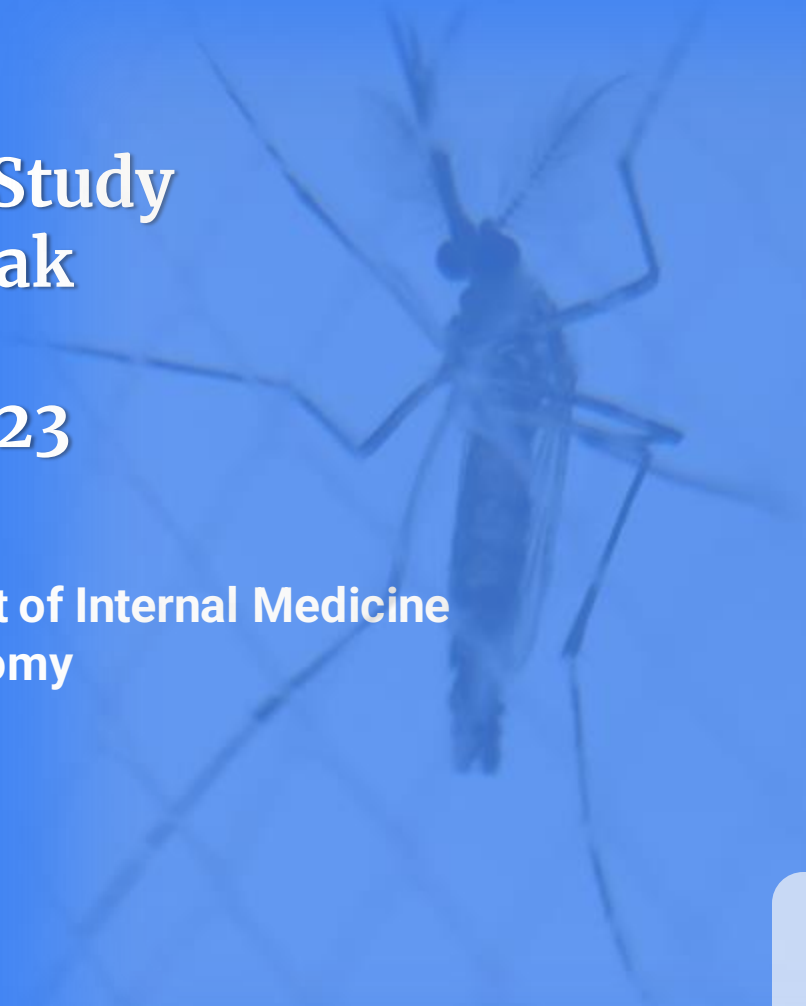


Clinico-epidemiological Study on Dengue Pocket Outbreak at the AWMCH from July 2022 to May 2023

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Introduction

- Dengue an arthropod-borne viral infection of humans
- Endemic to tropical and subtropical regions of the world and represents an important public health problem.
- Dengue viruses are transmitted by the bite of *Aedes Aegypti* mosquito primarily and to a lesser degree by *Aedes Albopictus*
- Infected by the one of the four dengue serotypes - DEN 1,2,3,4.

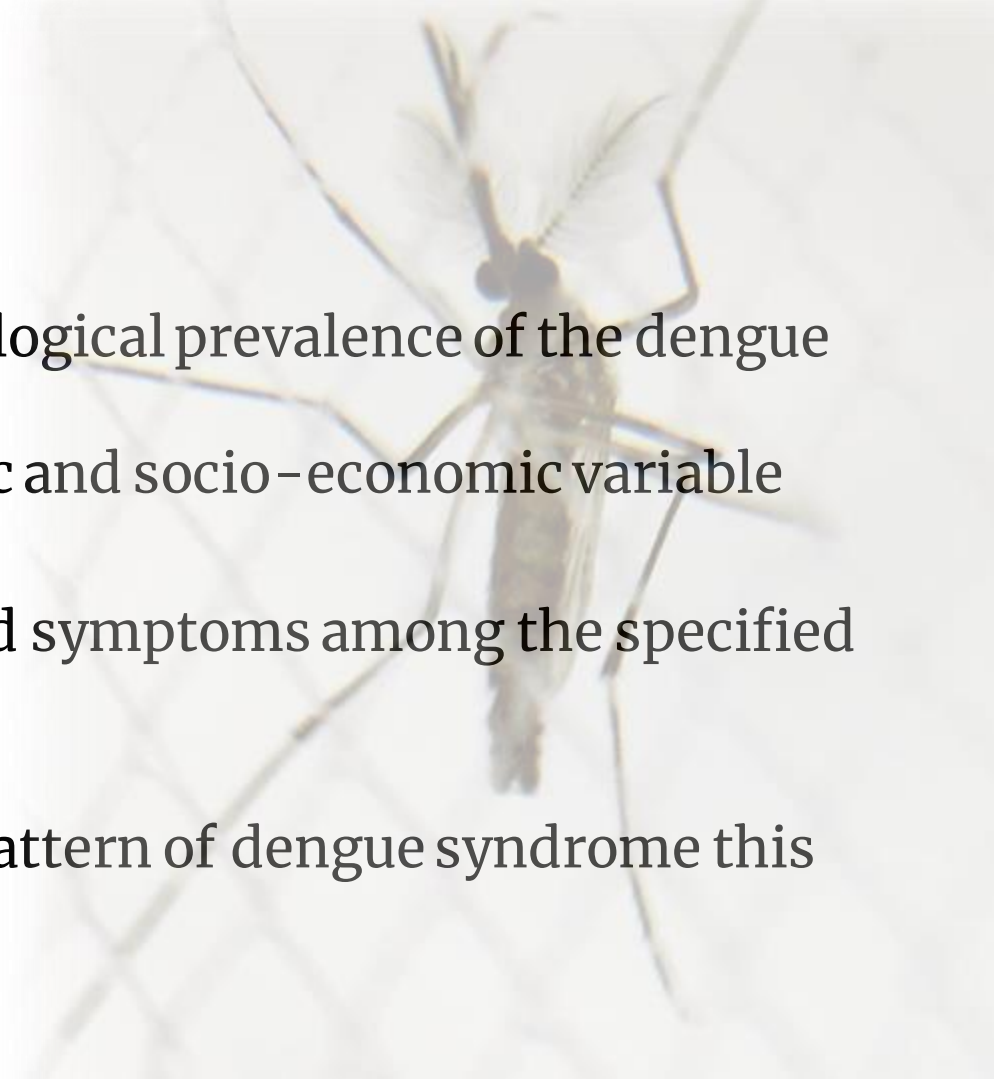
Aims of our study



- Understand the clinical and epidemiological dimensions of the dengue outbreak
- Analyze the impact of demographic factors on the occurrence and severity of dengue
- Evaluate the frequency, pattern, and causes of disease in specified populations and risk factors associated with them, variation in clinical presentation, differences in treatment modality

Objectives

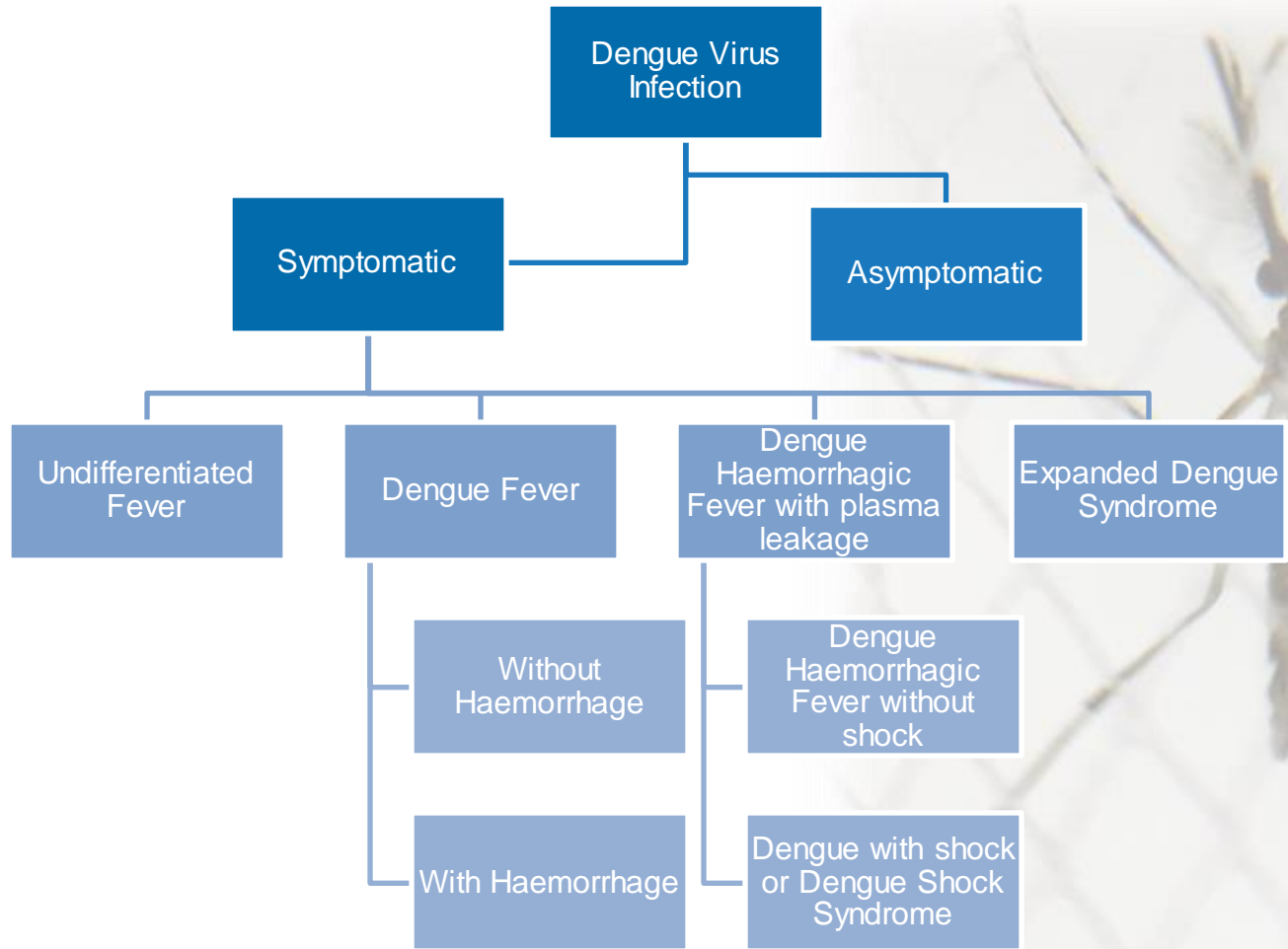
- Identify the sero-immunological prevalence of the dengue syndrome cases
- Document the demographic and socio-economic variable
- Assess the clinical signs and symptoms among the specified group
- Understand the changing pattern of dengue syndrome this year



Methods & Methodology



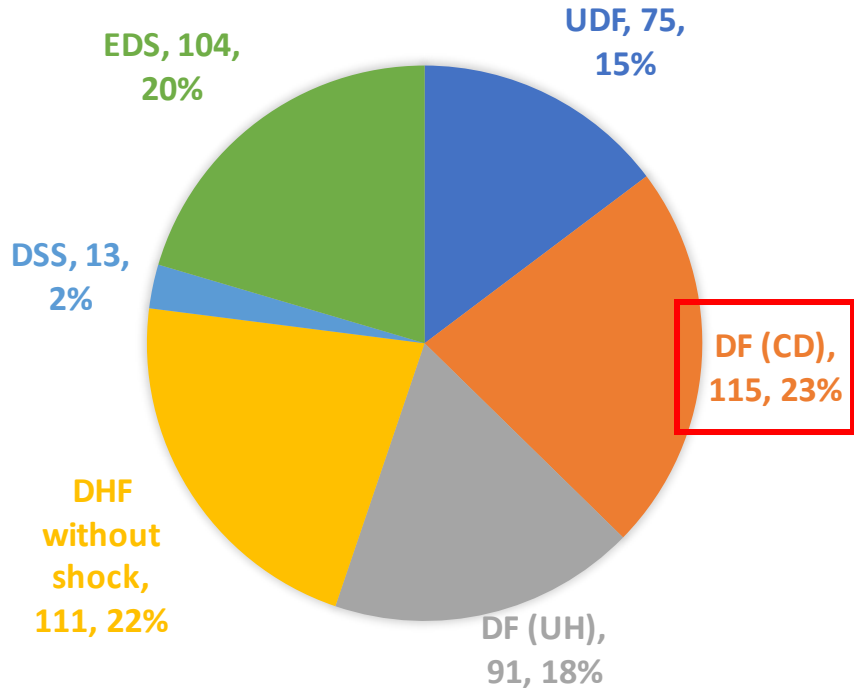
- Study Design: Cross-sectional Prospective Study
- Place of Study: Ad-din Women's Medical College & Hospital
- Study Population: 509
- Study Period: from July 2022 to May 2023



Ref: *National Guideline For Clinical Management of Dengue Syndrome, 4th Edition 2018 (Revised)*

Table 1: Distribution of Dengue Syndrome among the study population (n=509)

Dengue Syndrome		Number of Patients
Undifferentiated Fever (UDF)		75
Dengue Fever (DF)	DF without haemorrhage DF(CD)	115
	DF with unusual haemorrhage DF(UH)	91
Dengue Haemorrhagic Fever (DHF)	DHF without shock	111
	Dengue Shock Syndrome (DSS)	13
Expanded Dengue Syndrome (EDS)		104
Total		509



UDF: those who develop a simple fever indistinguishable from other viral infections, especially those who have been infected with the dengue virus for the first time.

Table 2 : Association of patients' demographic characteristics with dengue syndrome

Demographic variables		Type of Dengue Syndrome (n=509)					
		UDF (n=75)	DF(CD) (n=115)	DF(UH) (n=91)	DHF without shock (n=111)	DSS (n=13)	EDS (n=104)
Sex of patient	Male- 42% (n=214)	31(14%)	51(24%)	48(22%)	47(22%)	6(3%)	31(14%)
	Female- 58% (n=295)	44 (15%)	64 (22%)	43 (14%)	64 (22%)	7 (2%)	73 (25%)
Age of patient	≤19years (n=163)	49	30	51	19	8	6
	20-39 years (n=255)	21	61	30	70	3	70
	≥40years (n=101)	5	24	10	22	2	38

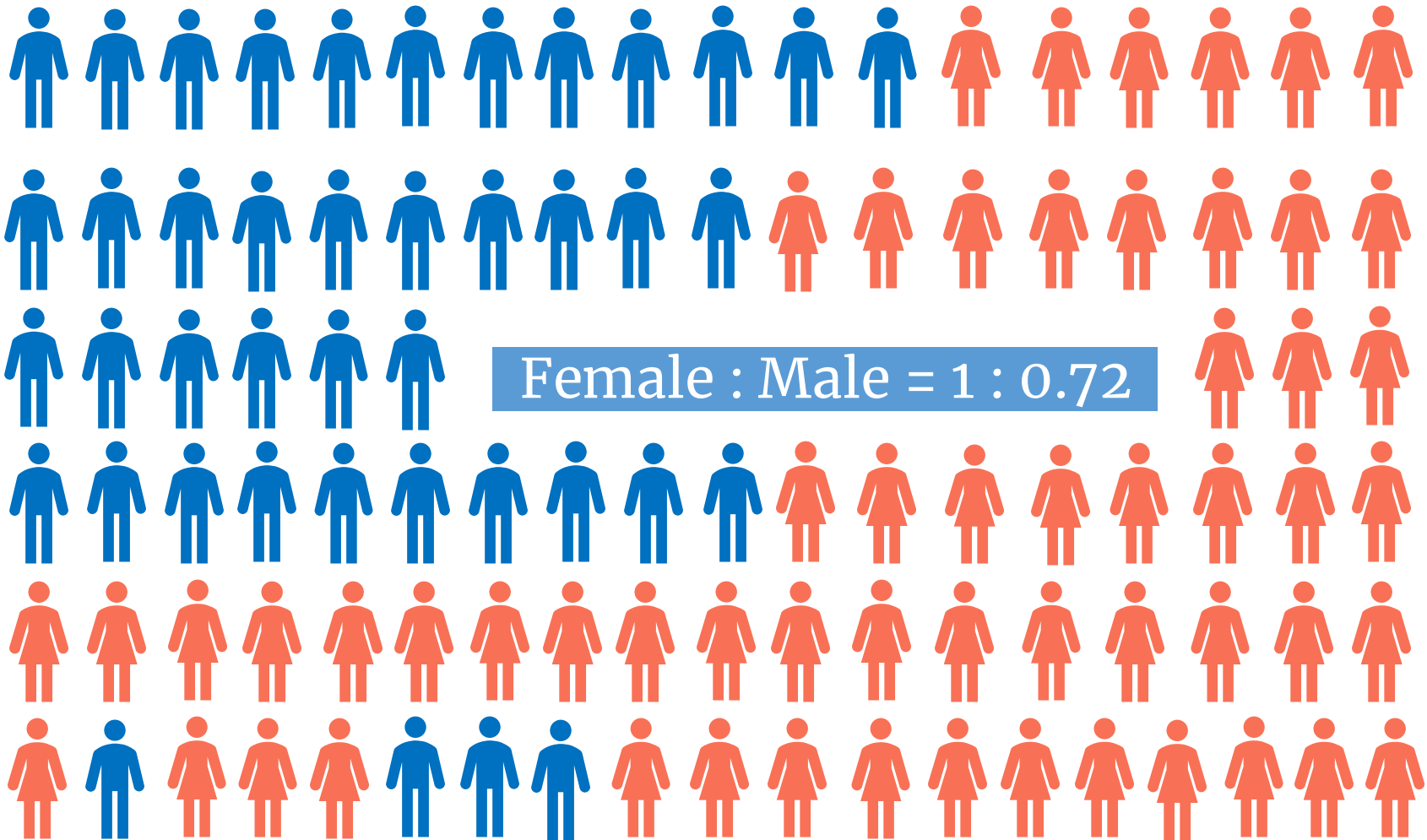


Table 2: Association of Sero-immunological findings with Dengue Syndrome

Sero-immunological findings		Type of Dengue Syndrome (n=509)					
		UDF (n=75)	DF (CD) (n=115)	DF(UH) (n=91)	DHF without shock (n=111)	DSS (n=13)	EDS (n=104)
NS1	Positive(60%) (n=261)	0(0%)	77(30%)	71(27%)	71(27%)	10(4%)	32(12%)
	Negative (40%)(n=181)	75	38	20	40	3	5
IgM	Positive(16%) (n=69)	0(0%)	22(32%)	7(10%)	36(52%)	1(1%)	3(4%)
	Negative(84%) (n=373)	75	93	84	75	12	34
IgG**	Positive(n=57)	0	20	7	27	1	2
	Negative (n=385)	75	95	84	84	12	35

Table 3: Composite table showing association of dengue syndrome with socio-economic and environmental status

Socio-Economic Variables		Type of Dengue Syndrome(n=509)	
		Mild dengue infection(n=281) Undifferentiated Fever(75 cases)+ DF(UH) (91 cases)+ DF(CD) (115 cases)	Severe dengue infection(n=228) DHF (111 cases)+DSS (13 cases)+EDS(104 cases)
Income Group	Total Monthly Income		
Low-income	≤9737BDT(n=84)	46	38
Lower -mid income	9738-38184BDT(n=126)	92	34
Upper -mid income	38185 -118500BDT(n=165)	108 (38.4%)	57(25%)
High-income	≥118501BDT(n=134)	102	32

Following World Bank,2023 per capita Gross Net Income: GNI; HH=Household Economy: Total monthly HH-income of families in BD Currency(Tk.)

Table 3: Composite table showing association of dengue syndrome with socio-economic and environmental status

Environmental Variables		Mild dengue infection(n=281) Undifferentiated Fever(75 cases)+ DF(UH) (91 cases)+ DF(CD)(115 cases)	Severe dengue infection(n=228) DHF (111 cases)+DSS (13 cases)+EDS(104 cases)
Which Floor	Ground floor(n=131)	82	49
	1 st floor(n=178)	138	40
	2 nd + 3 rd floor(n=158)	106	52
	4 th +Others floor(n=42)	22	20
Water Container	Yes(n=270)	206	64
	No(n=239)	142	97
Mosquito Net	Yes(n=342)	249	93
	No(n=167)	99	68
Plant Flower Vase	Yes(n=298)	192	106
	No(n=211)	156	55

Chart 1: Presenting symptoms of patients with dengue syndrome on admission

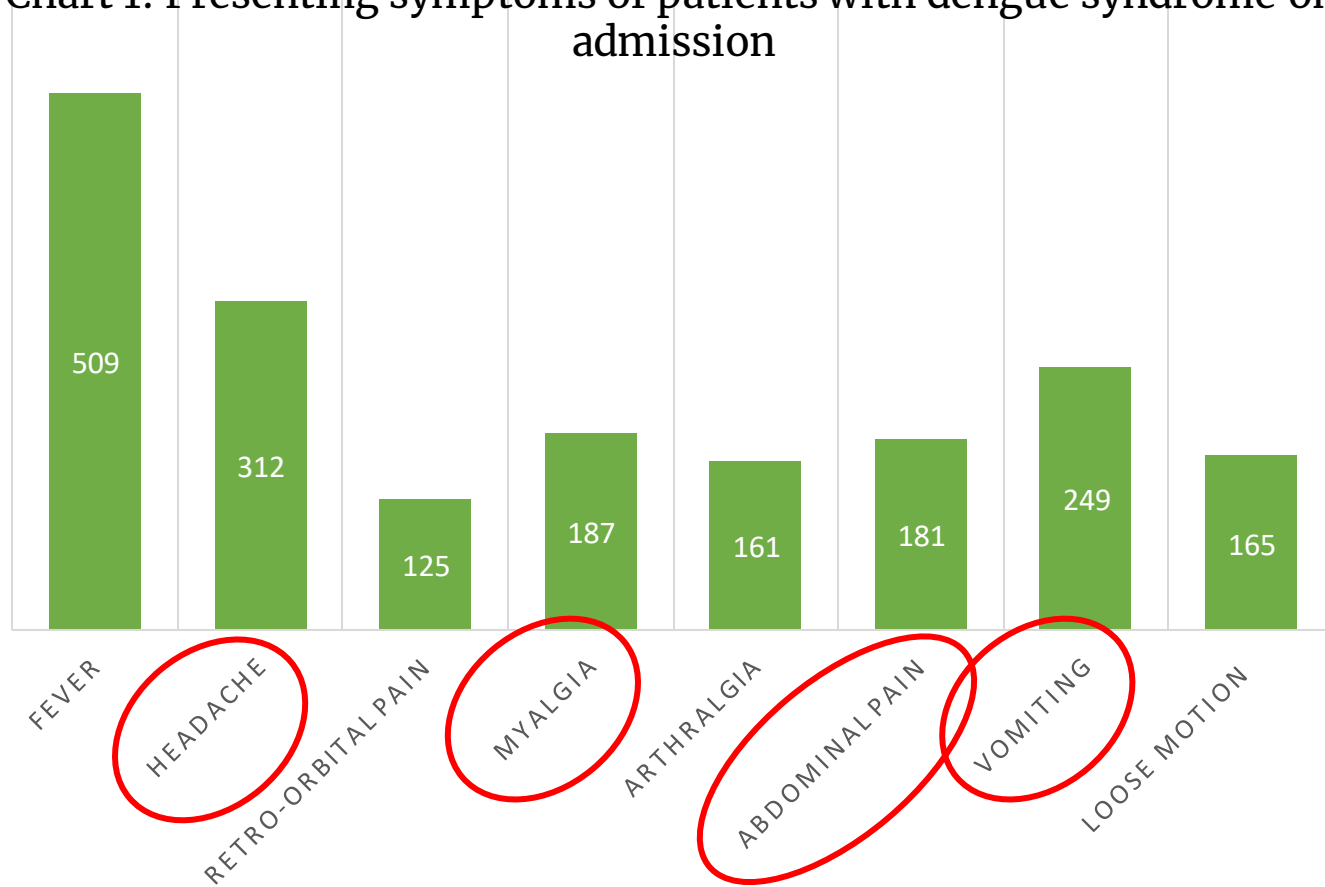


Table 4: Haemorrhagic manifestations of patients with Dengue Syndrome on admission

Haemorrhagic manifestations		Type of Dengue Syndrome (n=509)				
		UDF (n=75)	DF with unusual hemorrhage (n=91)	DHF without shock (n=111)	DSS (n=13)	EDS (n=104)
Types	Number of Patients					
Haematuria	100	0	35	50	3	13
Purpura	91	0	44	27	5	19
Epistaxis	80	0	65	9	1	3
Hematemesis	72	0	37	16	5	14
Hemorrhage spots inside lips/tongue	69	0	37	20	4	10
Hemoptysis	81	0	47	18	4	11
Gum Bleeding	102	0	57	39	5	4
PV Bleeding/Pre- date menstruation	152	0	77	42	5	23
Melena	60	0	33	18	2	2
Hematochezia	52	0	27	17	1	3

Chart 2: Haemorrhagic manifestations of patients with Dengue Syndrome on admission

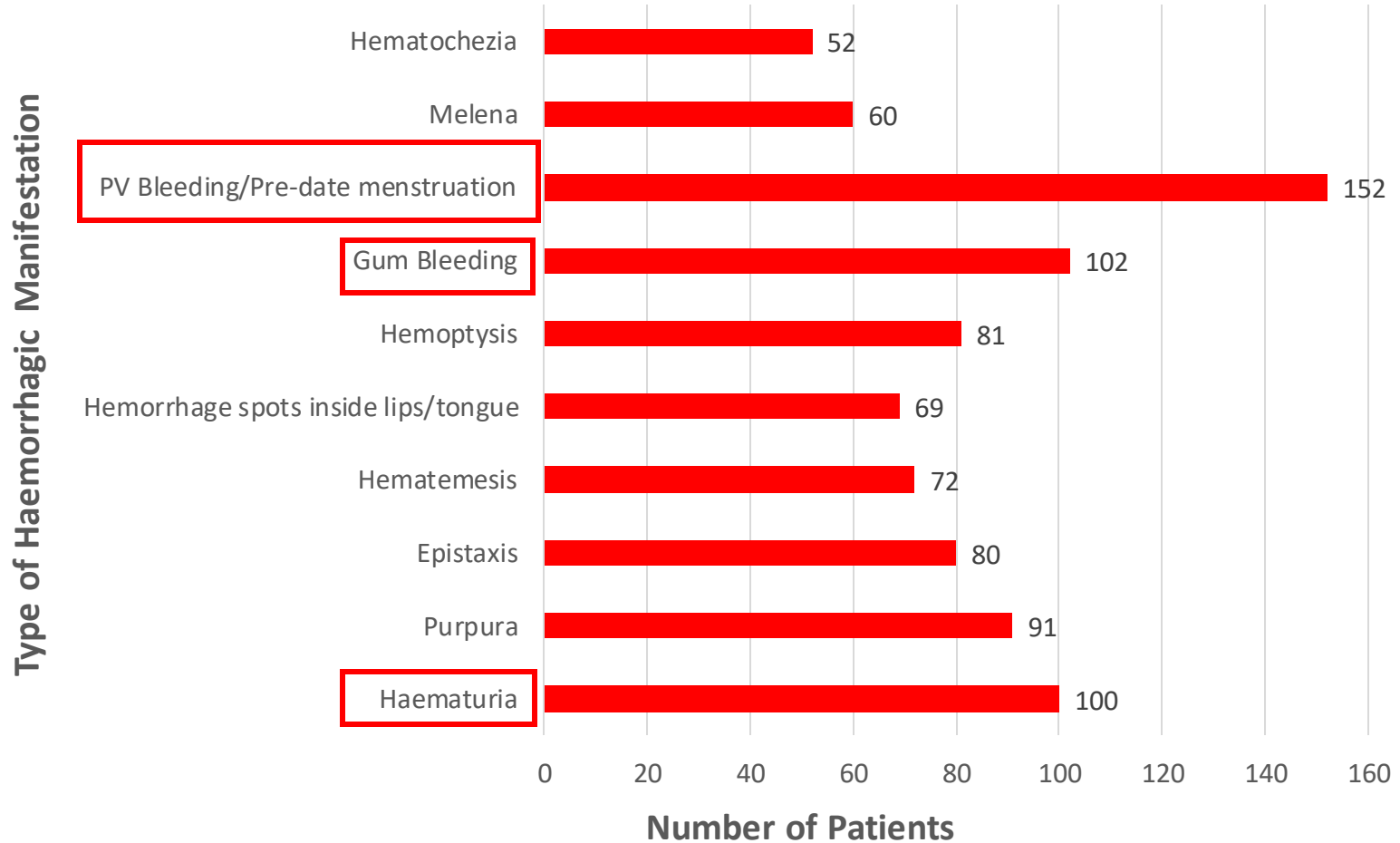


Table 5: Signs of patients with Dengue Syndrome on admission

Clinical signs		Type of Dengue Syndrome (n=509)					
		UDF (n=75)	DF(CD) (n=115)	DF(UH) (n=91)	DHF without shock (n=111)	DSS (n=13)	EDS(n=104)
Tourniquet Test	Positive (n=109)	0	0	0	81 (73%)	3(9%)	25
	Negative (n=400)	75	115	91	30 (27%)	10 (91%)	79
Capillary Refill Time	Normal(n=444)	75	115	152	83(75%)	2(15%)	84
	Prolonged(n=65)	0	0	6	28(25%)	11(85%)	20
Body Rash	Present(n=160) (31%)	16(10%)	51(32%)	22(14%)	36(23%)	7(4%)	32(20%)
	Absent(n=349) (69%)	59	64	136	75	6	72
Ascites	Present (n=135) (27%)	0(0%)	0(0%)	0(0%)	103(75%)	11(8%)	21(15%)
	Absent (n=374) (73%)	75	115	91	8	2	83
Pleural Effusion	Present (n=134) (26%)	0 (0%)	0(0%)	0(0%)	91(68%)	9(7%)	34(25%)
	Absent (n=375) (74%)	75	115	91	20	4	70

Table 5: Haematological, Serological, Radiological Investigation Findings

HcT according to gender & age groups of patients	Parameters measured	Type of Dengue Syndrome (n=509)					
		UDF (n=75)	DF (CD) (n=115)	DF (UH) (n=91)	DHF without shock(n=111)	DSS (n=13)	EDS (n=104)
Adolescents males (13–18 years) (n=30)	Low (<38%) (n=12)	1	4	2	0	4	1
	Normal (38-50%) (n=18)	3	1	12	0	1	1
	High (>50%) (n=0)	0	0	0	0	0	0
Adolescent females (13–18 years) (n=21)	Low (<34%) (n=19)	2	1	9	7	0	0
	Normal (34-44%) (n=2)	1	1	0	0	0	0
	High (>44%) (n=0)	0	0	0	0	0	0
Adult male (≥19 years) (n=124)	Low (<41%) (n=52)	3	7	8	29	0	5
	Normal (41-50%) (n=58)	5	25	16	9	0	3
	High (>50%) (n=14)	0	6	1	1	4	2
Adult female (≥19years) (n=192)	Low (<36%) (n=88)	11	14	25	29	0	9
	Normal (36-44%) (n=82)	6	29	15	21	0	11
	High (>44%) (n=22)	1	6	5	4	1	5

Limitations of finding baseline HcT:

HcT on admission was recorded as the baseline,

as patients came to Ad-din after rehydration (oral/parenteral)

Table 5: Haematological, Serological, Radiological Investigation Findings

		UDF (n=75)	DF (CD) (n=115)	DF (UH) (n=91)	DHF without shock(n= 111)	DSS (n=13)	EDS (n=104)
Platelet Count	Low (86%) (n=439) * $<100,000$ cells/mm ³	63 (14%)	99 (22%)	86 (20%)	104 (24%)	12 (3%)	75 (17%)
	Normal (14%) (n=70)	12	16	5	7	1	29
Total count of White Blood Cells	Normal (14%)(n=346)	46	82	92	88	10	28
	Leucopenia (86%) (n=162) * <5000 cells/mm ³	29 (18%)	33 (20%)	66 (41%)	23 (14%)	3(2%)	8(5%)

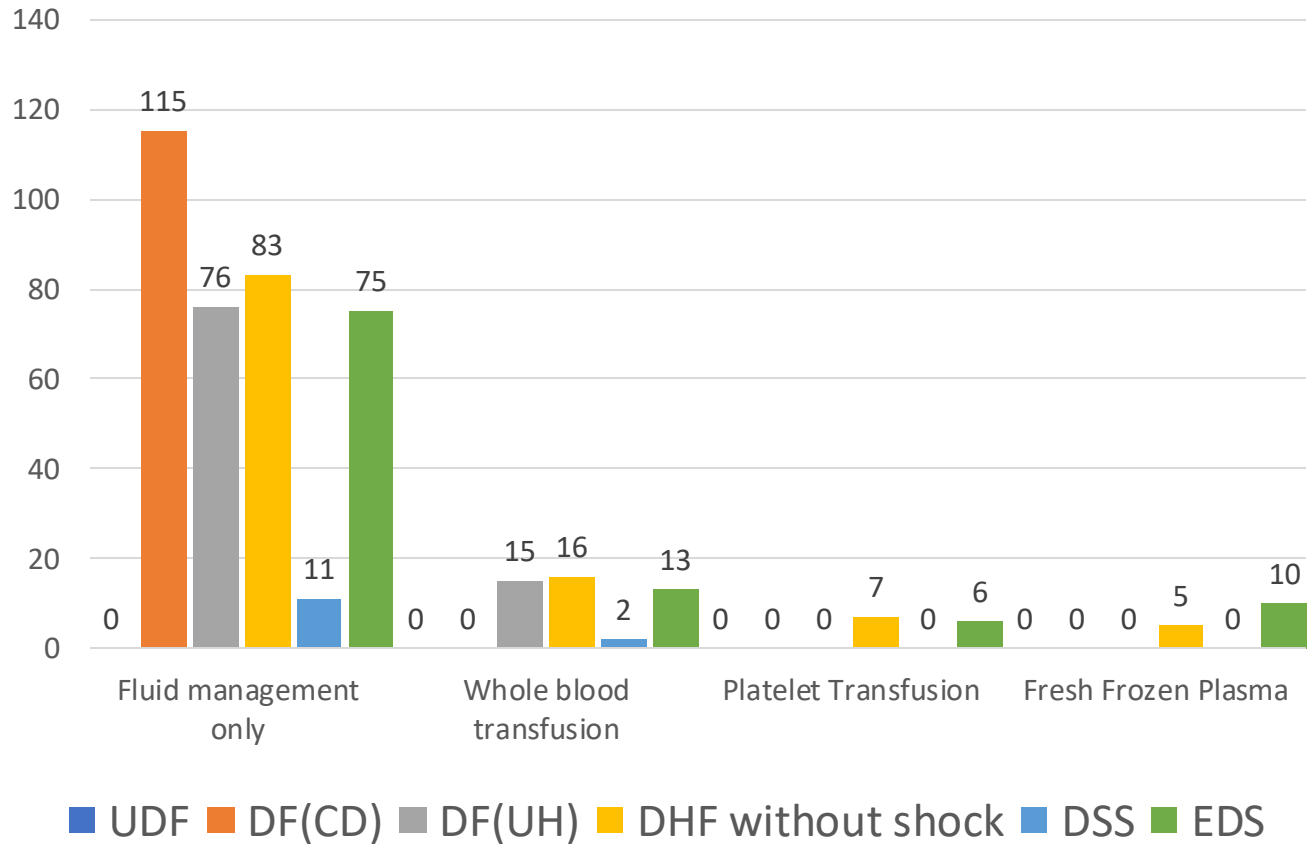
Table 5: Haematological, Serological, Radiological Investigation Findings

		UDF (n=75)	DF (CD) (n=115)	DF (UH) (n=91)	DHF without shock (n=111)	DSS (n=13)	EDS (n=104)
USG Findings	Ascites +/- edematous or thickened gall bladder/ acalculous cholecystitis (n=172)	0(0%)	0(0%)	0(0%)	110(64%)	11(7%)	51(29%)
Chest X-ray findings	Pleural effusion (n=138)	0(0%)	0(0%)	0(0%)	93(67%)	10 (7%)	35(25%)
ALT	<40 IU/L (n=361)	75	93	85	59	7	42
	40-400 IU/L(n=106)	0	22	6	49	5	24
	>400 IU/L (n=42)	0(0%)	0(0%)	0(0%)	3(7%)	1(2%)	38(91%)

Table 6: Transfusion History of patients with Dengue Syndrome on admission

Transfusion History	Type of Dengue Syndrome(n=509)					
	UDF (n=75)	DF(CD) (n=115)	DF(UH) (n=91)	DHF without shock (n=111)	DSS (n=13)	EDS (n=104)
Fluid management only (n=360) (71%)	0(0%)	115 (32%)	76 (21%)	83(23%)	11(3%)	75(21%)
Whole blood transfusion(n=46)(9%)	0(0%)	0(0%)	15(33%)	16(35%)	2(4%)	13(28%)
Platelet Transfusion(n=13)(3%)	0(0%)	0(0%)	0(0%)	7(54%)	0(0%)	6(46%)
Fresh Frozen Plasma(n=15)(3%)	0(0%)	0(0%)	0(0%)	5(33%)	0(0%)	10(67%)
No transfusion/infusion required (n=75)(14%)	75(100%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)

Chart 3: Transfusion History of patients with Dengue Syndrome on admission

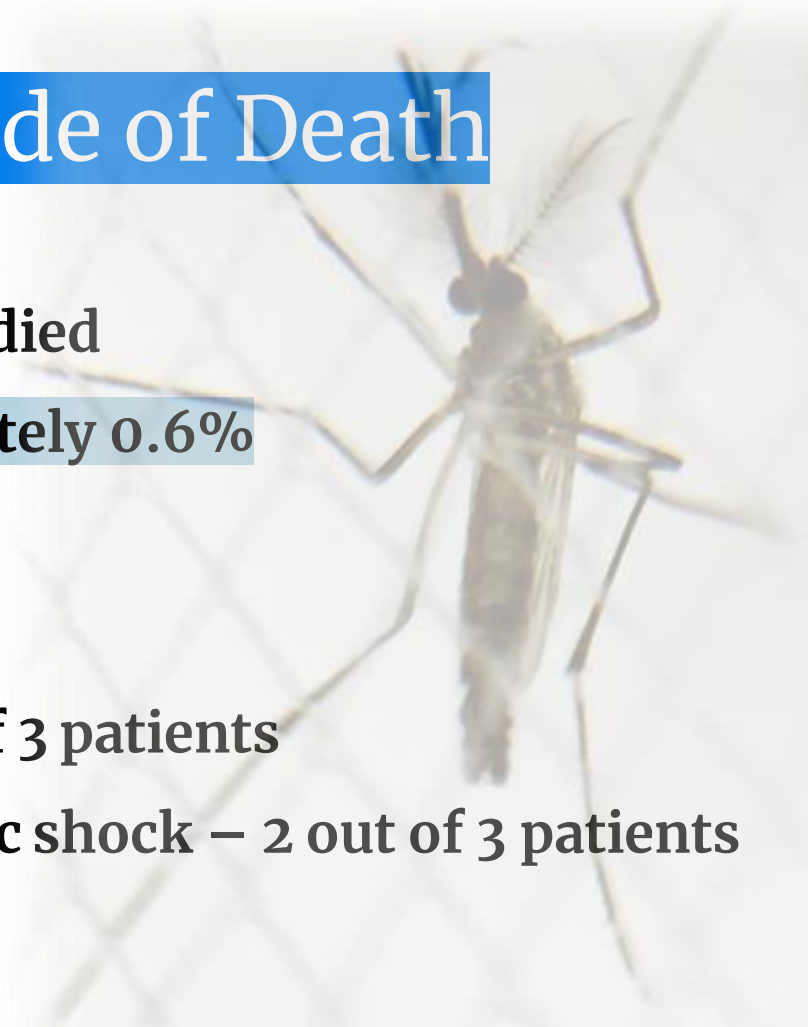


Mortality & Mode of Death

- 3 out of 509 dengue patients died
- Mortality rate was approximately 0.6%

Mode of Death:

- Acute Liver Failure – 1 out of 3 patients
- Myocarditis with cardiogenic shock – 2 out of 3 patients

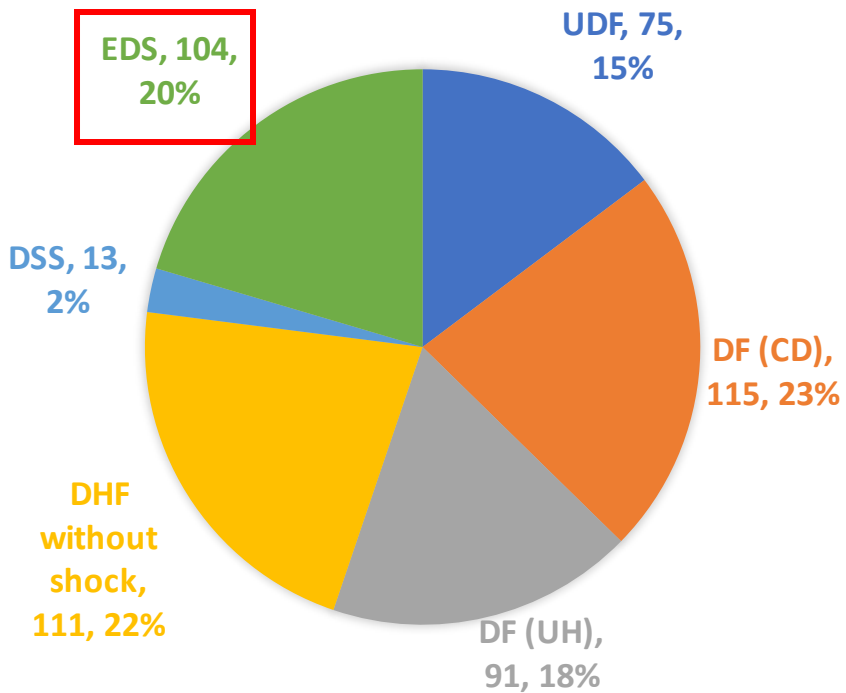


Persistent Thrombocytopenia in Convalescent Phase of DENGUE: ITP in disguise

Prof Dr Richmond Ronald Gomes
Department of Internal Medicine



Distribution of Dengue Syndrome among the study population (n=509)



Expanded dengue syndrome

The World Health Organization, in 2012, coined the term “expanded dengue syndrome” to describe patients that do not fit into either DHF or DSS but show atypical symptoms in vital organs systems such as the cardiovascular system, neurological system, kidneys, gut, and hematological system.

Expanded dengue syndrome

System	Unusual or atypical manifestations
Neurological	<ul style="list-style-type: none">Febrile seizures in young children.Encephalopathy.Encephalitis/aseptic meningitis.Intracranial haemorrhages/thrombosis.Subdural effusions.Mononeuropathies/polyneuropathies/Guillane-Barre Syndrome.Transverse myelitis.
Gastrointestinal/hepatic	<ul style="list-style-type: none">Hepatitis/fulminant hepatic failure.Acalculous cholecystitis.Acute pancreatitis.Hyperplasia of Peyer's patches.Acute parotitis.
Renal	<ul style="list-style-type: none">Acute renal failure.Hemolytic uremic syndrome.

Expanded dengue syndrome

System	Unusual or atypical manifestations
Cardiac	Conduction abnormalities. Myocarditis. Pericarditis.
Respiratory	Acute respiratory distress syndrome. Pulmonary haemorrhage.
Musculoskeletal	Myositis with raised creatine phosphokinase (CPK). Rhabdomyolysis.
Lymphoreticular/bone marrow	Infection associated haemophagocytic syndrome. IAHS or Haemophagocytic lymphohistiocytosis (HLH), <u>idiopathic thrombocytopenic purura (ITP)</u> . Spontaneous splenic rupture. Lymph node infarction.
Eye	Macular haemorrhage. Impaired visual acuity. Optic neuritis.
Others	Post-infectious fatigue syndrome, depression, hallucinations, psychosis, alopecia.

Immune Thrombocytopenic Purpura

Idiopathic thrombocytopenic purpura (ITP) is immune mediated with involvement of autoantibodies most often directed against the platelet membrane glycoprotein IIb/IIIa, which sensitise the platelet resulting in premature removal from the circulation by cells of the reticulo-endothelial system.

** Davidson's Principles and Practice of Medicine, 24th Edition*

ITP

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graph TD; ITP[ITP] --- PRIMARY["PRIMARY (idiopathic)"]; ITP --- SECONDARY[SECONDARY]
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**PRIMARY
(idiopathic)**

SECONDARY

SECONDARY ITP

H. pylori, viral infections (HBV, COVID, HCV, HIV, etc.)

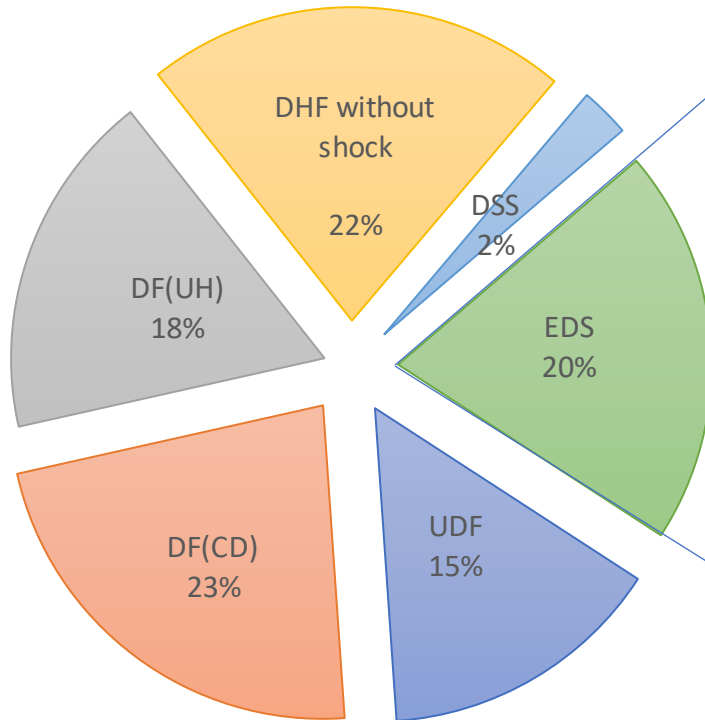
CLL, Lymphoma

Pregnancy

CTD (SLE)

Drugs

Distribution of dengue syndrome among the study population (n=509)



Hepatitis+ Acalculous cholecystitis	38	36.5%
I TP	34	32.6%
Cholecystitis	12	11.5%
Pancreatitis	4	3.8%
Acute Kidney Injury	4	3.8%
Myocarditis +ALF	4	3.8%
RPGN	1	1.0%
SIADH	1	1.0%
Non Immune Hemolytic Anemia	1	1.0%
Meningitis	3	2.9%
Encephalitis	2	1.9%
Total	104	

Pathophysiology of Thrombocytopenia in Severe Dengue

- Direct virus induced platelet destruction
- Virus induced bone marrow suppression
- Auto-immune destruction of platelets
- Increased platelet consumption due to trapping of platelet in sticky and damaged endothelium

Objectives of the study

- ❑ Find the seropositive dengue cases during this ongoing outbreak with persistent thrombocytopenia (below 50,000 cells/mm³) from post critical phase (convalescent phase) (Beyond 10 days of illness)
- ❑ To rule out the secondary causes of ITP (HBV,HCV,HIV,SLE) to determine if dengue is the underlying etiology in these cases
- ❑ To determine the role of corticosteroids in treating secondary ITP which is not categorically prescribed in dengue by monitoring the pre- and post- treatment platelet count.

Methods & Methodology

- Study Design: Case Control Study
- Place of Study: Ad-din Women's Medical College & Hospital
- Study Population: 50
- Study Period: from July 2022 to May 2023

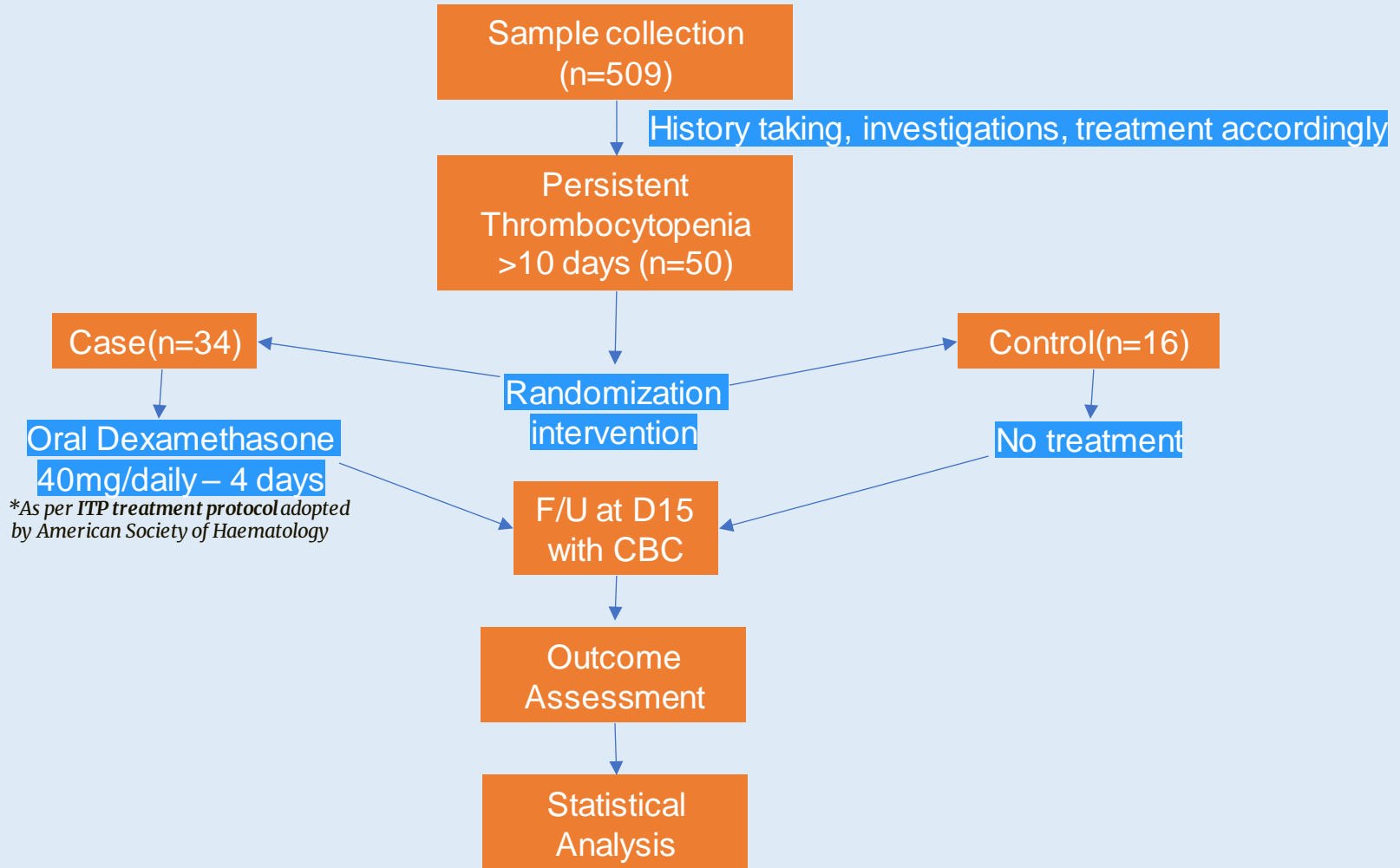
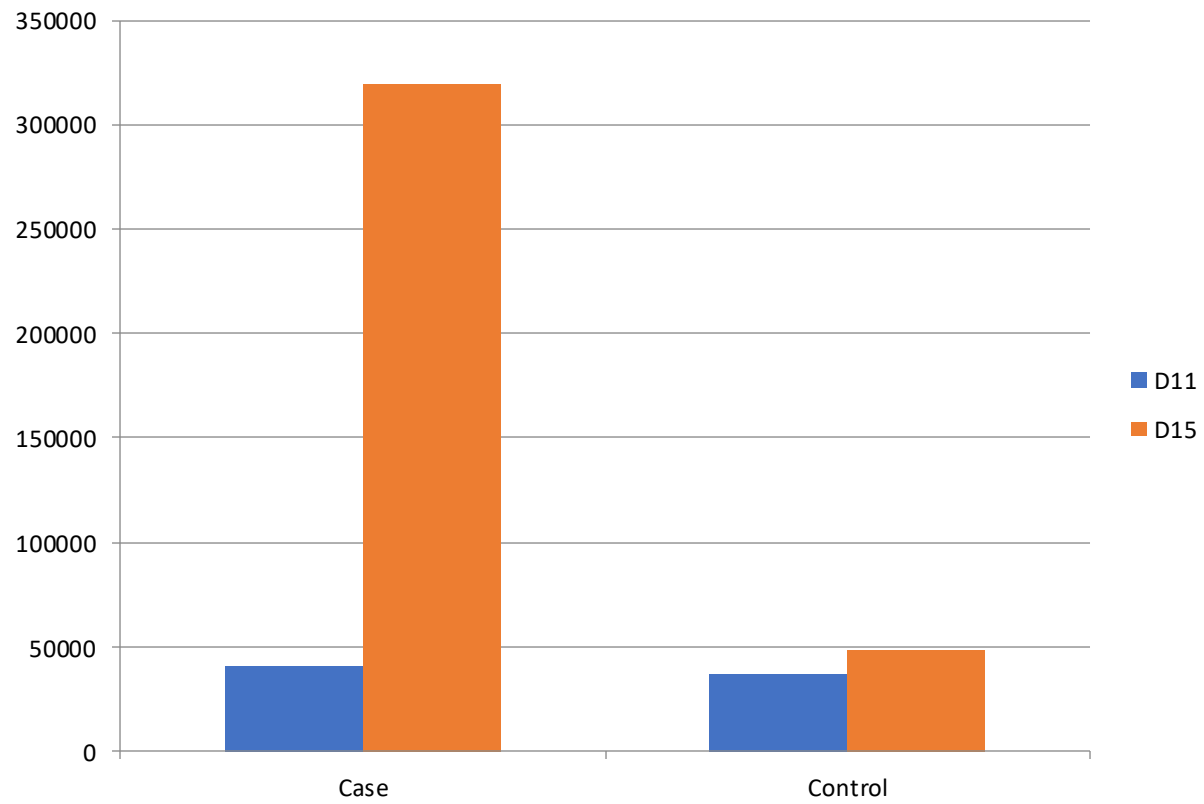


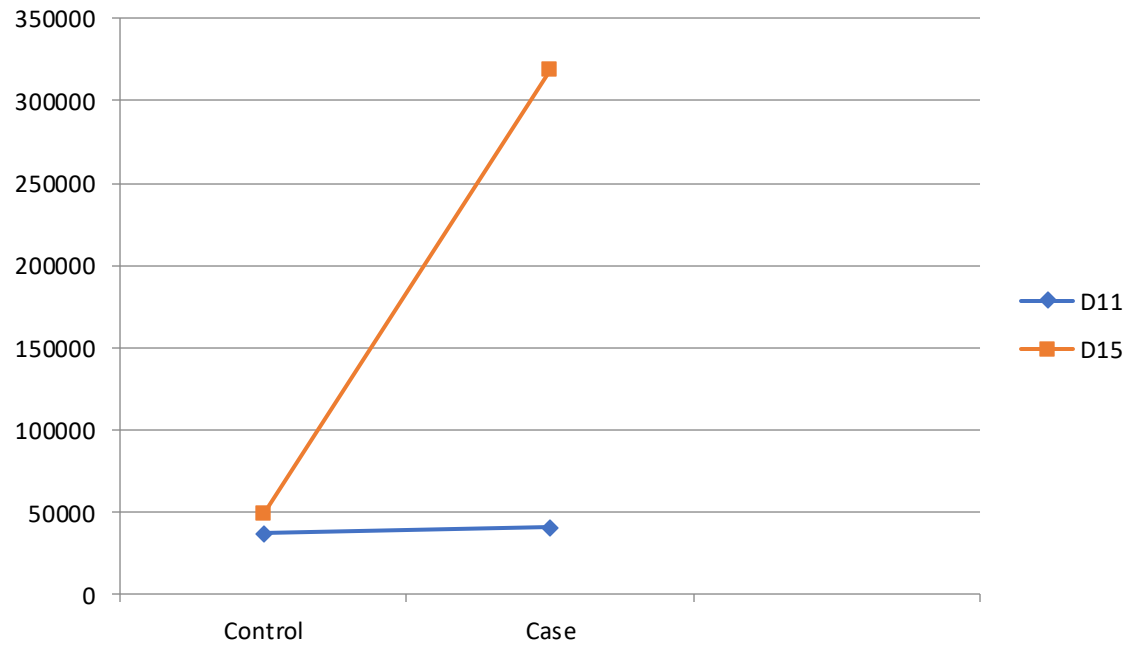
Table 1: Comparison between the case and control (N=50)

Demographic and clinical profile (N=50)	Case (34)	Control (16)
Age in years (Mean \pm SD): 37.02 \pm 14.24	37.55 \pm 14.94	35.87 \pm 13.02
Sex		
Male – 32 (64%)	19 (55.88%)	13(81.25%)
Female – 18 (36%)	15 (44.115)	3 (18.75%)
Comorbidities		
DM 7 (14%)	4(11.765)	3 (18.75%)
HTN 5 (10%)	4 (11.76%)	1(6.25%)
DM+HTN 1 (10%)	1(2.945)	0
Bronchial asthma 6 (12%)	3 (8.82%)	3 (18.75%)
Multiple co morbidity (DM, HTN, IHD,CKD) 6 (12%)	3 (8.82%)	3 (18.75%)
NS 1 Positive 37 (74%)	27 97.41%)	10 (62.5%)
Dengue IgM positive 13 (26%)	7 (20.58%)	6 (37.5%)

Results of our study

	Case (34)	Control (16)	P value
Platelet			
After 11 days	40470.58± 4775.15	37062.50 ±6597.66	0.043
After 15 days	319352.94 ± 93717.13	48437.50 ± 7907.53	0.000





Conclusion

- Persistent Thrombocytopenia beyond 10 days of dengue illness in the convalescent phase is rare.
- If present, we can suspect that the patient is having this thrombocytopenia due to dengue-induced secondary ITP as a part of expanded dengue syndrome. To prove this, as we have no provision of anti-platelet antibody, we can conduct a therapeutic trial with short term steroid therapy (dexamethasone) after excluding common causes of secondary ITP.

Conclusion

- In our study, all the patients responded in the therapeutic trial, whereas the control group had little or no improvement in platelet count, so we can conclude that cases with persistent thrombocytopenia in dengue fever beyond 10 days of illness maybe a suitable candidate for short-term steroid therapy.
- Our trial also proves that dengue is one of the underlying etiology for secondary ITP.

THANK YOU