

ORIGINAL ARTICLE

Outcome of Dengue Patients Admitted in the PICU of Bangladesh Shishu Hospital & Institute

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Abstract

Background: Recent re-emergence of dengue patient among Bangladeshi children have created a huge burden in the morbidity and mortality of our children.

Objectives: This study was designed to document the outcome of dengue patients, admitted in the ICU of Bangladesh Shishu Hospital & Institute (BSH&I).

Methods: This retrospective observational study was performed among the children having dengue infection and who were admitted in the PICU of BSH&I from 1st June 2019 to 31st December 2019. All patients who were diagnosed as dengue fever by serological tests (NS1, Dengue IgG & IgM) and those who were admitted in the PICU were included in this study. Total one hundred and twenty-six patients were enrolled. Data were collected from hospital record of the Dengue patients.

Results: Mean age of the Dengue patients were 5.91(±3.53) years. Most of the patients suffering from dengue fever were urban dwellers; among them 52.4% were female. Presenting symptoms during admission in the PICU were fever which was present in 119 patients (94.4%), followed by hypotension in 106 (84.1%) patients. Severe dengue (SD) was diagnosed in maximum number of cases (i.e., 62.7%), followed by Dengue fever with warning signs (DFWS) in (20.6%) and Expanded Dengue Syndrome (EDS) in 16.7%. Maximum cases received crystalloid (98.4%), about 51.6% patients received colloid. A good number of patients received blood transfusion (23%), plasma was received in (23%) and albumin was received in (33.3%) cases. Majority of the patients received Oxygen (80.2%); antibiotics were prescribed in 87.3% cases. Fifty-five percent patients received inotropes for the management of shock. The overall outcome revealed 75.4% patients were cured and discharged. Only 21.43% patients died in the PICU despite protocol-based management. Death due to severe dengue was 15(18.9%) out of 79, followed by death due to Dengue Hemorrhagic fever with warning signs which was 8 (30.7%) out of 26 and death in Expanded Dengue syndrome was 4(19.04%) out of 21.

Conclusion: This retrospective study found that majority of the Dengue patients admitted in PICU has survived. However the death due to Dengue with warning signs was higher than death in severe Dengue cases. Delayed recognition of warning signs along with delayed referral to PICU may be responsible for such outcome.

Keywords: Dengue, Outcome of dengue, mortality in dengue.

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Introduction

Bangladesh is situated in the tropical and sub-tropical regions like other Southeast Asian (SE) countries and like them has become a suitable habitat for the dengue vector and its increased transmission. Before 2000, only sporadic dengue cases were reported from Dhaka and other parts of the country.^{1,2} Dengue caused a serious public health concern, following a sudden outbreak in 2000 where around 5,551 cases and 93 death occurred in the country. During the Dengue outbreaks from 2000-2017, both types of the vectors (*Aedes aegypti* and *Aedes albopictus*) were identified in Bangladesh.^{3,4} Recent re-emergence of dengue and emergence chikungunya is found in our country, both spreads by the *Aedes* mosquitoes and have created a huge burden in the morbidity and mortality with insufficient allocation of resources under the CDC Operational Plan (OP) of the Health, Population, and Nutrition Sector Program (HPNSP: 2017–2022).⁵ Like other countries, once the virus have emerged in Bangladesh, they are expected to remain in the environment and cause increased public health problems in the near future. Bangladesh first experienced a large outbreak of Dengue in the year 2000 with 5551 cases and case fatality was found 93. The containment of the disease was successfully handled afterwards. Between the years 2007 to 2011 very low number of cases were reported with no death record. From 2015 the incidence of cases started rising with few deaths. This is obviously a change in epidemiology of the disease.⁶ The aim of the study was to observe the clinical features, complications and predictors of mortality and outcome of moderate and severe dengue cases admitted in the PICU of Bangladesh Shishu Hospital & Institute.

Materials and Methods

Present study was conducted in Paediatric Intensive Care Unit (PICU) of Bangladesh Shishu Hospital & Institute. This was a retrospective observational study. Data was collected from hospital records. Duration of the study was from 1st June 2019 to 31st December 2019. All the children below 15 years of age having clinical features of dengue and confirmed by IgM, IgG and rapid dengue test NS1Ag were included in the study. Children with other diseases were excluded from the study. Informed consent was taken from parents and the study was approved by

Institutional Ethical Committee. Detailed history and examination findings of each patient were collected from hospital record. The patients were classified according to revised WHO guideline as 1) Dengue Fever with warning signs, 2) Severe dengue and 3) Expanded Dengue Syndrome and they were managed appropriately.⁷ The requirement of crystalloids or colloids and the use of blood products were also retrieved from hospital records.

The data were entered and analyzed using SPSS (Statistical Packages for Social Science). The presenting symptoms, clinical features, laboratory parameters and outcome of these children were taken for analysis.

Results

Table I shows the demographic characteristics of the patients. Most of the patients suffering from dengue were urban dwellers. Among them 52.4% were female. Mean age of the patients were 5.91 ± 3.53 years. Regarding presenting symptoms during admission in PICU, fever was present in 119 patients (94.4%), followed by hypotension in 106 (84.1%) patients. Other major symptoms that necessitate intensive care admission were narrow pulse pressure, respiratory distress, shock, abdominal pain, and ascites (Table II).

Table I		
<i>Demographic profile of PICU admitted Dengue patients (N=126)</i>		
Variables	Number	Percentage
13 October Urban	108	85.7
Rural	18	14.3
Gender		
Male	60	47.6
Female	66	52.4
Age		
0-5 years	60	47.6
6-10 years	50	39.7
11 years or above	16	12.7
Mean \pm SD	5.91 \pm 3.53	
Schooling Status		
School going	66	52.4
Non-School going	60	47.6

Table II*Clinical Features of patients admitted in the ICU*

Presenting Symptoms at admission	Number	Percentage
Fever	119	94.4
Hypotension	106	84.1
Narrow Pulse Pressure	91	72.2
Respiratory distress	87	69
Shock	84	66.7
Abdominal Pain	75	59.5
Vomiting	74	58.7
Pleural Effusion	55	43.7
Ascites	45	35.7
Rash	36	28.6
Abdominal Distention	29	23
Headache	20	15.9
Melaena	19	15.1
Bleeding	14	11.1
DIC	13	10.3
Convulsion	13	10.3
Myalgia	10	7.9
Haematemesis	9	7.1
Anuria	9	7.1
Liver Dysfunction	7	5.6
Obesity	4	3.2
Positive Tourniquet test	3	2.4
Eye Congestion	3	2.4
AKI	3	2.4

This study found that 33 (26.2%) patients had both pleural effusion and ascites. Isolated pleural effusion was present in 17.5% (22) cases (Table III).

Table III*Pleural Effusion and Ascites of Dengue patients*

Escape of Fluid	Frequency	Percentage
Both Pleural Effusion and Ascites Positive	33	26.2
Pleural Effusion Positive	22	17.5
Presence of Ascites	12	9.5
Absence of Ascites	59	46.8

The admitted patients were classified into three groups according to the WHO. Severe Dengue was diagnosed in maximum number of cases (i.e., 62.7%) followed by Dengue fever with warning signs (20.6%) and Expanded Dengue Syndrome (16.7%) (Table IV).

Table IV*Diagnosis according to WHO guideline*

Diagnosis	Frequency	Percentage
Dengue fever with warning sign	26	20.6
Severe Dengue	79	62.7
Expanded Dengue Syndrome	21	16.7
Total	126	100

Table V shows that maximum number of patients received Crystalloid (98.4%), about 51.6% received colloid. A good number of patients received blood (23%), plasma was also received in 23% and albumin was received in 33.3%. Majority of patients received Oxygen (80.2%), antibiotics was received in 87.3% and, anti-ulcerant was received in 92.9%. 55.6% patients received inotropes for the management of shock. A very few number of patients required platelet transfusion (7.1%), and steroid was received in 15.1%.

Table V*Treatment pattern of ICU admitted dengue patients*

Treatment	Yes	
	Frequency	Percentage
Crystalloid	124	98.4
Colloid	65	51.6
Blood	29	23
Plasma	29	23
Albumin	42	33.3
Inotropes	70	55.6
Platelet Transfusion	9	7.1
Oxygen	101	80.2
Anti-Convulsant	12	9.5
Antibiotic	110	87.3
Anti-ulcer ant	117	92.9
Steroid	19	15.1

Regarding hospital stay mean duration of hospital stay was 7.83 ± 3.0 days. Sixty-one percent patients (n=77) had an average hospital stay of 6-10 days (Table VI).

Table VI
Duration of Hospital stay of the admitted patients

Days	Number of patients	Percentage	Mean \pm SD
1-5 days	27	21.4	7.83 \pm 3.0
6-10 days	77	61.1	
11 days or more	22	17.5	

Table VII shows the outcome of the admitted patients. Ninety five i.e., 75.4% patients were cured and discharged and 21.43% (n=27) patients died in the PICU despite protocolized management. Four patients (3.17%) were discharged on risk bond, so the outcome of those four patients is unknown whether they were cured or died.

Table VII
Outcomes of the Dengue Patients admitted in the ICU

Outcomes	Number of patients	Percentage
Cure	95	75.40
Discharged on risk bond (DORB)	4	3.17
Death	27	21.43

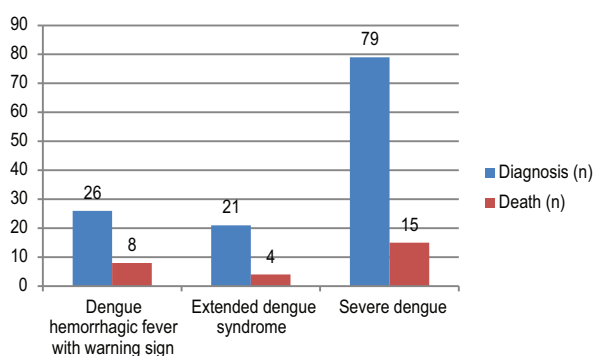


Fig.-1 Number of death according to diagnosis (n=126)

Death due to severe dengue was the highest i.e., 15 cases out of 79, which accounts for 18.9% followed by death due to Dengue Hemorrhagic fever with warning signs 8 out of 26, which accounts for 30.7% and Expanded Dengue syndrome 4 out of 21, which accounts for 19.04% (Fig.1). Among the death cases

though the number of deaths is more in SD group but percentage was more in DF with WS group. This occurred due to delay in diagnosis and delayed referral to ICU.

Discussion

In this observational study we have found that the male female ratio was 0.9:1. The mean age at presentation was 5.9 (\pm 3.53) years in our study which was similar to Khan et al⁸ i.e., 5.6 (\pm 3.8) years. The commonest age group varied in different studies like 5-10 years observed by Palaniappan.⁹⁻¹¹ Kale et al¹² showed 11-15 years was the most commonly affected age group. Rasul et al¹³ showed 10-14 years as most commonly affected age group. In our study Female patients predominated male patients by their number this finding was opposite to the finding by Sultana & Afroze.^{14,15} Anker et al¹⁶ explored the sex-related differences in the prevalence of dengue in more detail. They noted that the magnitude of the difference is small and is not consistent in pediatric patients. However, male female differences regarding the use of health services, the use of fully covered dresses by female children, and prioritizing provisions of male children in the society might be reasons for the differences noted in our country.^{17, 18}

Dengue patients typically present with the triad of fever, pain, and rash. However, gastrointestinal and bleeding manifestations might occur in variable proportions.¹⁹ The most common bleeding manifestations was epistaxis and melena similar to several previous studies.^{20,21}

The common clinical feature we found was fever (94.4%), followed by Hypotension (84.1%), Narrow pulse pressure (72.2%). Pothapregada et al²² found similar findings like fever in 94.6% cases, conjunctival congestion (89.6%), myalgia (81.9%), coryza (79.7%), headache (75.1%), palmar erythema (62.8%), retro-orbital pain (51.3%), joint pain (28.7%), and rash (17.2%). He also noted common atypical

manifestations of dengue fever at admission were lymphadenopathy (52.3%), splenomegaly (20.7%), epigastric tenderness (16.4%) biphasic fever (15.7%), right hypochondriac pain (8.4%), seizures (6.5%), and febrile diarrhea (6.5%), [Table 1]. The mean duration of fever was 4.8 (1.8) days at admission. Khan et al⁸ found 310 cases 63.9540% cases with vomiting next to fever among 310 cases, followed by ascites and rash (21%), pleural effusion (20%) abdominal pain (14%) and shock (12%).

When incidence was observed it was found that the incidence of Severe dengue was 62.7% in our study, whereas severe dengue infection was seen in 102 cases (39.1%) by Pothapregada.²² Khan found that out of the 310 cases 63.9% cases had dengue fever, 18.7% of Dengue Hemorrhagic Fever I & II and 17.4 % cases of Dengue Shock Syndrome.⁸

In this observation 55.6% patients received Inotropes. Bhaskar found use of inotropes were 74.2% cases, and they were associated with higher mortality rate (11.5%).¹⁰ Goonasekera et al. reported a mortality of 55.5% patient who received inotropes.²³ Transfusion of blood products were also associated with higher death rates of 23.3%.¹⁰

In this observation we found that the mean duration of hospital stay was 7.83 (\pm 3.0) days, whereas Vikram et al found that the duration was 5.5 days in Dengue without co-infection and 11.8 with co-infection.¹⁰ Mortality was found to be 21.43% (27 cases) in our study. Haridarshan et al²⁴ reported only 1 death among 175 cases, Bhaskar et al¹⁰ reported 2 deaths among 29 cases of dengue without co-infection and 1 death among 6 cases of dengue with co-infection.

Conclusion

This retrospective study found that majority of the Dengue patients admitted in PICU has survived. However the death due to Dengue with warning signs was higher than death in severe Dengue cases. Delayed recognition of warning signs along with delayed referral to PICU may be responsible for such outcome.

Limitation of the study

Our study has its limitation due to small sample size but it provided useful information for management of most of the dengue cases. Continuous monitoring, early anticipation of shock, timely use of fluid therapy guided by routine hematocrit values and clinical parameters can all be used successfully to improve

the final outcome in dengue patients.

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