



Health worker Christine Sinthia Roy is tending to dengue-affected children at Shaheed Ahsan Ullah Master General Hospital in Gazipur, Dhaka on 19 October 2023. UNICEF delivers vital medical supplies, including 125,000 testing kits, and supports the government in building healthcare staff capacities, offering technical advice, and implementing actions. © UNICEF Bangladesh/2023/Haque

Highlights

- As of 7th December 2023, **316,160 people** (including **40 per cent women** and **17 per cent children (0-15 years old)**) had been infected with dengue, with **1,643 deaths (57 per cent female, 10 per cent children below 15 years old)** reported.¹ In Cox's Bazar, as of 2nd December 2023, a total of **17,469 persons [4,062 Bangladeshi and 13,407 (26th November) from Rohingya camps]** have tested positive for dengue. A total of **2,300 persons (2,001 Bangladeshi and 299 Rohingya refugees)** were admitted to Cox's Bazar Sadar Hospital and another 1,555 persons were admitted to Upazila Hospitals. **18 persons (15 from Rohingya camps, 3 from the host)** died due to Dengue-related complications.²
- The monthly recorded cases have **declined from 67,769 in October to 35,261 in November 2023 (DGHS).**
- Out of the **632,995 kits** supplied by CDC, DGHS throughout the country, **UNICEF contributed kits for 276,395 tests.** Additionally, **UNICEF supplied 17,000 kits for the dengue test** to Gazipur and Narayanganj City Corporation.
- With support from UNICEF, the CDC-DGHS is continuing the capacity building of doctors and senior staff nurses in Dhaka and other parts of the country on dengue case management. **880 healthcare providers have so far been trained throughout the country.**
- The Communication Section consistently promoted awareness through impactful social media messages, **reaching a total of 90,235,561 individuals to date.**
- In partnership with the Ministry of Women and Children Affairs (MoWCA), **> 345,300 people (>234,800 women, >1,385 persons with disabilities)** were reached with **targeted dengue prevention direct messaging, events, and discussions** across 30 of the most dengue-prevalent districts through 572 Child Protection Community Hubs (CPCH).



Deadly Dengue Outbreak in Bangladesh



unicef 
for every child

**UNICEF BANGLADESH
Dengue Outbreak**

*Situation Report #6
15th December 2023*

SITUATION IN NUMBERS



316,160

Dengue cases (40 per cent female) recorded (Health Emergency Operation Centre and Control Room, DGHS 7th December 2023)



53,369

children (0-15 years old, 40 per cent girls) infected (Health Emergency Operation Centre and Control Room, DGHS 7th December 2023)



64/64

Districts

Districts affected (Health Emergency Operation Centre and Control Room, DGHS 7th December 2023)

Bangladesh: Nearly 1,000 people die of dengue in severe outbreak

28 September 2023



Bangladesh battles record dengue deaths as disease pattern changes

The densely populated country faces its worst-ever outbreak in history, with more than 1,500 dead and hospitals packed to the brim.



Socio-demographic and Clinical Predictors of Progression to Severe Dengue: A Cross Sectional Study

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Introduction

Dengue, the fastest spreading mosquito borne viral infection globally, is now endemic in more than 100 countries in the WHO Regions of Africa, the Americas, the Eastern Mediterranean, South-East Asia and the Western Pacific*.

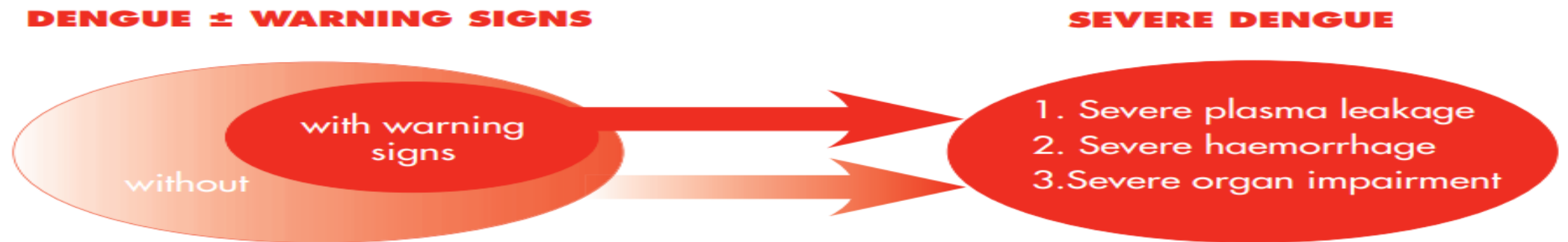
Most of the patients with dengue infection recovers spontaneously as that of the characteristics of the viral fever but some of them suffers from severe dengue.

The new 2009 WHO classification for dengue was hence created to allow clinicians to triage patients easily according to their clinical presentations for more effective clinical management but it has been long**.

* European Centre for Disease Prevention and Control: Factsheet about Dengue

** Htun, T. P., Xiong, Z., & Pang, J. (2021). Clinical signs and symptoms associated with WHO severe dengue classification: a systematic review and meta-analysis. *Emerging Microbes & Infections*, 10(1), 1116–1128.

This study investigate the likelihood of new factors associated with severe dengue, which may be useful to further revise the existing dengue 2009 classifications for more accurate triaging of patients as identifying predictors of severe dengue is crucial for early intervention and effective management.



CRITERIA FOR DENGUE ± WARNING SIGNS

Probable dengue

live in /travel to dengue endemic area.

Fever and 2 of the following criteria:

- Nausea, vomiting
- Rash
- Aches and pains
- Tourniquet test positive
- Leukopenia
- Any warning sign

Laboratory-confirmed dengue

(important when no sign of plasma leakage)

Warning signs*

- Abdominal pain or tenderness
- Persistent vomiting
- Clinical fluid accumulation
- Mucosal bleed
- Lethargy, restlessness
- Liver enlargement >2 cm
- Laboratory: increase in HCT concurrent with rapid decrease in platelet count

*(requiring strict observation and medical intervention)

CRITERIA FOR SEVERE DENGUE

Severe plasma leakage

leading to:

- Shock (DSS)
- Fluid accumulation with respiratory distress

Severe bleeding

as evaluated by clinician

Severe organ involvement

- Liver: AST or ALT ≥ 1000
- CNS: Impaired consciousness
- Heart and other organs

Aims & Objectives of Study

General Objective :

Identification of socio demographic and clinical predictors of progression to severe dengue.

Specific Objectives :

1. To create a social & demographic profile of severe dengue patients.
2. To identify different co-morbidities and their effect on dengue severity.
3. Among warning signs, identify the most trusted predictor of severe dengue.
4. To search for new warning sign for prediction of progression to severe dengue

Materials & Methods

Study Design :

Descriptive type of Cross Sectional Study

Place of Study :

Inpatient unit of Department of Medicine, ShSMCH, Dhaka, Bangladesh.

Study Period :

03 months

Materials & Methods

Study Population :

NS1 antigen Positive Severe Dengue Patients.

Sample Size :

75 samples were taken in this study.

Sampling technique :

Sample was selected by Convenient Purposive sampling technique.

Materials & Methods

Inclusion Criteria :

- ☐ All Confirmed (NS1 Positive) Severe Dengue patients.
 - (Severe dengue was defined as: Dengue Shock Syndrome or Fluid accumulation with Respiratory Distress or Severe Bleeding or Severe Organ Involvement)
- ☐ Age > 12 years
- ☐ Patient giving informed consent to take part in this study

Exclusion Criteria :

Dengue with coinfection (Septic shock, Tubercular or Parapneumonic Effusion) were excluded from the study.

Materials & Methods

Variables to Analysis : A Pretested Questionnaire was set to collect data including:

- Socio-demographic characteristics
- Body mass index
- Co-morbidity
- Warning signs
- Treatment received
- Outcome

Ethical Consideration :

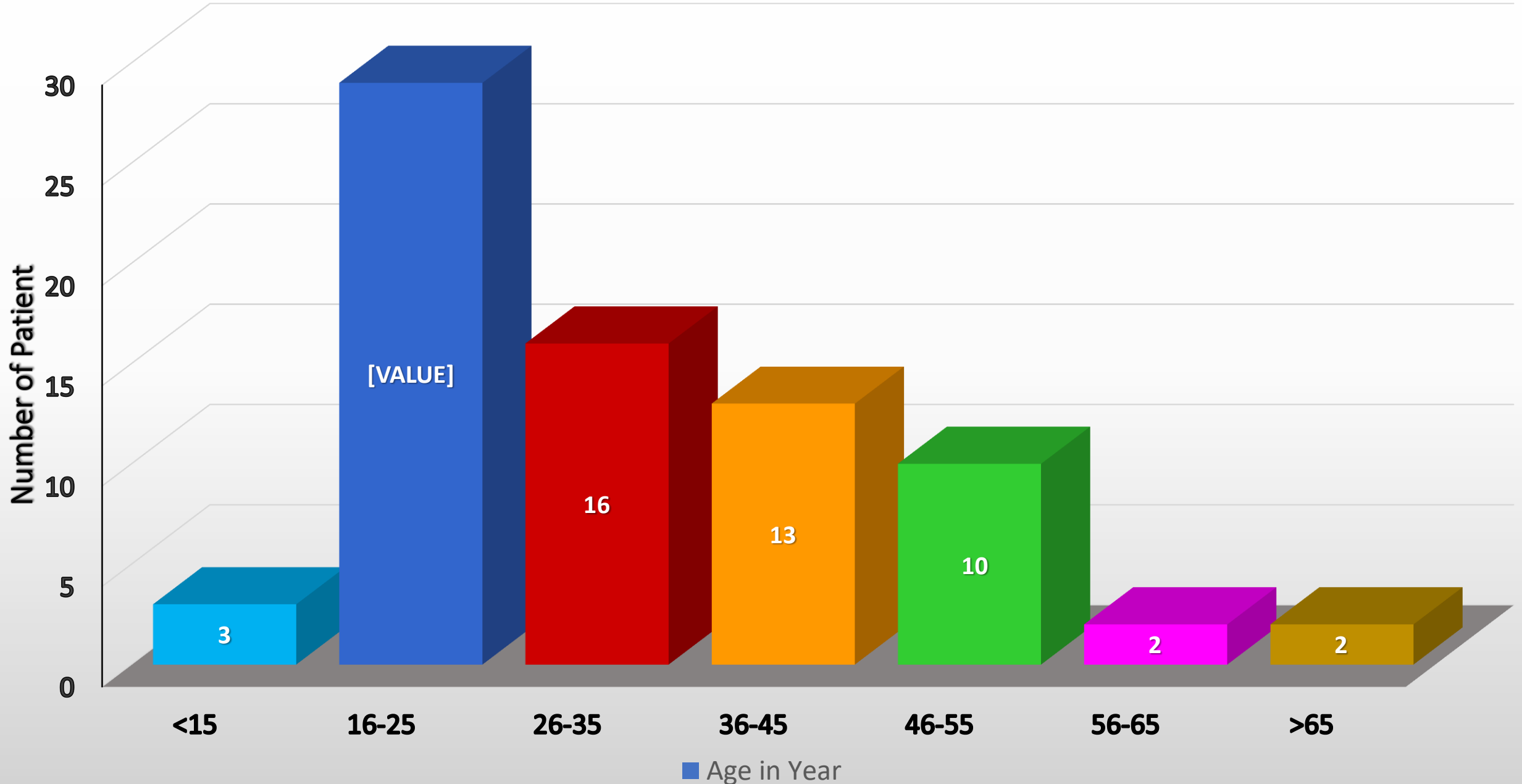
Ethical Clearance was taken from ethical review board of ShSMCH.

Declaration:

The authors declare no conflict of interest.

Results & Discussion

Age Distribution of the Patients (n=75)



❑ The study's analysis of 75 dengue patients revealed a diverse age distribution, with the **largest group being 16-25 years old (38.67%)**, followed by 26-35 years (21.33%).

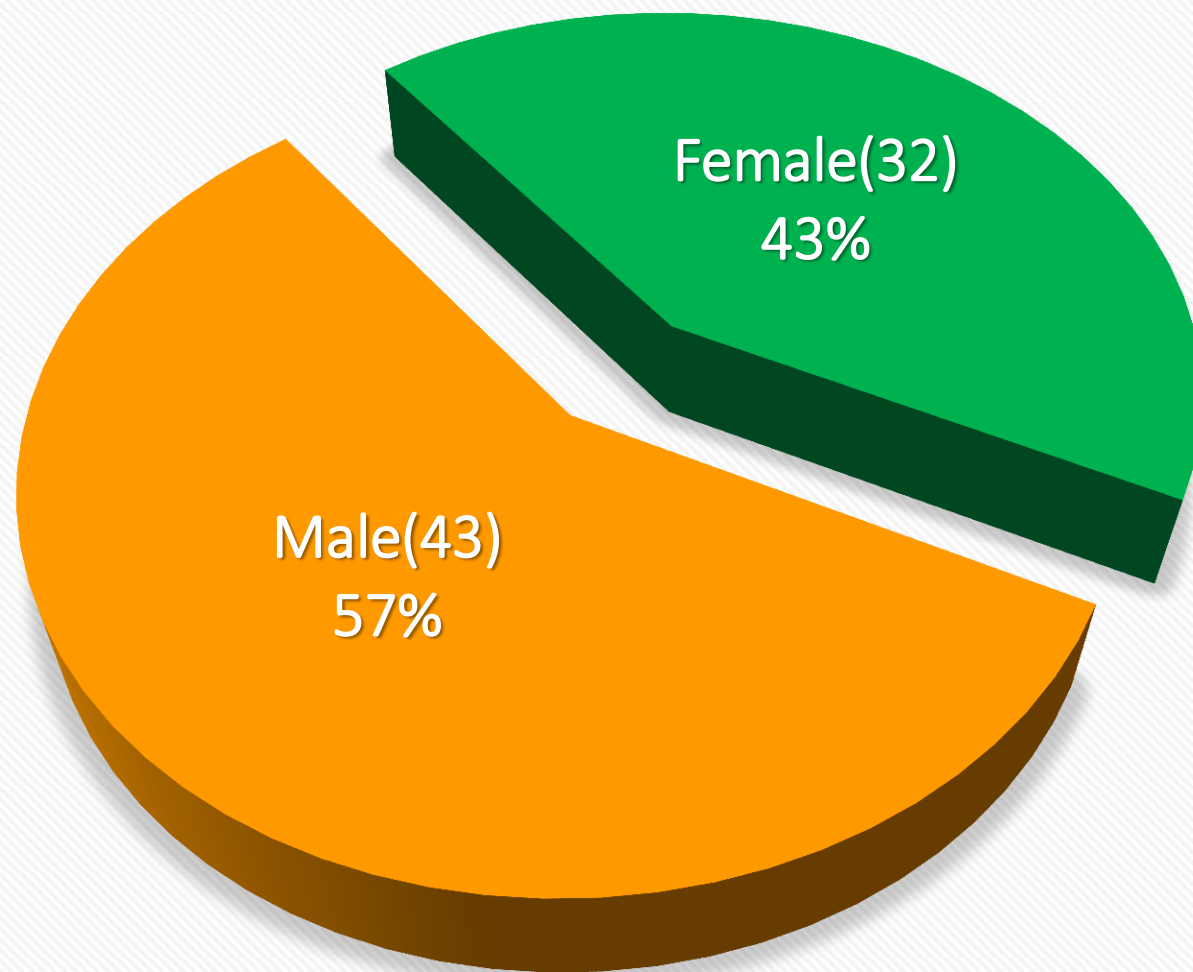
❑ The **least represented age groups were 56-65 and >65 years**, each constituting **2.67%** of the participants.

❖ This result didn't support two large studies, One in Mexico stated: "The youngest and oldest population groups had relatively higher odds of severe dengue" *, another one in Thailand stated: "Advanced age is a risk factor for severe and fatal outcome after dengue infection "**

*Annan, E., Treviño, J., Zhao, B., Rodriguez-Morales, A. J., & Haque, U. (2023). Direct and indirect effects of age on dengue severity: The mediating role of secondary infection. *PLoS Neglected Tropical Diseases*, 17(8), e0011537.

**Huang, N., Shen, Y. J., Chou, Y. J., Tsai, T. F., & Lien, C. E. (2023). Advanced age and increased risk for severe outcomes of dengue infection, Taiwan, 2014–2015. *Emerging Infectious Diseases*, 29(8), 1701.

Gender Distribution

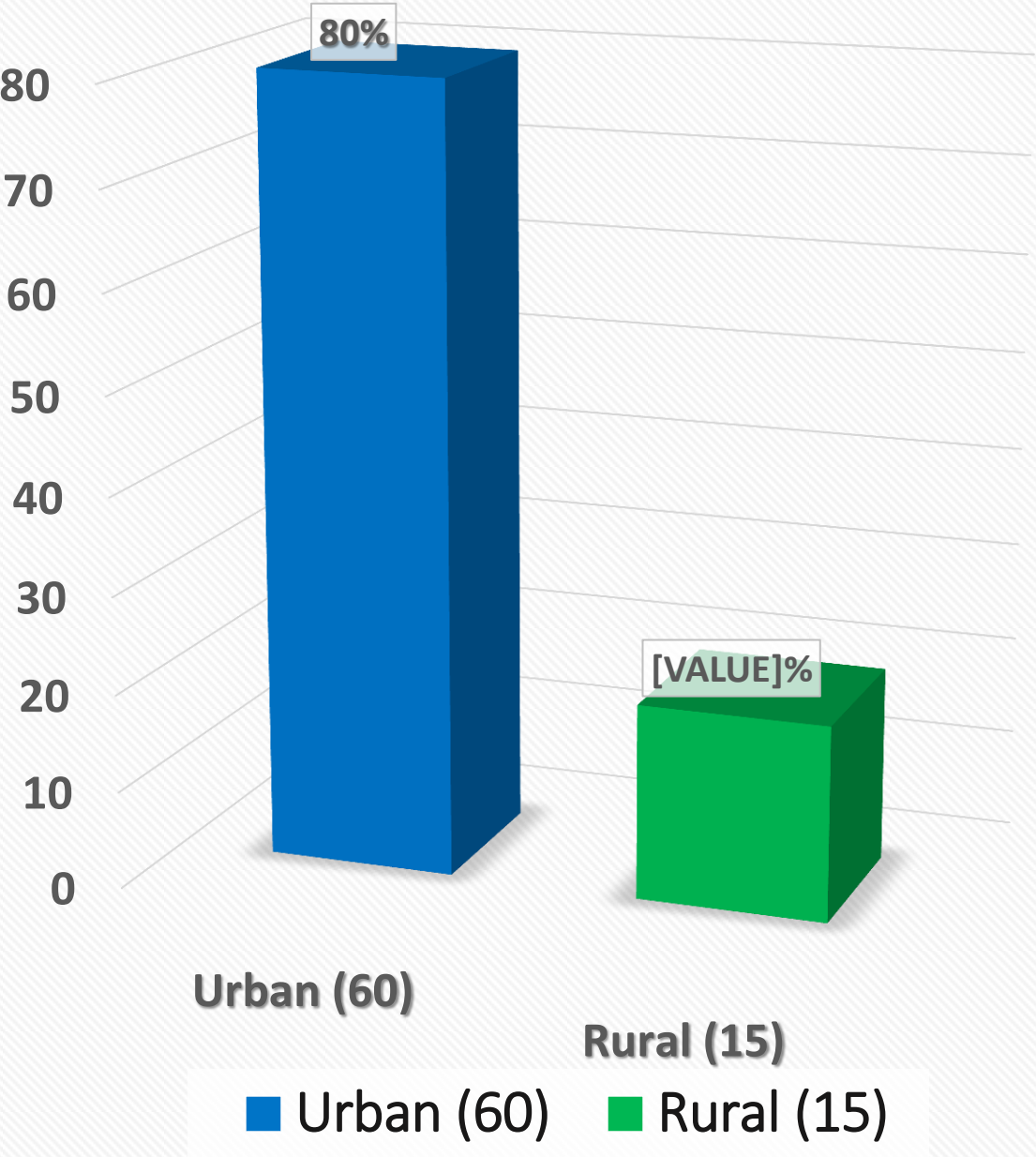


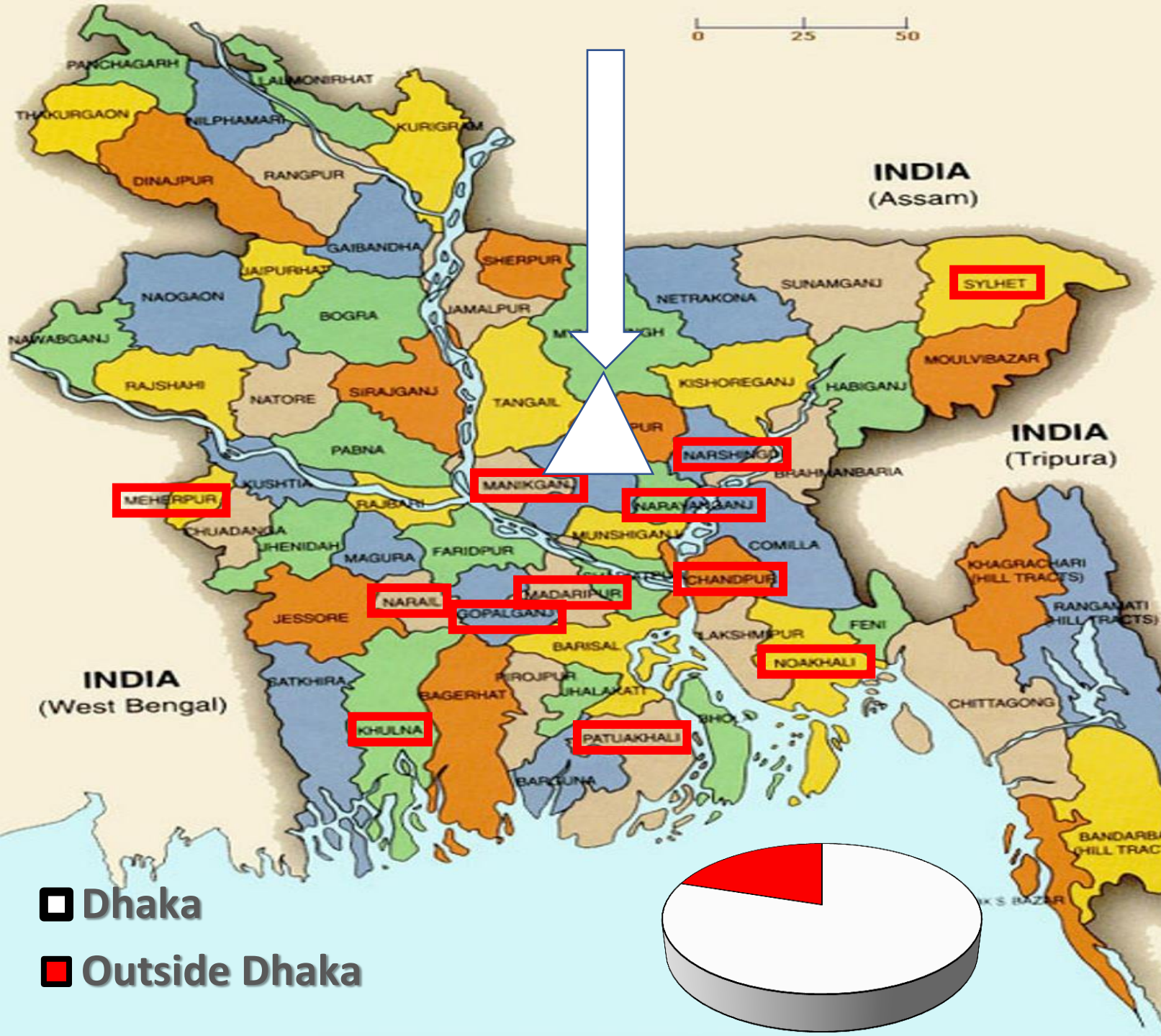
■ Male(43) ■ Female(32)

❑ **Males comprised a higher** proportion of the study population at **57.33%**, compared to females at 42.67%.

❖ Gender distribution showed a clear male predominance in all the dengue outbreaks reported in Bangladesh. The proportion of male cases was almost double compared to females in all studies *

Distribution of Patients according to Residence





District	Frequency	Total
Dhaka	60	60
Manikganj	03	15
Madaripur	02	
Narsinghdi	01	
Noakhali	01	
Narayanganj	01	
Patuakhali	01	
Narail	01	
Chandpur	01	
Khulna	01	
Meherpur	01	
Gopalganj	01	
Sylhet	01	
Total		75

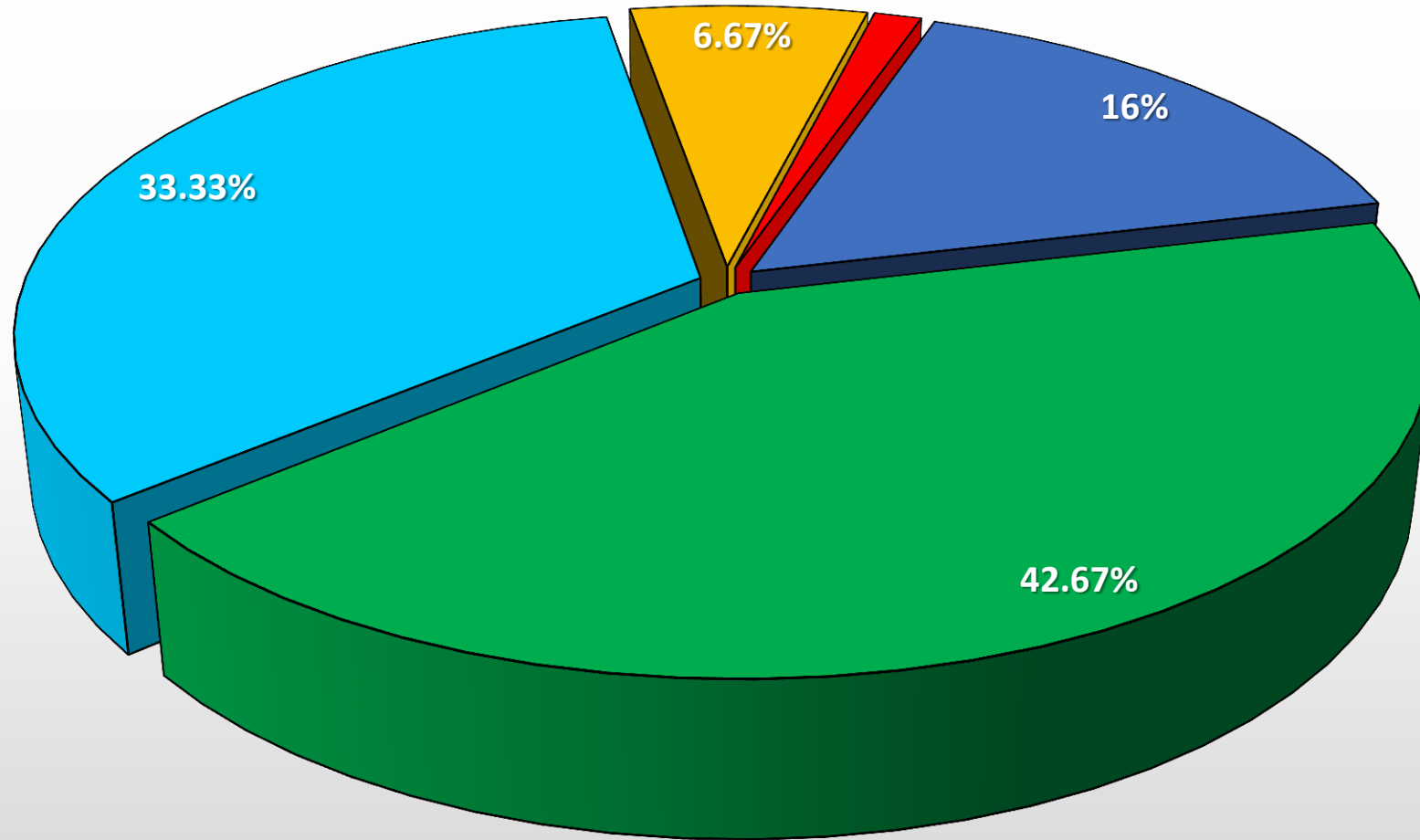
❑ The majority of the patients resided in **urban areas (80.00%)**, with the remaining 20.00% from rural settings.

❑ Out of 75 patients, **60 were from Dhaka District**. Among other 15 patients from outside Dhaka

❖ A Meta analysis of 106 articles published between 1958 and 2021 estimated that comparing between urban and rural settings reported rural dengue incidence as being as high or higher than in urban locations*

* Man, O., Kraay, A., Thomas, R., Trostle, J., Lee, G. O., Robbins, C., Morrison, A. C., Coloma, J., & Eisenberg, J. N. S. (2023). Characterizing dengue transmission in rural areas: A systematic review. *PLoS Neglected Tropical Diseases*, 17(6), e0011333

Distribution of Patients according to BMI

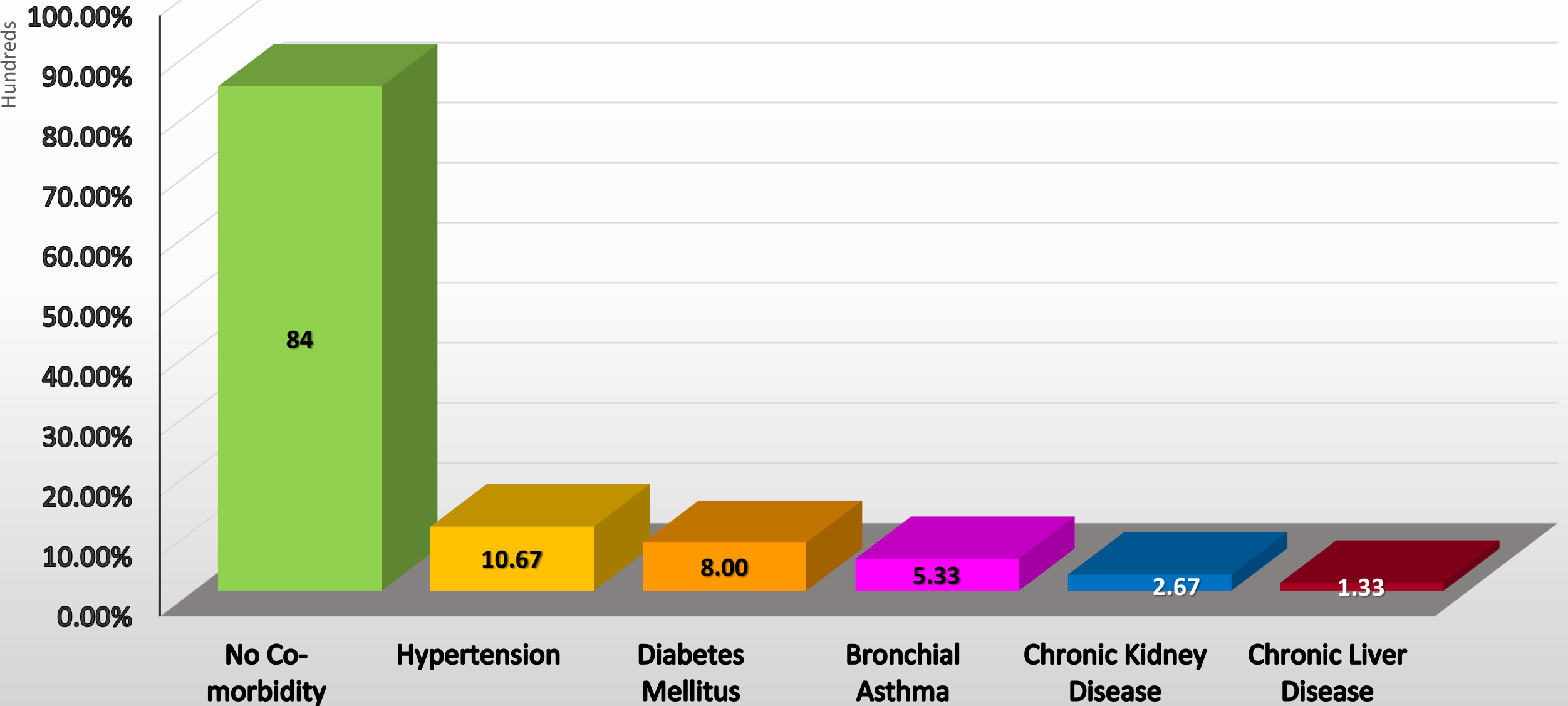


■ Underweight (12) ■ Normal Weight (32) ■ Overweight (25) ■ Obese (5) ■ Morbidly Obese (1)

❖ A total of 1417 hospitalized patients with dengue in China revealed that the obese group had more petechiae , more dyspnea and more severe hepatitis but **no difference in severe dengue or mortality between obese and nonobese group***

* Chiu, Y.-Y., Lin, C.-Y., Yu, L.-S., Wang, W.-H., Huang, C.-H., & Chen, Y.-H. (2023). The association of obesity and dengue severity in hospitalized adult patients. *Wei Mian Yu Gan Ran Za Zhi [Journal of Microbiology, Immunology, and Infection]*, 56(2), 267–273.

Co-morbidities

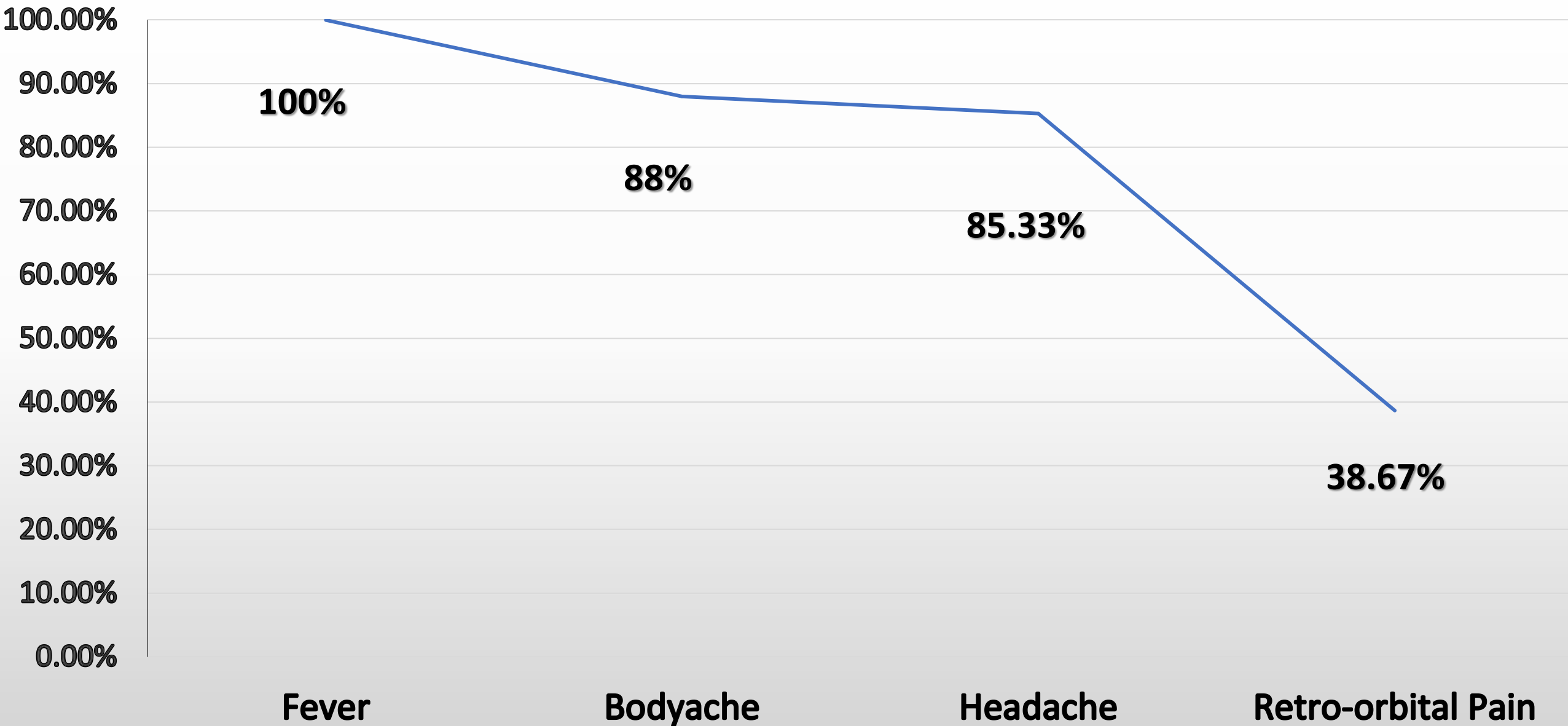


- ❖ A Meta analysis of 39 articles from 1790 records found that patients with comorbidity had 2-times higher risk of progression into severe dengue.*
- ❖ Among 6,300 dengue patients who presented with any pre-existing one co-morbidity & two or more existing co-morbidities had 1.63 times & 2.90 times higher risk than dengue patients who did not presented with any existing co-morbidity.

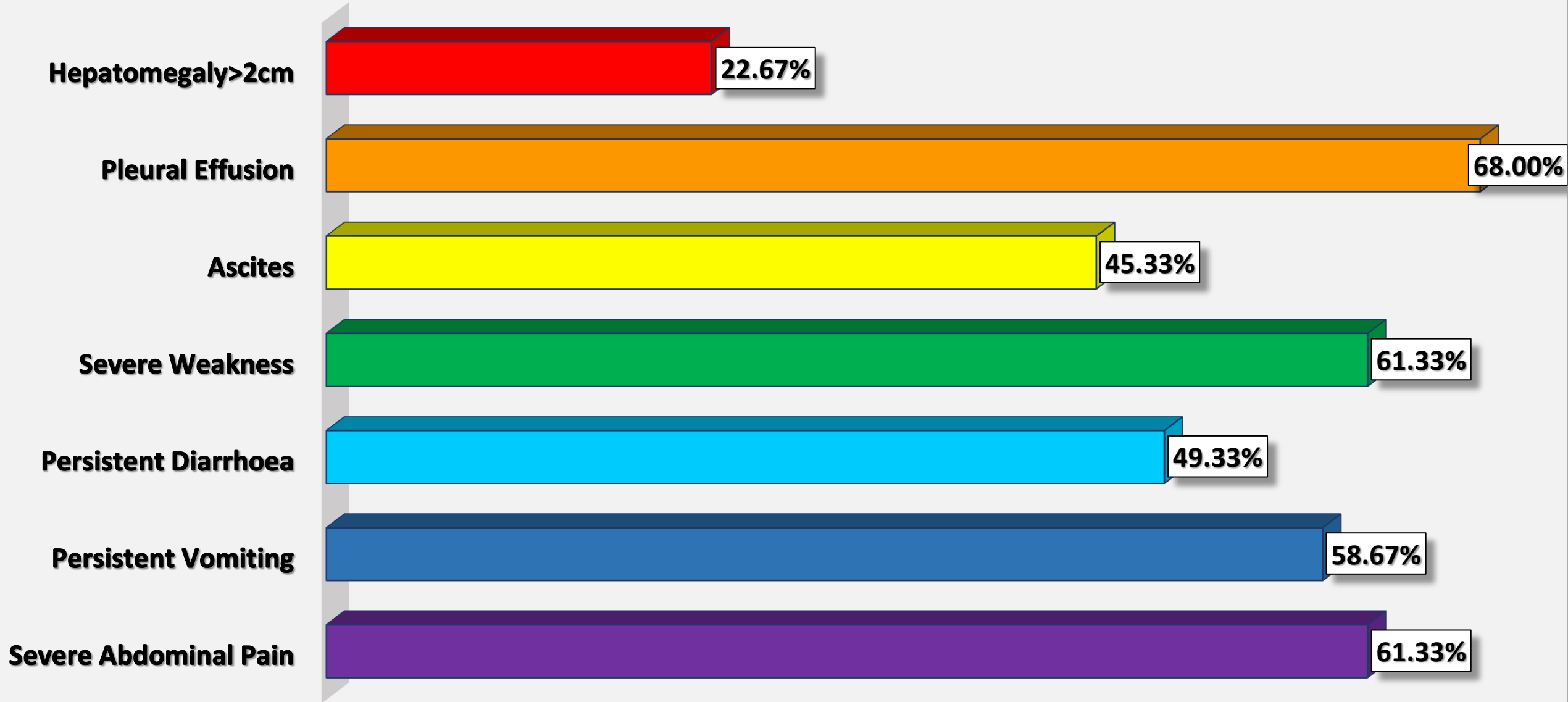
* Htun, T. P., Xiong, Z., & Pang, J. (2021). Clinical signs and symptoms associated with WHO severe dengue classification: a systematic review and meta-analysis . *Emerging Microbes & Infections*, 10(1), 1116–1128.

** Pang, J., Hsu, J. P., Yeo, T. W., Leo, Y. S., & Lye, D. C. (2017). Diabetes, cardiac disorders and asthma as risk factors for severe organ involvement among adult dengue patients: A matched case-control study. *Scientific Reports*, 7(1), 1–10.

Distribution of Presenting Symptoms among the Participants



DISTRIBUTION OF WARNING SIGNS AMONG PARTICIPANTS



Co relations		Dengue Shock Syndrome	Co relations		Dengue Shock Syndrome
Dengue Shock Syndrome	Pearson Correlation	1	Hepatomegaly >2cm	Pearson Correlation	-0.133
	Sig. (2-tailed)			Sig. (2-tailed)	0.303
Severe Abdominal Pain	Pearson Correlation	0.028	Ascites	Pearson Correlation	-0.004
	Sig. (2-tailed)	0.819		Sig. (2-tailed)	0.971
Vomiting	Pearson Correlation	.461**	Pleural Effusion	Pearson Correlation	-0.023
	Sig. (2-tailed)	<0.001		Sig. (2-tailed)	0.857
Diarrhea	Pearson Correlation	.418**	Outcome	Pearson Correlation	.264*
	Sig. (2-tailed)	<0.001		Sig. (2-tailed)	0.022
Severe Weakness	Pearson Correlation	-0.218			
	Sig. (2-tailed)	0.072			

❑ **Severe abdominal pain**, despite its **high frequency (61.33%)**, showed a **negligible correlation** with dengue shock syndrome

❑ **Severe weakness**, a symptom in **61.33%** of patients, showed a **negative correlation with dengue shock syndrome** , suggesting it may not be a reliable predictor of shock.

❖ Among 700 dengue patients in a tertiary care center in Malaysia, the most sensitive warning signs in detecting SD were abdominal pain (59%)*

* Ahmad, M., Ibrahim, M., Mohamed, Z., Ismail, N., Abdullah, M., Shueb, R., & Shafei, M. (2018). The sensitivity, specificity and accuracy of warning signs in predicting severe dengue, the severe dengue prevalence and its associated factors. *International Journal of Environmental Research and Public Health*, 15(9), 2018.

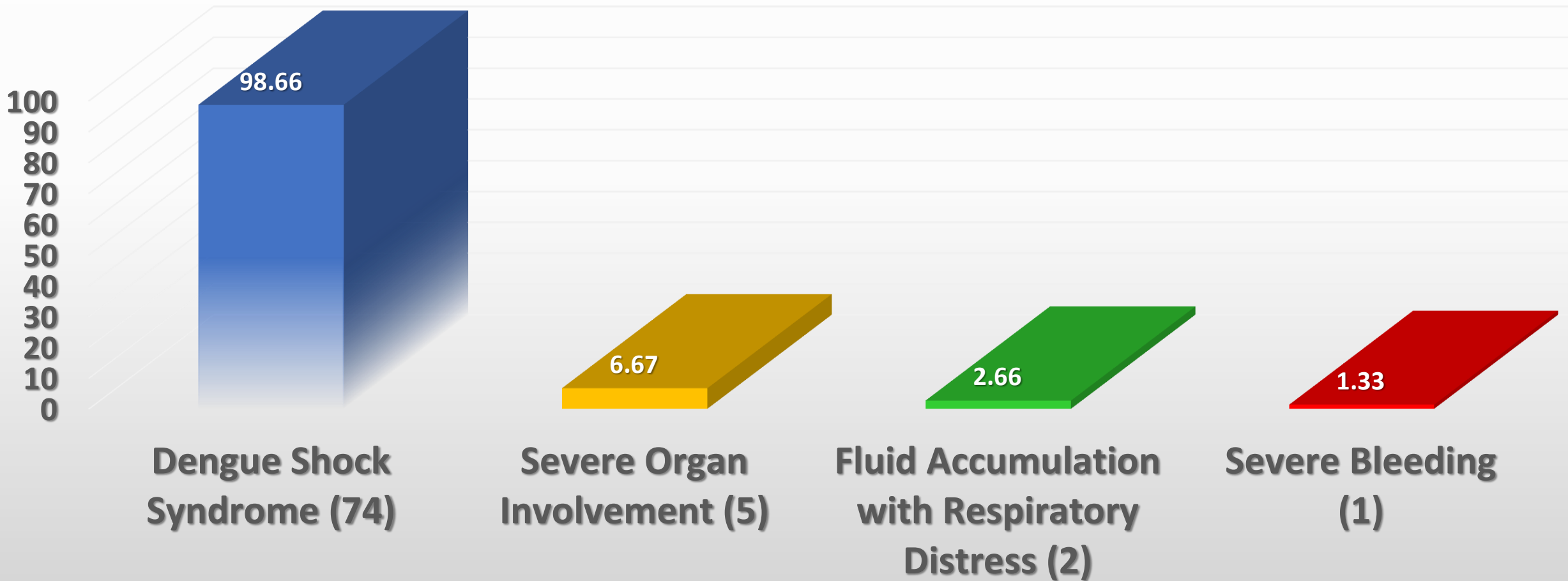
❑ **Dengue shock syndrome had a strong positive correlation with:**

➤ **Vomiting & Diarrhea** , indicating these symptoms as significant predictors of severe dengue.

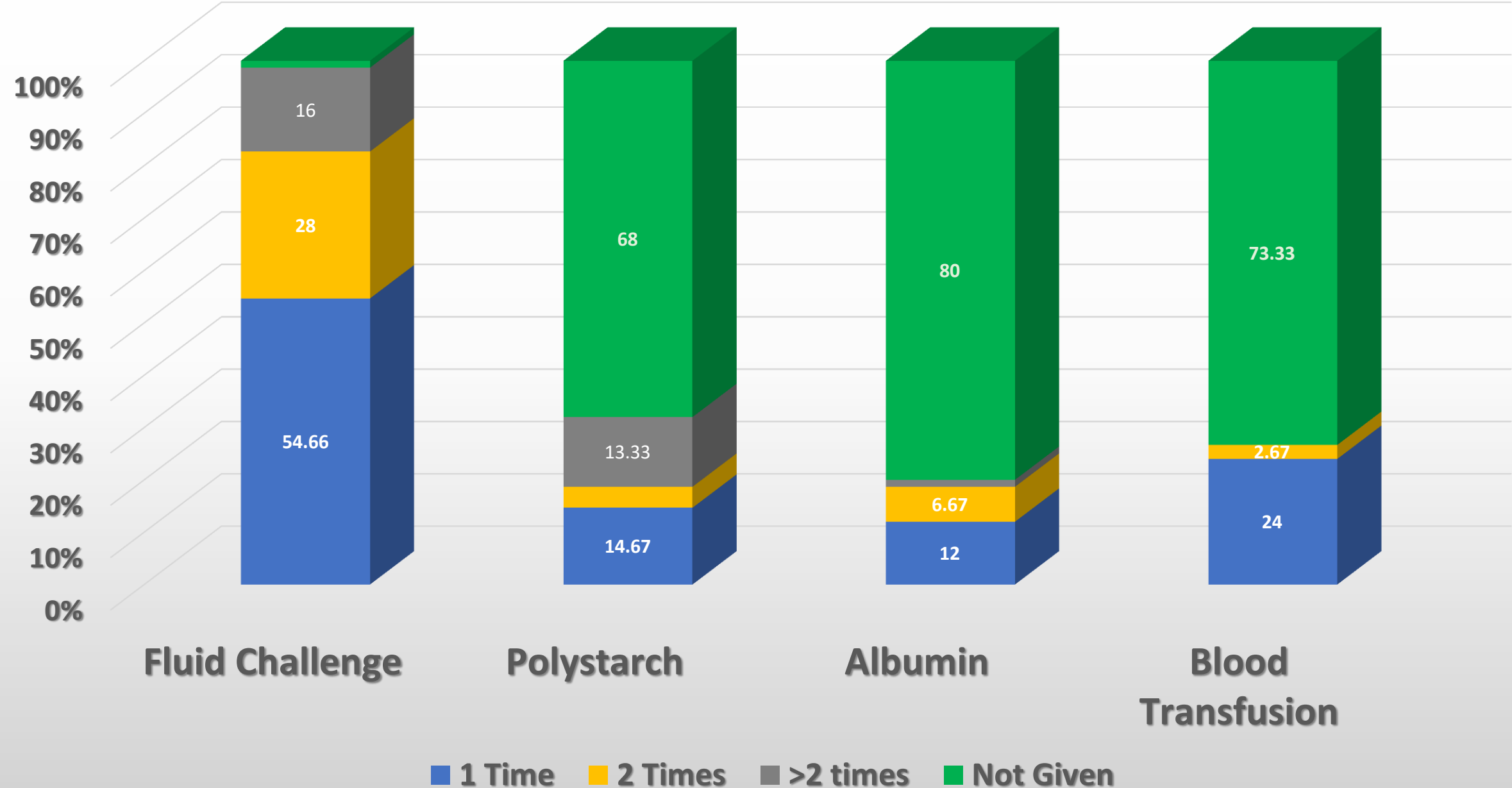
❖ Among 700 dengue patients in a tertiary care center in Malaysia, the **significant factors associated with severe dengue were persistent vomiting** , mucosal bleeding, HCT rise and rapid platelet drop after controlling confounders in multiple logistic regression. **The other four WS, which were significant during simple logistic regression, were found to be not significant.***

* Ahmad, M., Ibrahim, M., Mohamed, Z., Ismail, N., Abdullah, M., Shueb, R., & Shafei, M. (2018). The sensitivity, specificity and accuracy of warning signs in predicting severe dengue, the severe dengue prevalence and its associated factors. *International Journal of Environmental Research and Public Health*, 15(9), 2018.

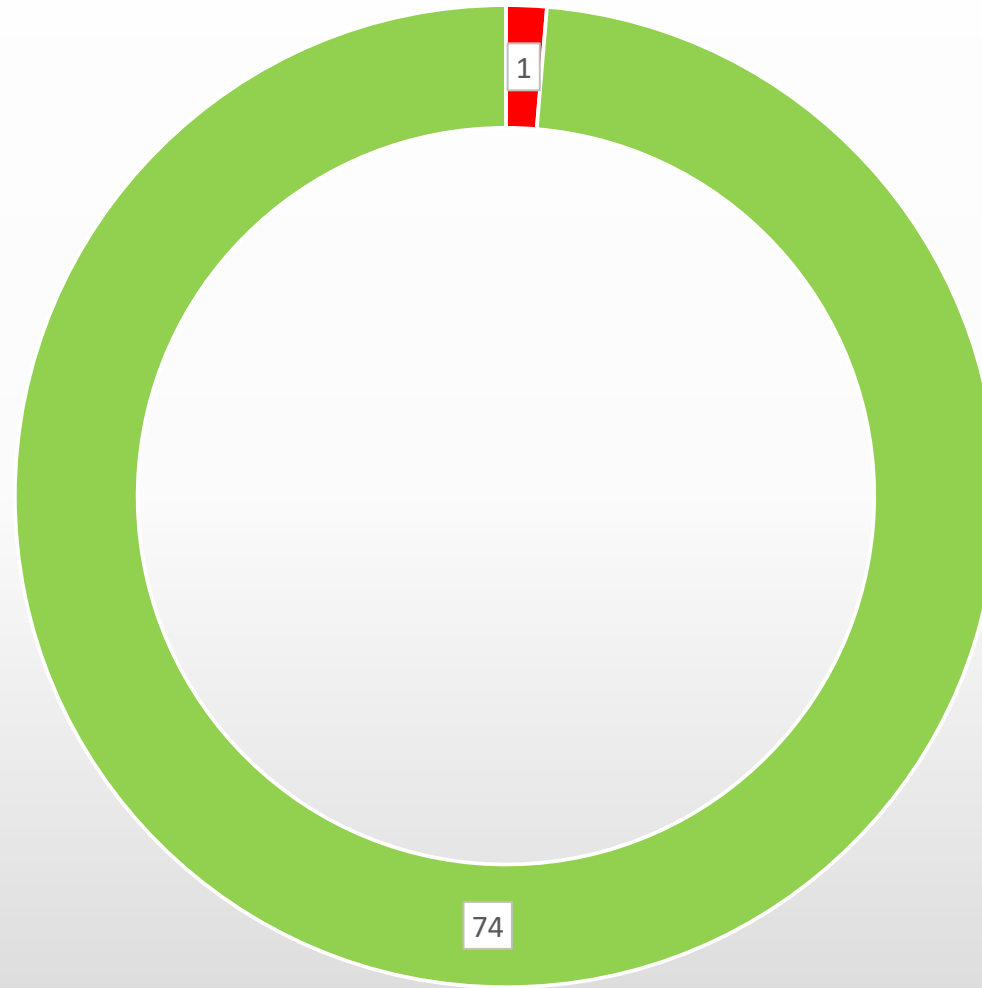
Distribution Of Participants (in percentage) By Presence of Severe Dengue



Distribution of Participants by Treatment Regimen



Steroid Use (n=75)



■ Given ■ Not needed

❑ **Blood transfusions** were administered to 24% (18 patients) once and 2.67% (2 patients) twice.

❑ **Only One Patient received Steroid.**

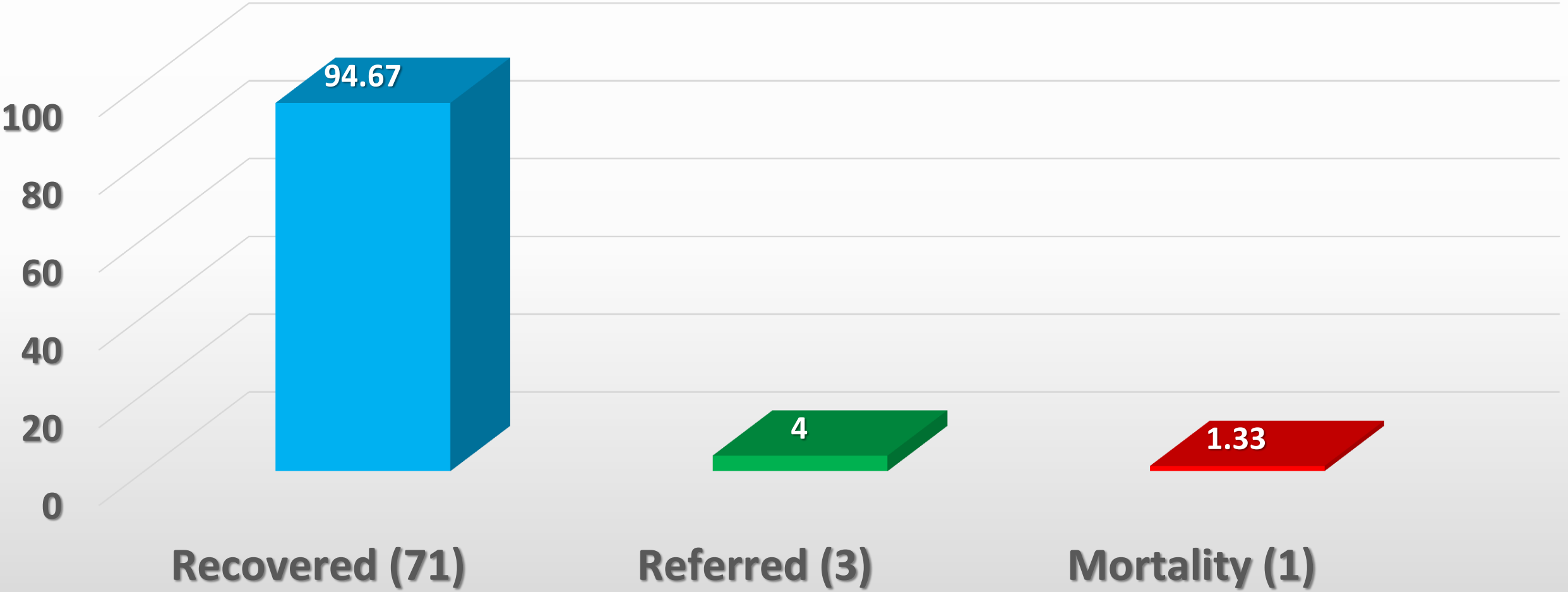
❖ In a case series of 10 patients in Sri Lanka, researchers observed blood transfusions to be lifesaving in many deteriorating dengue patients outside the stipulated indications.*

❖ There is no evidence of efficacy, and recent studies recommend not using steroids routinely**

*Kularatne, S. A. M., Dalugama, C., Rajapakse, M., Warnasooriya, S., Pathirage, M., Ralapanawa, U., & Jayalath, T. (2023). Blood transfusion in severe dengue infection: a case series. *Journal of Medical Case Reports*, 17(1).

** Centre For Disease Control

Treatment Outcome (in Percentage)



Limitation

- Small sample size (75 cases) due to time and resource constraint.
- Involvement of only one Centre in Dhaka, which may not reflect the wholesome picture of our country.
- As it was cross-sectional study, patients were assessed only at presentation.

Conclusion

These findings emphasize the importance of Persistent Vomiting & Diarrhea as reliable predictor of dengue shock syndrome while **question severe weakness as warning sign for admission into hospital in a resource constrain country like Bangladesh.**

Therefore, other warning signs may be useful for triaging potential severe dengue in patients and may guide further enhancement of the current WHO dengue severity classifications.



THANK YOU...