

***Short Report***

## Febrile seizures in paediatric patients: What is the exact chance of having dengue as the underlying disease?

\*Beuy Joob<sup>1</sup>, Viroj Wiwanitkit<sup>2</sup>

*Sri Lanka Journal of Child Health*, 2022; **51**(1): 126-128

DOI: <http://dx.doi.org/10.4038/sljch.v51i1.10019>

(Key words: Dengue, Febrile seizure)

### Introduction

Febrile seizure (FS) is a common clinical problem in medical practice<sup>1</sup>. In a tropical country, infection is a common cause of FS<sup>2,3</sup>. FS may be induced by dengue infection in a child<sup>4-6</sup>. Whilst previously, dengue was considered a tropical infection, the endemic area of dengue has expanded due to increased global temperature<sup>7</sup>. In present report, authors re-analysed the available data in Thailand.

### Objective

To estimate the chance that a child presenting with FS has dengue as the underlying disease.

### Method

This is a clinical mathematical model study in Thailand, where dengue is highly endemic. To develop the clinical mathematic model, data regarding epidemiology of FS and dengue related FS among Thai children 0–15 years old are used as primary data template<sup>5,6,8</sup>. Primary data are the published data available in standard referencing international databases (PUBMED and SCOPUS) and Thai referencing database (Thai Index Medicus). The local database is the Thai national database covering scientific reports by all health institutions maintained by Thai Ministry of Higher Education, Science, Research and Innovation. This

database collected only data reported by published authors in scientific journals that are proven and verified for quality.

The data analysis according to the mathematical model for path probability analysis was performed. In brief, the model is for describing a specific chance of each alternative mode of an event. In the present study, the event is dengue related FS and there are two alternative modes of this event, with and without previous history of FS. The inclusions are all published data between 1950 and 2020. The exclusions are any data that are not complete. According to the inclusion and exclusion criteria, there are 3 published datasets<sup>5,6,8</sup>.

To estimate the chance that a child presenting with FS has dengue as underlying disease, the probability distribution assignment and path probability analysis are performed. The Excel Software Program was used for calculation. This is not a study in humans and does not required signed informed consent from patients.

### Results

Regarding the available clinical epidemiological data, the proportion of paediatric patients with acute febrile illness with and without previous history of FS are equal to 47.9: 52.1 (47.9% versus 52.1%)<sup>8</sup>. There is a difference between the rate of dengue related FS between the paediatric acute febrile illness patients with and without a previous history of FS. The rate of dengue related acute febrile illness for the case with the first episode of FS is equal to 10%<sup>5</sup>. The probability distribution assignment and path probability analysis was done. The corresponding chance for dengue related FS in each group of patients is shown in Table 1. The overall final chance of dengue related FS is equal to 5.2%

<sup>1</sup>Sanitation 1 Medical Academic Centre, Bangkok, Thailand, <sup>2</sup>Honorary Professor, Dr. DY Patil University, Pune, India

\*Correspondence: beuyjoob@hotmail.com

 <https://orcid.org/0000-0002-5281-0369>

(Received on 21 September 2020: Accepted after revision on 20 November 2020)

The authors declare that there are no conflicts of interest

Personal funding was used for the project.

Open Access Article published under the Creative

Commons Attribution CC-BY  License

**Table 1: Probability distribution assignment and path probability analysis**

Group	Rate of dengue related FS	Path probability	Chance of dengue related FS*
With previous history of febrile seizure (FS)	0 %	47.9 %	0 %
Without previous history of FS	10 %	52.1 %	5.21 %

\*Chance of dengue related acute febrile seizure for each group is calculated by “rate of dengue x path probability” for that group.

\*\* Overall final chance for all groups is the summarization of final chance in each group

### Discussion

Acute febrile illness is a common clinical problem in tropical paediatrics. Several infections can be seen in clinical practice and it is sometimes difficult for a definitive diagnosis. Dengue is a common disease and might be misinterpreted as other disease<sup>9</sup>. For example, dengue might be easily mistaken for influenza. The common clinical spectrum between the two diseases can be detected<sup>10,11</sup>. Regarding dengue, the acute febrile illness and haemostatic problem are the classical clinical features and there might be some atypical clinical presentations including neurological presentation<sup>9</sup>.

Regarding atypical clinical presentation, FS is a common clinical presentation in dengue<sup>4</sup>. In a recent report from Thailand, one-fifth of the patients had FS<sup>4</sup>. Nevertheless, an interesting observation is the different reported rates of dengue-related FS among paediatric FS patients with and without a history of previous seizure episode. According to the report by Pancharoen C, *et al*, there were no dengue cases among the paediatric FS patients with the first episode of illness<sup>5</sup>.

In the present report, the authors use the modelling technique and can estimate the chance that a paediatric patient presenting with FS has dengue as underlying disease. It can be seen that about 5% of paediatric FS in our setting had dengue as an underlying disease. In general, investigation for the infectious cause of FS is necessary. Based on the findings in the present study, there is a need for a specific work-up for dengue in any paediatric patients with FS as well as acute febrile illness in tropical setting. There might also be a similar epidemiological pattern in other tropical countries.

### Conclusions

In the present study, 5% of paediatric patients with FS had dengue. Regardless of a previous history of seizure, work up for dengue infection should be done in case management.

### References

1. Wing R, Dor MR, McQuilkin PA. Fever in the paediatric patient. *Emergency*

*Medical Clinics of North America* 2013; **31**:1073-96.

<https://doi.org/10.1016/j.emc.2013.07.006>  
PMid: 24176480

2. Gupta A. Febrile seizures. *Continuum (Minneapolis)* 2016; **22**: 51-9.  
<https://doi.org/10.1212/CON.0000000000000274>  
PMid: 26844730

3. Kimia AA, Bachur RG, Torres A, Harper MB. Febrile seizures: emergency medicine perspective. *Current Opinion in Pediatrics* 2015; **27**: 292-7.  
<https://doi.org/10.1097/MOP.0000000000000220>  
PMid: 25944308

4. Hongsiriwon S. Dengue haemorrhagic fever in infants. *Southeast Asian Journal of Tropical Medicine and Public Health* 2002; **33**(1):49-55.

5. Pancharoen C, Chansongsakul T, Bhattarakosol P. Causes of fever in children with first febrile seizures: How common are human herpesvirus-6 and dengue virus infections? *Southeast Asian Journal of Tropical Medicine and Public Health* 2000; **31**(3): 521-3.

6. Yasri S. Dengue seropositivity among paediatric patients with repeated acute febrile seizure. *Advanced Tropical Medicine and Public Health International* 2019; **9**: 22-6.

7. Junxiong P, Yee-Sin L. Clustering, climate and dengue transmission. *Expert Review of Anti-infective Therapy* 2015; **13**(6):731-40.  
<https://doi.org/10.1586/14787210.2015.1028364>  
PMid: 25872683

8. Pongpattanachot S. Febrile convulsion in childhood in Yasothon Hospital: retrospective study in 3 years. *Yasothon Medical Journal* 2001; **3**(2): 59-61.

9. Wiwanitkit V. Dengue fever: diagnosis and treatment. *Expert Review of Anti-infective Therapy* 2010; **8**(7): 841-5.  
<https://doi.org/10.1586/eri.10.53>  
PMid: 20586568
10. Chaiwarith R, Prommee N, Liwsrisakun C, Oberdorfer P, Nuntachit N, Pothirat C. A novel influenza A H1N1 clinical manifestations in patients at Chiang Mai University Hospital. *Journal of the Medical Association of Thailand* 2011; **94**(8): 908-15.
11. Cunha BA, Raza M. During influenza season: all influenza-like illnesses are not due to influenza: dengue mimicking influenza. *Journal of Emergency Medicine* 2015; **48**(5): e117-20.  
<https://doi.org/10.1016/j.jemermed.2014.12.051>  
PMid: 25736548