



**THE DAILY DENGUE SEVERITY SCORE ACCURACY
IN THE ASSESSMENT OF SEVERE MANIFESTATIONS OF DENGUE INFECTION
IN AGES 1 MONTH TO 18 YEARS OLD ADMITTED FROM 2018 TO 2020
IN PERPETUAL SUCCOUR HOSPITAL, IN CEBU CITY, PHILIPPINES**



Mary Ann G. Abella, MD
Author

Belle M. Ranile, MD, FPPS, FPIDSP
Co-Author

BACKGROUND

Dengue

- affects about 1% of the world's population annually and is associated with high morbidity

Daily Dengue Severity Score¹

- can help clinicians predict outcomes and provide timely management
- has 14 parameters related to clinical parameters and management with a score of
- Based on the pathophysiology of Dengue, the day of defervescence was designated as Day 0 (D0).
- One and 2 days before defervescence was designated as Day-1 (D-1) and Day-2 (D-2) and so on. One and 2 days after defervescence was designated as Day+1 (D+1) and Day+2 (D+2).

Cebu City

- ranked the highest with 3,290 cases and 20 deaths (11.8% increased compared to the 3,267 cases with 16 death in 2018)²

Several Scoring Systems

- PELOD-2 Score³
- Pediatric Risk of Mortality III-Acute Physiology Score (PRISM III-APS)⁴
- pediatric Sequential Organ Failure (pSOFA) score⁵
- Pediatric Multiple Organ Dysfunction Score (P-MODS)⁶

¹ Tangnararatchakit K, Chuansumrit A, Watcharakuldiolk P, Apiwattanakul N, Lertbunnian R, Keatka J, et al. Daily Dengue Severity Score to Assess Severe Manifestations. The Pediatric Infectious Disease Journal. 2020 March; 39(3): 184-187.

² Department of Health. [Online]. 2019 [cited 2020 August. Available from: HYPERLINK "https://www.doh.gov.ph/press-release/DOH-DECLARES-NATIONAL-DENGUE-EPIDEMIC"

³ Stéphane Létourneau M.F., Adam Duhannet P., Salleron J., Bruno Grandbastien M., Jacques Lacroix M., Francis Lévesque M.Pediatric Sequential Organ Failure (PELOD-2): An Update of the Pediatric Logistic Organ Dysfunction Score. Critical Care Medicine. 2013 July; 41(7): p. 1761-1773.

⁴ Pollack MM, Patel KM, Ruttimann UE. The pediatric risk of mortality iii—acute physiology score (prism iii-aps): A method of assessing physiologic instability for pediatric intensive care unit patients. The Journal of Pediatrics. 1997;131(4):575-81.

⁵ El-Mohshari GM, El-Mekawy MS, Zayed MS. Pediatric sequential organ failure assessment (pSOFA) score: a new mortality prediction score in the paediatric intensive care unit. Annals de Pediatr a (English Edition). 2020;90(3):277-85.

⁶ Graciano AL, Ballo JA, Rahi DS, Ahmad N, Girir BP. The Pediatric Multiple Organ Dysfunction Score (P-MODS): Development and validation of an objective scale to measure the severity of multiple organ dysfunction in critically ill children*. Critical Care Medicine. 2005;33(7):1484-91.

OBJECTIVES

General Objectives

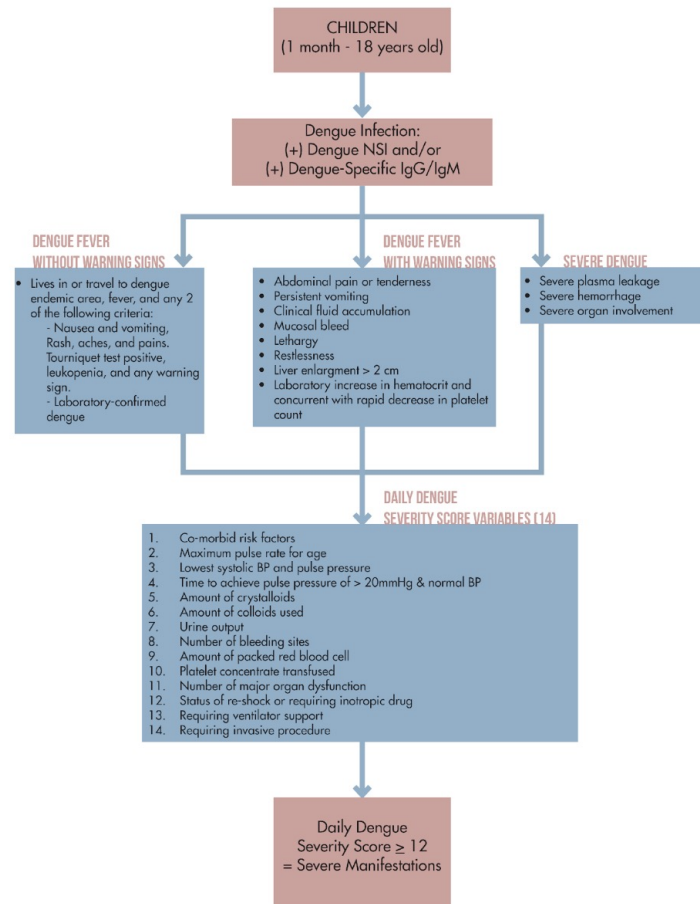
- To determine the accuracy of the Daily Dengue Severity Score in the assessment of severe manifestations of Dengue Infection

Specific Objectives

- To compare the clinicodemographic profile of the patients classified as Dengue with or without warning signs, and Severe Dengue
- To determine and compare the mean Daily Dengue Severity Score among patients classified as Dengue with or without warning signs, and Severe Dengue
- To determine the sensitivity, specificity, positive likelihood ratio and overall accuracy of Daily Dengue Severity Score to predict Severe Dengue before defervescence phase

METHODOLOGY

Conceptual Framework



Study Design

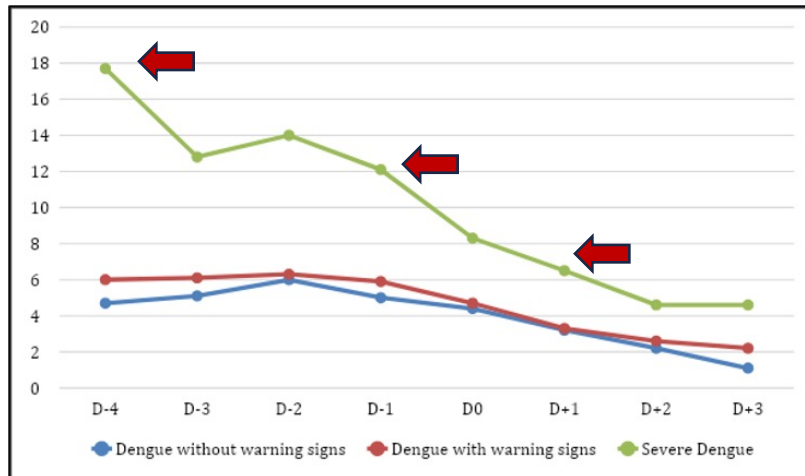
- Cross-Sectional Study

Study Population and Setting

- **1 month to 18 years old** admitted from January 2018 to December 2020
- **Laboratory confirmed** Dengue Non-Structural Protein Antigen NS1 test or Dengue-specific IgM/IgG
- **Exclusion criteria:** admitted ≤ 24 hours in due to rapid deterioration leading to demise, transferred to another facility, or in recovery/defervescence phase

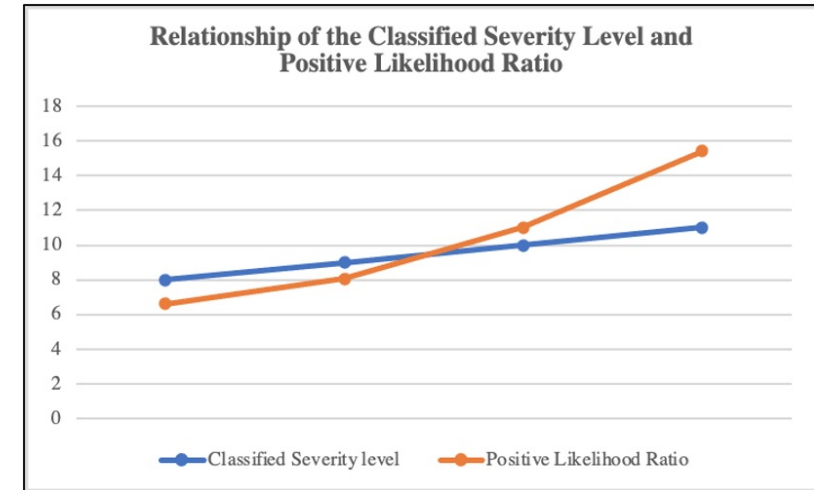
RESULTS

Mean Daily Dengue Severity Score



- Increasing scores from D-2 and D-1 prior D0 in comparison to the succeeding days after D0 which showed decreasing geometric mean on D+1, D+2 and D+3

Positive Likelihood Ratio



- As the scores are increasing, there is also a higher likelihood of going into Severe Dengue, with cut points of **8, 9, and 10** had the ability to predict subsequent Severe Dengue at D-1

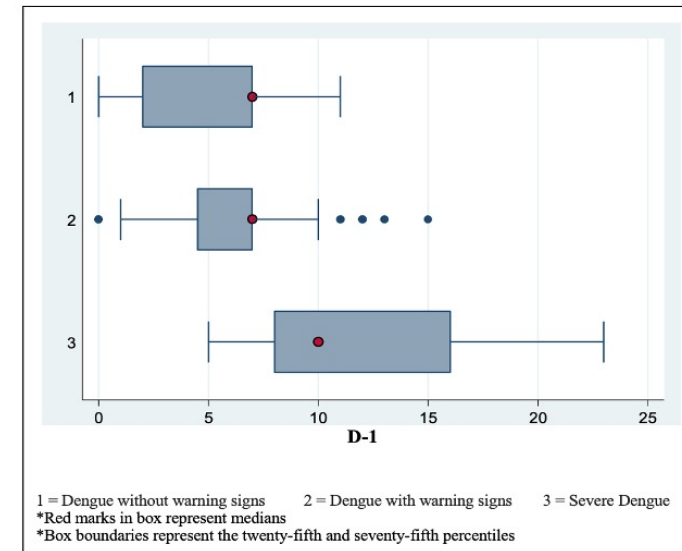
RESULTS

Clinicodemographic Profile

Table A.1 Clinicodemographic Profiles of Patients				
Patient Profiles	Diagnosis			P-value
	Dengue without warning Signs (N=34)	Dengue with warning signs (N=271)	Severe Dengue (N=22)	
Demographic				
Male, %	50.0	58.3	50.0	0.521
Age (yr) (Mean ± SD) (month) (n=4)	9.2±5.0	8.2 ± 4.2	8.14±3.3	0.46
Duration of fever (day) (Mean ± SD)	3.9±2.0 ^a	4.2±1.5	5.1±3.5 ^a	0.03
Duration of hospitalization (day) (Mean ± SD)	5.6± 1.5 ^a	5.8± 2.7 ^b	7.5 ± 2.4 ^{ab}	0.008
Hematological Status (Complete Blood Count)				
Initial Hematocrit (%)	41.2±4.2	39.6±4.8	40.5±5.0	0.16
Highest Hematocrit	42.2±4.5 ^a	41.7±4.3 ^b	46.3±6.0 ^{ab}	0.000
Initial White Blood Cell count (10 ³ /μL)	1.18.7±5.87	1.11.8±6.48	1.29.6±6.80	0.41
Initial platelet count (×10 ³ /μL)	159.7±61.7	139.7±64.5	140.9±93.0	0.25
Lowest platelet count (×10 ³ /μL)	86.8±43.6 ^{ac}	60.2±39.7 ^{bc}	22.5 ± 21.1 ^{ab}	0.000
Bleeding sites (n,%)				
Epistaxis	2(5.9)	26(9.6)	1(4.6)	0.59
Petechiae ± ecchymosis	7(20.6)	39(14.4)	9(40.9)	0.005
Hypermenorrhea	0(0)	2(0.74)	0(0)	-
Gross hematuria	0(0)	0(0)	0(0)	-
Melena	0(0)	0(0)	0(0)	-
Hematemesis	0(0)	0(0)	0(0)	-
Hematochezia	0(0)	0(0)	0(0)	-
Mode of presentation (n,%)				
Hepatomegaly	0(0)	20(7.4)	9(40.9)	
Headache	8(23.5)	41(15.1)	8(36.4)	
Myalgia	1(2.9)	24(8.9)	4(18.2)	
Vomiting	13(38.2)	118(43.5)	15(68.2)	
Cough	23(32.4)	219(19.2)	9(59.1)	
Abdominal pain	6(17.6)	100(36.9)	17(77.3)	
Hemodynamic status (Mean ± SD)				
Pulse pressure	32.6± 5.1	33.8±6.2 ^b	29.5±8.4 ^b	0.01
Systolic Blood Pressure	98.8±9.1 ^a	98.3±9.4 ^b	90.4±23.4 ^{ab}	0.005
Diastolic Blood Pressure	65.6±7.0	64.3±6.6	60.9±16.6	0.08
Complications during admission				
Myocarditis	0(0)	3(1.1)	4(18.2)	
Pleural effusion	0(0)	9(3.3)	14(63.6)	
Encephalitis	0(0)	0(0)	0(0)	
Presence of comorbidities (n,%)	1 (3.0)	2(0.7)	1(4.6)	-
Discharged (n,%)	33(100.0)	271(100)	22(100)	0.05

^{a,b,c} statistical significance at p-value <0.05

Distribution of Dengue Severity Scores at D-1



- The mean, standard deviation, and geometric mean [mean±SD (geometric mean) and interquartile range (IQR)] of Dengue without warning signs showed 5.0±3.2 (5.2) IQR 5, Dengue with warning signs had 5.9±2.7 (5.4) IQR 2.5, and Severe Dengue had 12.1±5.2 (11.1), IQR 8.

CONCLUSIONS

Daily Dengue Severity Score Accuracy in the Assessment of Severe Manifestations

- This scoring has the ability to assess subsequent severe manifestations leading to Severe Dengue at D-1 compared with other days
- The scores 8, 9, and 10 were the cut points to predict subsequent Severe Dengue at D-1
- Sensitivity of 66.7% to 80%
- Specificity of 87.88% to 93.94%
- Positive likelihood ratio of 6.6 to 11
- Correctively classified patients of 85.42%

RECOMMENDATIONS

Adaptation of the Daily Dengue Severity Scoring in the clinical practice

- This scoring when adapted particularly in the Emergency Room, Pediatric Intensive Care Unit (PICU) or wards can help clinicians assess the possibility of progression to Severe Dengue
- This scoring tool would also aid in the prompt management and timely referral before disease progression

Continuation Study

- The researcher recommends a continuation of this study be pursued prospectively with at least 3 scoring frequency every 8 hours within a 24-hour shift for more conclusive and reliable evidences