# Identifying clinical features of fluid status among children with suspect dengue in Indonesia

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## Abstract

**Background:** The incidence of dengue had significantly increasing every years in Indonesia. Children is vulnerable population and have higher risk develop to shock complication from dengue. This infectious disease can cause several symptoms such as nausea or vomiting, no appetite, leakage of blood plasma and the patient may experience hypovolemic shock. One of the factors that can affect dengue virus infection is nutritional and fluid status.

**Purpose:** To identifying clinical features of fluid status among children with suspect dengue in Indonesia

**Method:** A descriptive quantitative method and conducted at the public health center in West Java Indonesia. The sample taken by a convenience sampling method. Inclusion criteria were children aged 1-14 years old diagnosed with dengue infection and hospitalized in Pediatric Ward.

**Results:** Finding that the respondents diagnosed with dengue fever (DF) had experienced dehydration of 86.8%. and diagnosed with dengue hemorrhagic fever (DHF) had experienced dehydration of 83.3%

**Conclusion:** Most children with dengue infections have dehydrated. This condition is because of symptoms such as nausea, vomiting, lack of appetite, abdominal pain, and then following by difficulty taking oral fluid.

Keywords: Clinical features; Fluid status; Children; Suspect dengue

## INTRODUCTION

Dengue fever (DF) is common in tropical and subtropical regions, especially during the rainy season when optimal conditions for mosquitoes breed, making epidemics of extraordinary events with a short time (Center for Disease Control and Prevention, 2010). Dengue fever and dengue hemorrhagic fever can affect most Asian and Latin American countries and have become a major cause of hospitalisation and death in children and adults (World Health Organization, 2014). Dengue fever is transmitted by female mosquitoes, especially Aedes aegypti and Aedes albopictus species, which can transmit other diseases such as chikungunya, yellow fever, and zika virus (World Health Organization, 2018; Muktar, Tamerat, & Shewafera, 2016).

The incidence of dengue and dengue hemorrhagic fever in 2010 to 2018 has increased and decreased, especially in 2016 is the largest outbreak in the entire world. With an average estimated number of ± 3.5 million cases. Latin America reaches 2.38 million cases with 1032 death is ranked as the biggest outbreak. In Indonesia ranks second in dengue fever outbreaks (World Health Organization, 2018).

Based on (Ministry of Health of the Republic of Indonesia, 2017) total people infected with dengue

fever in Indonesia is 204,171 cases with the death of 1,598 people. Most groups who experienced this disease at the age of 5-14 years with a case fatality rate (CFR) reached 43.44% and aged 15-44 years reached 33.25%. It should be noted that the incidence of dengue hemorrhagic fever is reported if the first number of cases shows a doubling or more increase compared to the previous year's average. Based on previous research that eight children out of 10 in Indonesia are infected with dengue virus with ages 1-4 years 33.8%, children aged 5-9 years 64.4%, ages 10-14 years 83.1%, and age 15-18 years 89.0% (Prayitno et al., 2017)

The risk of dengue hemorrhagic fever has increased quite seriously, because it can cause death with a fairly high mortality rate, especially in conditions of extraordinary events. According to data from the West Java Health Office the number of dengue fever in 2016 in West Java province amounted to 37,418 cases with the death of 277 people with a case fatality rate (CFR) of 0.74%. The incidence of dengue fever in the district area with nine regencies in West Java shows a relatively large difference, the incidence of dengue fever in the city shows higher, caused by transportation system factors and high population mobility (The Health Authority Office of The Province of West Java, 2016 ).

Patients infected with the dengue virus experience disturbances in nutrient and fluid intake so that intake can cause excessive fluid loss (Puspita, Nugroho, & Sari, 2018). Fluid status plays an important role in the treatment of dengue infection because in children there is often a fluid imbalance caused by symptoms that arise such as having a high incidence of vomiting, abdominal pain and flushing, low platelet count and hemocrit

(Kularatne et al., 2015; Bhat, Chavan, Ojha, & Nair, 2015; Lim, Fuah, Lee, Kaniappan, & Fah, 2019).

The clinical picture in children often appears and develops into a rash compared to adults and this has a relationship with dengue infection. Rashes and red spots when experiencing dengue fever appear due to several possibilities. The first is the response of the patient's immune system when exposed to the virus (Ramos, Tomashek, Arguello, Luxemburger, Quiñones, Lang, & Muñoz-Jordan, 2009; Chen, Huang, Kuo, & Li, 2018).

Oral fluid intake of about 3,000 ml in children infected with the dengue virus can help reduce intravenous fluid administration and reduce hospitalization (Tan et al., 2018). Nurse and family support is one of the success factors in providing nutrition and fluid intake to dengue patients in order to prevent hypovolemic shock (Puspita, Nugroho, & Sari, 2018).

This infectious disease can cause several symptoms such as nausea/vomiting, no appetite, leakage of blood plasma and the patient may experience hypovolemic shock. One of the factors that can affect dengue virus infection is nutritional and fluid status.

**RESEARCH METHOD**

A descriptive quantitative method conducted at a public health center in West Java-Indonesia. The convenience sampling method with 71 children with inclusion criteria aged 1-14 years old diagnosed with dengue infections and hospitalized in the pediatric ward. Identifying clinical features while a week's hospitalization by demographic characteristics following with fluid status, and assessing of laboratory data. The ethical clearance with letter number 1213/EC/KEPK-UNYANI/VII/2019.

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## RESULTS

### Table 1. Demographic Characteristics and Clinical Features N = 71

| Variables | |
|---|---|
| Age (Mean+SD) Range (Years) | (4.7±2.54)(1-14) |
| | |
| **Gender (n/%)** | |
| Male | 37/52.1 |
| Female | 34/47.9 |
| | |
| **Fever Duration (Phase) (Days) (n/%)** | |
| Acute (1-3) | 3/4.2 |
| Critical (4-5) | 26/36.6 |
| Recovery (6-7) | 42/59.2 |
| | |
| **Signs & Symptoms (n/%)** | |
| Nausea | 15/21.1 |
| Dry mouth | 17/23.9 |
| Loss of appetite | 36/50.7 |
| Fatigue | 9/2.7 |
| | |
| **Hemorrhagic Signs (n/%)** | |
| Nose and gum bleeding | 7/9.8 |
| Petechiae | 9/12.7 |
| | |
| **Laboratory Data** | |
| Hematocrit (mean ± SD) (%) | 36.8±2.58 |
| Thrombocyte(mean ± SD) ($10^3$/μL). | 136.75±86.795 |
| | |
| **Clinical Features** | |
| **Dengue Fever (DF) (n/%)** | |
| Dehidration | 46/86.8 |
| Normal | 5/9.4 |
| Over Dehidration | 2/3.8 |
| | |
| **Dengue Hemorrhagic Fever (DHF) (n/%)** | |
| Dehidration | 15/83.3 |
| Normal | 3/16.7 |
| Over Dehidration | 0/0.0 |

The table shows 71 children with a mean age of 4.7 years old and a standard deviation of 2.54 years old with a range of 1-14 years old, 52.1% were males. The respondents diagnosed with DF have experienced dehydration 86.8% and DHF have dehydrated as much as 83.3%

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## DISCUSSION

The results showed that 71 children with a mean age of 4.7 years old were infected with the dengue. This study is similar to the previous study which states that not all children aged <5 years have low immunity so they are susceptible to disease (Permatasari, Ramaningrum, & Novitasari, 2013; Velumani, Toh, Balasingam, S., Archuleta, Leo, Gan, & Fink, 2016).

This shows that when the formation of specific antibodies against antigens is complete, the body has high immunity to fight viral infections. Immune response with specificity and immunological memory stored in dendritic cells and lymph nodes is not yet perfect, macrophage function and formation of specific antibodies against certain antigens are still lacking. So that the secretion of cytokines by macrophages due to viral infection is lacking which causes a lack of production of interferon (IFN) which functions to inhibit viral replication and prevent the spread of infection to cells that have not been affected.

Based on gender, it was found that there were more males than females, namely 37 (52.1%). That is similar with previous study and supported by the theory (Raihan, Hadinegoro, & Tumbelaka, 2016; Megariani, Mariko, Alkamar, & Putra, 2016).

Factor states that the low percentage of women with infection compared to men is because the women's immune system is better than that of men. In women, the production of anti-inflammatory cytokines is more, so that women infected with dengue give less clear clinical complaints and are rarely treated.

### Fluid Status Among Children with Dengue Infection

Fluid status is the most important thing for our body. The results show that most children with dengue infections are dehydrated. This is because of symptoms such as nausea, vomiting, lack of appetite, abdominal pain following by difficulty taking oral fluids.

## CONCLUSIONS

Fluid as basic life needs must be met for human survival and it is the most important thing for our body. This study shows that most children with dengue infections are dehydrated. Healthcare professionals need to improve the monitoring of nutritional status and fluid status daily. It is necessary to provide counseling on nutritional and fluid status, especially in children with dengue infection.

## REFERENCES

Bhat, V. G., Chavan, P., Ojha, S., & Nair, P. K. (2015). Challenges in the laboratory diagnosis and management of dengue infections. *The open microbiology journal*, *9*, 33.

Center For Disease Control and Prevention. (2010). Epidemiology Dengue Fever. Retrieved from www.cdc.gov

Chen, C. H., Huang, Y. C., Kuo, K. C., & Li, C. C. (2018). Clinical features and dynamic ordinary laboratory tests differentiating dengue fever from other febrile illnesses in children. *Journal of microbiology, immunology and infection*, *51*(5), 614-620.

Kularatne, S. A., Weerakoon, K. G., Munasinghe, R., Ralapanawa, U. K., & Pathirage, M. (2015). Trends of fluid requirement in dengue fever and dengue haemorrhagic fever: a single centre experience in Sri Lanka. *BMC research notes*, *8*(1), 130.

Lim, C. T., Fuah, K. W., Lee, S. E., Kaniappan, K., & Fah, T. R. (2019). Dengue-associated acute kidney infection: an updated and comprehensive qualitative review of literature. *Nephrology*.

Megariani, M., Mariko, R., Alkamar, A., & Putra, A. E. (2016). Uji diagnostik pemeriksaan antigen nonstruktural 1 untuk deteksi dini infeksi virus dengue pada anak. *Sari Pediatri*, *16*(2), 121-7.

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Ministry of Health Republic of Indonesia. (2017). Pedoman Pencegahan dan Pengendalian Demam Berdarah Dengeu Di Indonesia. Jakarta: Kementrian Kesehatan RI 2017.

Ministry of Health Republic of Indonesia. (2017). Profil Kesehatan Indonesia. Jakarta: Kementrian Kesehatan RI 2017. Retrieved from http://www.kemkes.go.id

Muktar, Y., Tamerat, N., & Shewafera, A. (2016). Aedes aegypti as a Vector of Flavivirus. *J Trop Dis*, *4*(223), 2.

Permatasari, D. Y., Ramaningrum, G., & Novitasari, A. (2013). Hubungan status gizi, umur, dan jenis kelamin dengan derajat infeksi dengue pada anak. *Jurnal Kedokteran Muhammadiyah*, *2*(1).

Prayitno, A., Taurel, A., Nealon, J., Satari, H. I., Karyanti, R., Sekartini, R., Hadinegoro, S. R. (2017). Dengue seroprevalence and force of primary infection in a representative population of urban dwelling Indonesian children, 1–16.

Puspita, D., Nugroho, K. P., & Sari, N. K. K. (2018). Dukungan Perawat dan keluarga dalam pemberian asupan nutrsi cairan pada pasien penderita demam berdah di rumah sakit P\paru dr. ario wirawan, salatiga. *Jurnal Kesehatan Kusuma Husada*, *9*(1).

Raihan, R., Hadinegoro, S. R. S., & Tumbelaka, A. R. (2016). Faktor prognosis terjadinya syok pada demam berdarah dengue. *Sari Pediatri*, *12*(1), 47-52.

Ramos, M. M., Tomashek, K. M., Arguello, D. F., Luxemburger, C., Quiñones, L., Lang, J., & Muñoz-Jordan, J. L. (2009). Early clinical features of dengue infection in Puerto Rico. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, *103*(9), 878-884.

Tan, V. P. K., Ngim, C. F., Lee, E. Z., Ramadas, A., Pong, L. Y., Ng, J. I., ... & Dhanoa, A. (2018). The association between obesity and dengue virus (DENV) infection in hospitalised patients. *PloS one*, *13*(7), e0200698.

The Health Authority Office of The Province of West Java (2016). Profil Kesehatan Provinsi Jawa Barat. Bandung. Retrieved from http://diskes.jabarprov.go.id

Velumani, S., Toh, Y. X., Balasingam, S., Archuleta, S., Leo, Y. S., Gan, V. C., & Fink, K. (2016). Low antibody titers 5 years after vaccination with the CYD-TDV dengue vaccine in both pre-immune and naive vaccinees. *Human vaccines & immunotherapeutics*, *12*(5), 1265-1273.

World Health Organization. (2011). Comprehensive Guidelines for Prevention and Control of Dengue and Dengue Haemorrhagic Fever. India: Office of South-East Asia.

World Health Organization. (2014). Dengue and Severe Dengue. Retrieved from http://www.who.int/mendiacentre/factsheet/fs17/en

World Health Organization. (2018). Dengue and Severe Dengue. Retrieved from http://www.who.int/mediacentre/factsheets/fs117/en/

World Mosquito Mosquito. (2014). Eliminate Dengue Project Yogyakarta. Retrieved from www.eliminatedengue.com/yogyakarta

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