signs and 29.6% in severe dengue fever and it is not statistically significant(p=0.921).

Table-14

Progressive leucopenia versus clinical type of Dengue diagnosis							
Leucopenia	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Yes	93	65.5	14	43.8	11	40.7	0.01
No	49	34.5	18	56.3	16	59.3	
Total	142	100.0	32	100.0	27	100.0	

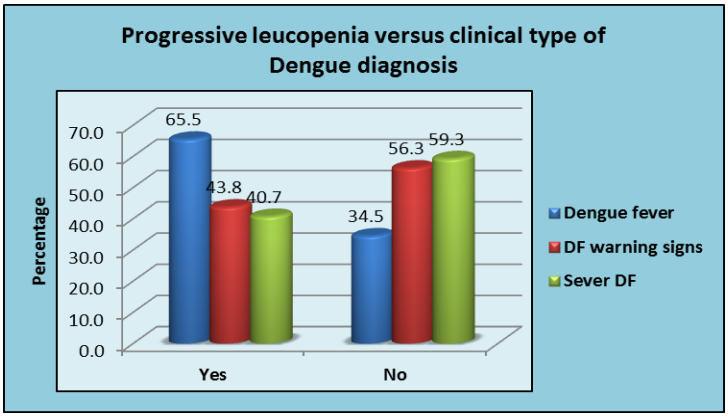

Fig-14

Progressive leucopenia was found in 65.5% of dengue fever, 43.8% in DF with warning signs and 40.7% in severe dengue fever and it is not statistically significant in our present study(p=0.01). Leukocytosis was identified more in severe dengue who presented with/ developed bleeding manifestations which was significantly associated with severity of dengue fever.

Table-15

Lymphocytopenia versus clinical type of Dengue diagnosis							
Lymphocytopenia	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Yes	50	35.2	13	40.6	6	22.2	0.306
No	92	64.8	19	59.4	21	77.8	
Total	142	100.0	32	100.0	27	100.0	

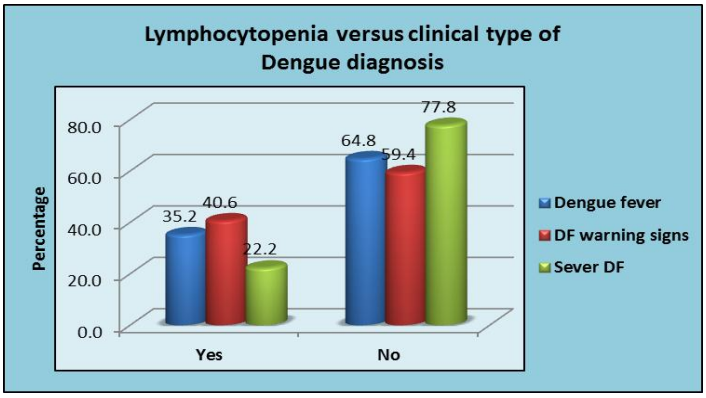

Fig-15

Lymphocytopenia was found in 35.2% in dengue fever, 0.6% in DF with warning signs and 22.2% in severe dengue fever which is not statistically significant.

Table-16

Raising hematocrit versus clinical type of Dengue diagnosis							
Hematocrit	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Yes	70	49.3	17	53.1	13	48.1	0.912
No	72	50.7	15	46.9	14	51.9	
Total	142	100.0	32	100.0	27	100.0	

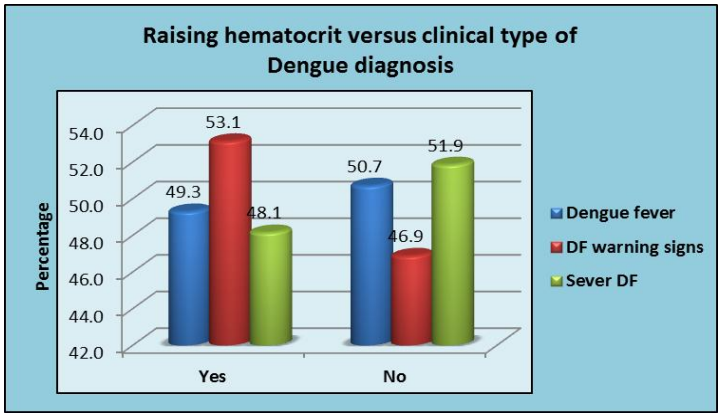

Fig-16

Raising heamtocrit was identified in 49.3% in dengue fever, 53.1% in DF with warning signs and 48.1% in severe dengue fever and it is statistically not significant in our present study(p=0.912).

Table-17

Thrombocytopenia versus clinical type of Dengue diagnosis							
Thrombocytopenia	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Yes	119	83.8	30	93.8	22	81.5	0.308
No	23	16.2	2	6.3	5	18.5	
Total	142	100.0	32	100.0	27	100.0	

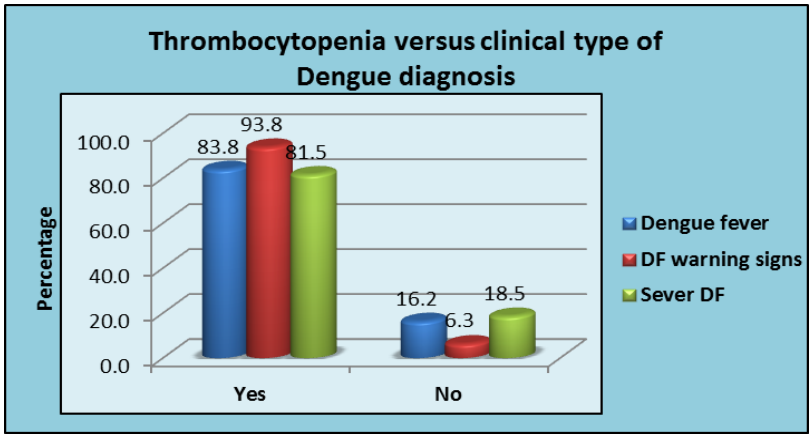

Fig-17

Thrombocytopenia was found in 83.8% in dengue fever, 93.8% in DF with warning signs and 81.5% in severe dengue fever and it is not statistically significant(p=0.308).

Table-18

Sodium electrolyte levels versus clinical type of Dengue diagnosis							
Sodium	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Hypernatremia	2	1.4	1	3.1	3	11.1	0.008
Hyponatraemia	25	17.6	7	21.9	10	37.0	
Normal	115	81.0	24	75.0	14	51.9	
Total	142	100.0	32	100.0	27	100.0	

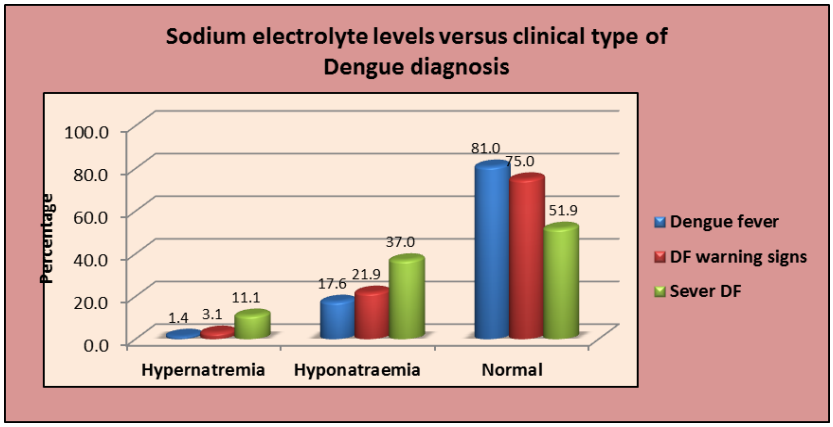

Fig-18

Hyponatraemia was found in 17.6% in dengue fever, 21.9% in DF with warning signs and 37% in severe dengue fever and this is significantly associated with severity of dengue fever(p=0.008).

Table-19

SGOT/SGPT levels versus clinical type of Dengue diagnosis							
SGOT/SGPT	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Increased	31	21.8	7	21.9	17	63.0	<0.001
Normal	111	78.2	25	78.1	10	37.0	
Total	142	100.0	32	100.0	27	100.0	

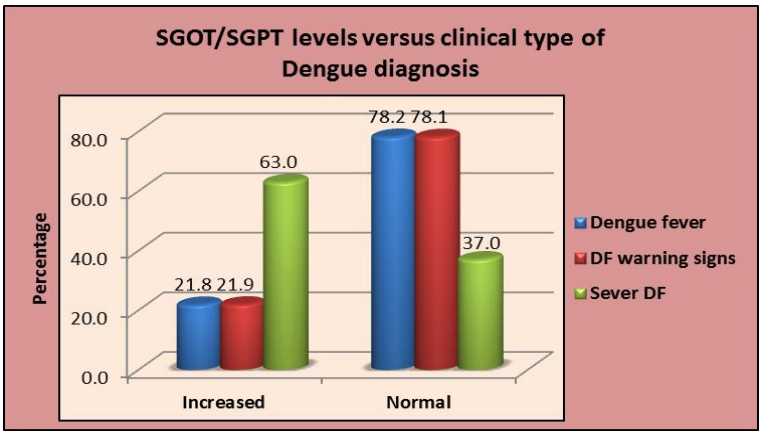

Fig-19

Elevated SGOT/SGPT levels were found in 21.8% in dengue fever, 21.9% in DF with warning signs and 63% in severe dengue fever and this has significant association with severity of dengue fever(p<0.001). The SGOT levels more than 1500 were having more mortality in our present study.

Table-20

PT/APTT/INR versus clinical type of Dengue diagnosis							
PT/APTT/INR	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Abnormal	0	0.0	0	0.0	3	11.1	<0.001
Normal	142	100.0	32	100.0	24	88.9	
Total	142	100.0	32	100.0	27	100.0	

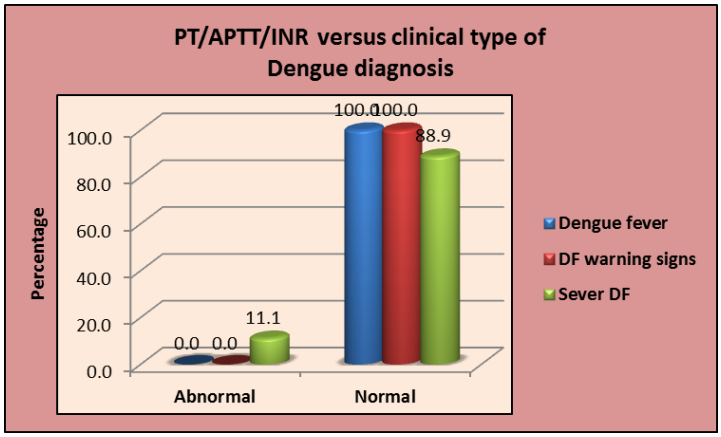

Fig-20

Prolonged PT/APTT.INR was found 11.1% only in severe dengue fever which is statistically significant (p<0.001).

Table-21

Respiratory findings versus clinical type of Dengue diagnosis							
RS findings	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Normal	137	96.5	29	90.6	13	48.1	<0.001
Plueral effusion	2	1.4	1	3.1	5	18.5	
Pneumonia	1	0.7	1	3.1	8	29.6	
Wheezy LRTI	2	1.4	1	3.1	1	3.7	
Total	142	100.0	32	100.0	27	100.0	

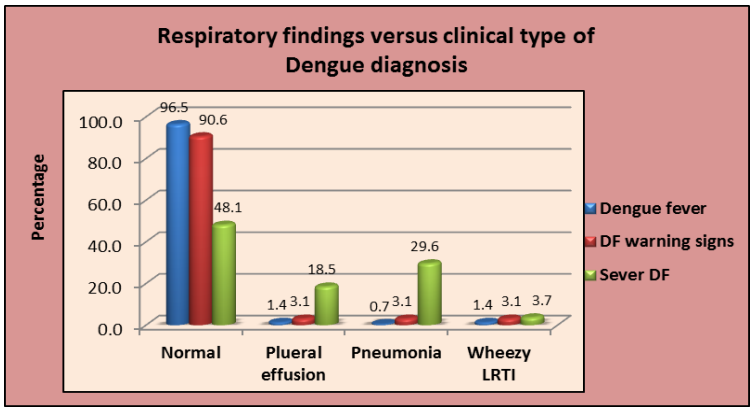

Fig-21

The presence of respiratory system involvement such as respiratory distress, Pneumonia, wheezy LRTI,ARDS and pleural effusion were found in 3.5% in dengue fever, 9.3 in DF with warning signs and 51.8% in severe dengue fever which is statistically significant(p<0.001).

Table-22

Per abdomen findings versus clinical type of Dengue diagnosis							
Signs	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Ascitis	0	0.0	2	6.3	4	14.8	<0.001
Tender hepatomegaly	10	7.0	11	34.4	20	74.1	<0.001
Total	142	100.0	32	100.0	27	100.0	

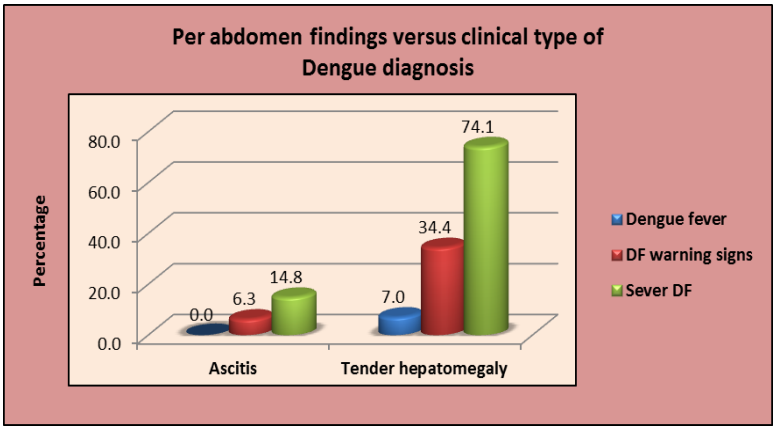

Fig-22

The presence of ascitis and tender hepatomegaly was found in 7% in dengue fever, 40.7% in DF with warning signs and 88.9% in severe dengue fever and this is statistically significant(p<0.001).

Table-23

Mental status findings versus clinical type of Dengue diagnosis							
CNS	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Alert	141	99.3	31	96.9	16	59.3	<0.001
Irritable	1	0.7	1	3.1	11	40.7	
Total	142	100.0	32	100.0	27	100.0	

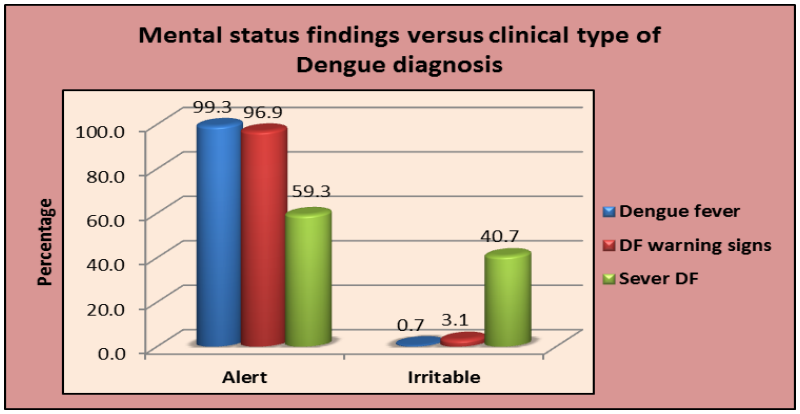

Fig-23

The presence of altered mental state like irritability was found in 0.7% in dengue fever, 3.1% in DF with warning sign s and 40.7% in severe dengue fever which is statistically significant(p<0.001).

Table-24

Outcome versus clinical type of Dengue diagnosis							
Outcome	**Dengue fever**		**DF with warning signs**		**Severe DF**		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Expired	0	0.0	0	0.0	4	14.8	<0.001
Improved	142	100.0	32	100.0	23	85.2	
Total	142	100.0	32	100.0	27	100.0	

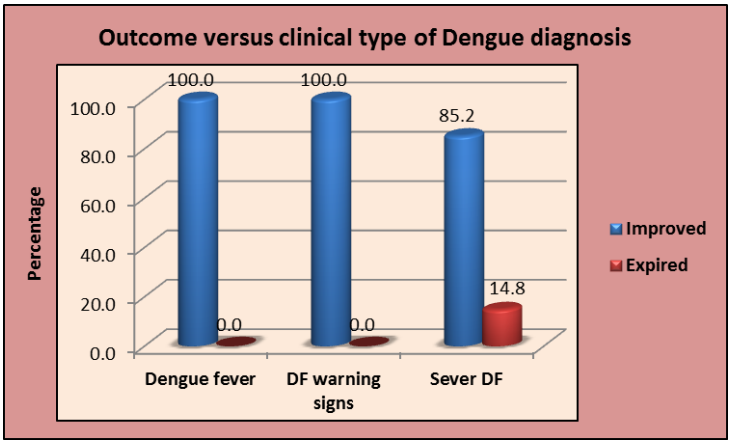

Fig-24

The mortality from dengue fever was seen in 14.8% from severe dengue fever.

DISCUSSION

We conducted this study based on the new WHO classification 2012 of dengue fever, to know which factors can predict severity so as to facilitate timely intervention. In our study out of 201 patients with dengue, 142 were classified as dengue fever, 32 as DF with warning signs and 27 children as severe dengue. However Prasad D *et al* found 82.1% as severe dengue and Sahana *et al* found 24.7% [9].

This variance in the subject distribution may be attributable to the timing of admission, the awareness in the draining community, timely intervention.

The mean age of presentation in our study was 6.59±3.96 years with 42.3% of the children in the 5-10 year age group, a finding similar to that by Gomber S *et al* and Rasul *et al* [10, 11].

This could be due to this age group prone for frequent mosquito bites due to their outdoor activities, but our study does not prove any significant association between age and the severity of dengue fever. Studies done by Shah I *et al* and Rachel C *et al* found younger age as one of the predictive markers for Dengue shock syndrome and dengue hemorrhagic fever [12].

The male:female ratio in our study was 1.57:1 similar to study by Rasul *et al*. Though studies by Anders KL *et al* and Phuong CX *et al* found increased risk of shock and death among females, our study did not have a significant statistical association similar to studies by Pongpan S and Ahmed FU *et al* [13].

There was no significant association was found between nutritional status and the severity of dengue fever. Pichainarong stated that severe dengue is rarely seen in children with protein energy malnutrition [14].

Many studies has been done previously to find out the risk factors significantly associated with severity of dengue fever like bleeding manifestations, leucopenia, raising hematocrit, hypotension, narrow pulse pressure, elevated SGOT/SGPT levels, deranged PT/APTT/INR etc. which are similar to our study.

The presence of bleeding manifestations was having a statistically significant association with the severity of dengue fever like many other studies. The most common bleeding manifestations found in our study was melena and epistaxis followed by others.

Narrow pulse pressure(< 20 mmhg) and prolonged Capillary refill time(>3 secs) and altered mental state i.e irritability was found to have significant association with severity of dengue fever as showed in the study done by Rajapakse s *et al* [15].

Low oxygen saturation was found in 59.3 % of severe dengue fever cases in our study, which is showing statistically significant association with the dengue fever severity. Progressive leukopenia, hyponatraemia, elevated SGOT/SGPT levels, prolonged PT/APTT/INR levels, presence of pleural effusion, LRTI, tender hepatomegaly and ascitis was significant association with the severity of dengue fever as shown by many of the studies. But this study did not find the association of anemia, lymphocytopenia, raising hematocrit, thrombocytopenia with severity of dengue fever. This could be because of early identification, diagnosis and intervention with IV fluids resulting in masking of results.

However many studies proposed hemo-concentration as a prognostic factor for the severity of dengue infection [16, 17]. Vasculopathy in dengue causes increased vascular permeability, leading to hemo-concentration and shock. Some studies concluded that white cell count > 5,000/µL is a prognostic factor for dengue severity [18]. while others found leucopenia. Normoleukocytosis or mild leukocytosis may be found in early dengue infection. When body temperature declines, most patients experienced

leucopenia from bone marrow suppression. Stress in accompanied with shock may somehow cause leukocytosis.

Thrombocytopenia was found to have association with the severity of dengue fever in the studies conducted by Jayashree K *et al*, Mogra G *et al* and Mourao *et al*, but this was not establisehed in our present study [19]. Low platelets are explained by bone marrow suppression and immune response induced platelet destruction by the liver and spleen.

Hyponatraemia was found to have significant association with severity of dengue fever.Studies done by Adisorn Lumpaopong *et al* showed mild hyponatremia is a common electrolyte disturbance and renal involvement is mild in patients with DF and DHF [20].

Studies done by Dayal A *et al* [21] and Sahana *et al* [18] found the association of pleural effusion, ascitis and tender hepatomegaly with the severity of dengue fever, which was again proved in our study. Although moderate liver enlargement is a normal response to dengue infection, it is more associated with severe dengue fever compared to DF.

The mortality among the severe dengue fever in our study was 14.8% which was more than those reported by Sahana *et al* where it was 2%. The overall mortality of dengue fever in our study was 0.02%. Various measures for early diagnosis and prompt intervention with emphasis on the warning signs and good supportive care could help decrease the fatality and morbidity associated with dengue.

CONCLUSION

The severity of dengue infection is significantly associated with some routine clinical parameters like presence of bleeding manifestations, pulse pressue<20 mmhg, prolonged CRT, low O2 saturation, Hyponatraemia, elevated SGOP/SGPT levels, Prolonged PT/APTT/INR levels, respiratory and abdominal involvement. These parameters may be used to predict, to forecast disease severity in patients suspected of dengue infection and to manage it early in the course of the illness. Various measures for early diagnosis and prompt intervention with emphasis on the warning signs and good supportive care would help decrease the fatality and morbidity associated with Dengue.

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